



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

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OFFICE OF  
RESEARCH AND DEVELOPMENT

Dr. James H. Johnson, Jr.  
Chair, Board of Scientific Counselors  
College of Engineering, Architecture, and  
Computer Sciences  
Howard University  
2366 Sixth Street NW  
Washington, DC 20059

Dear Dr. Johnson:

The Office of Research and Development would like to take this opportunity to thank you and the rest of the members of the Board of Scientific Counselors (BOSC) Subcommittee on Ecological Research for your March 2005 review of the EPA ORD Ecological Research Program. Enclosed with this letter is our response to the comments raised in your report revised on August 16, 2005. Please feel free to contact me if further information is needed.

We are pleased that the BOSC is supportive of this important research program and the direction in which it is moving. Again, thank you for your advice to ORD.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "William H. Farland".

William H. Farland, Ph.D.  
Acting Deputy Assistant Administrator for  
Science



Office of Research and Development's (ORD) Response to the  
Board of Scientific Counselors (BOSC) August 2005 Final Report  
that Reviews ORD's Ecological Research Program

**BOSC Ecological Subcommittee:**

Dr. Michael Clegg, Chair

Dr. John Giesy

Dr. R. Eugene Turner

Dr. Jianguo Wu

Dr. Sue Thompson

Dr. Richard Lowrance

Dr. Russel Frydenborg

**Submitted:**

Dr. Kevin Summers

Acting National Program Director

Ecological Research Program

Office of Research and Development

General Comments:

1. *The ERP is of good to high quality and program leadership is very good. The Subcommittee is impressed with the substantial accomplishments of the ERP as evidenced by the variety of excellent tools, methods, and research outcomes documented in the materials provided for the review.*

No comment necessary. However, it would be very helpful to understand what the Subcommittee means by “good to high quality”. Throughout the review numerous terms are used to describe the quality of ERP research, including “the ERP to be a high-quality scientific program” (p. 2), the quality of ERP science is high and compares favorably with ecological research in academic, non-governmental, and private sectors” (p. 2), “the research in LTG 1 is evidently of high scientific quality, and reflective of the start-of-the-art in broad-scale environmental research” (p.7), “this would improve synergy between investigators and enhance the overall body of research, which is generally of excellent quality” (p. 13), and “the scientific quality of the program is very good to excellent” (p. 15). Some evaluators of the ERP might use the term “good to high” to represent mediocre or average and these evaluators need to clearly understand the Subcommittee’s intention.

2. *The integration of LTG1 with other LTGs can be further improved through designing research projects specifically from cross-level integration and by reinforcing rules set by research programs for close collaboration between EPA and outside researchers at the national, regional, and local levels. This integration can be facilitated by working with other federal agencies, such as the National Science Foundation, U.S. Department of Agriculture, National Aeronautics and Space Administration, and National Oceanic and Atmospheric Administration, to develop multiple-scale, interdisciplinary, place-based and use-inspired research programs.*

Several opportunities will be pursued to create the type of integration described above. Already, through LTG 1’s Environmental Monitoring and Assessment Program (namely, the National Coastal Assessment, Great Rivers Program, and Western Pilot) significant collaboration is occurring with federal agencies (e.g., NOAA, USGS, NASA and DOI), state resource agencies (approximately 40 states), and academia (e.g., Pennsylvania State University, University of Minnesota, University of North Carolina, University of Southern Mississippi, University of Maryland, and University of California). While these collaborations have advanced LTG 1 goals, they have not been providing a basis for cross LTG integration.

In FY06, ERP has invested in a cross-goal integration “place-based” research program addressing the ecological issues associated with the

Mississippi Basin and its discharge into the Gulf of Mexico. This program will include assessments of ecological condition (LTG 1, Great Rivers Program, state agencies, interstate agencies, and academia), evaluation of causes of observed degradation (LTG 2, all ORD Labs and Centers and various Federal Agencies), forecasting the impact of environmental programs, policies, and potential remediation (LTG 2, multiple ORD Labs and Centers, several Federal agencies and academia), and assessment of the ecological services provided by the Mississippi River and necessary remediation (LTG 3, several ORD Labs and centers, Federal agencies, and academia). This FY06 “new” investment totals \$2.9M in addition to existing FTE and dollars in the Great Rivers Program (LTG 1). The research program will be initiated in FY06 with a planning effort to evaluate the best approaches for interaction of LTG 2 and 3 research projects with ongoing LTG 1 activities, a “new” NCER Request for Assistance developing a Mississippi Basin Ecological Services Grants/ Cooperative Program, and a focus on collaboration with EPA Program Offices (OW, OAR, and OPPTS), EPA Regions 3, 4, 5, 6, 7 and 8, and federal agencies (USGS, DOI, DOA, NOAA, and NASA). With present research commitments being completed in 2008-2009, increased investment of existing FTEs and resources from all ORD Labs and Centers within the Ecological Research Program will occur at that time, peaking in 2009-2011.

3. *Although the overall quality of research under LTG 1 is excellent, high transparency in research design, implementation, and evaluation and close collaborations with external scientists must be maintained to assure that this high quality research will persist.*

As elements of LTG 1 research mature and are transferred to operational phases in the Office of Water, ORD will continue to work with ORD, state resource agencies and academia to ensure continued excellence in the national streams and estuaries programs. At the same time, the ERP will invest in developing similar high quality research programs in other resource areas (e.g., Great Rivers, wetlands and lakes) utilizing internal ORD resources (FTEs and \$\$\$) and collaborating with other Federal Agencies and academia. However, extramural resources continue to erode from LTG 1 as a result of the budget process, approximately \$5M were cut from LTG 1 research activities in FY06 and additional reductions are possible for FY07. These reductions continue to occur despite the high quality of the LTG 1 research program and its success in the PART process. Until these budgetary reductions cease, it will be very difficult to guarantee continued strong collaborations with academia (except for those not requiring extramural investment). Finally, LTG 1 research design activities are striving for high transparency through the development of the EMAP Design Team and the EMAP Design Web Site. In FY05, this website was examined by users over 30,000 times.

- 4. Research for all three LTGs would be improved by collaborations with international scientific communities. This is important because many environmental problems are either physically connected or ecologically similar worldwide and because such scholarly exchange among countries will help improve the global environment in which we are embedded.*

In general, no comment is necessary and ORD agrees. In 2005-2006, researchers associated with LTG 1 have been, and are, involved with three international collaborations to develop condition indicators and coastal monitoring programs for the Baltic Sea (collaborators from government and universities in Russia, Estonia, Latvia, Lithuania, Poland, Germany, Denmark, Sweden and Finland), the Gulf of Mexico (Mexico and Cuba), and the Yellow Sea (China, South Korea and North Korea). In the coming years, ERP will strive to improvement international collaboration for LTG 2 and the development of LTG 3. However, this enhancement must be tempered by the availability of travel funds to support such collaboration.

- 5. Clear and substantial progress toward LTG 2 was demonstrated in much of the mature research, although this could not be readily evaluated for research at earlier stages of development. Stakeholder input to identify research gaps does occur, but the process to brief decision-makers of results and accept feedback currently is informal or often lacking. The effectiveness of this aspect of the program could be improved by establishing timely and regular communications with a broad array of stakeholders using an established procedure.*

In general, no comment is necessary and ORD agrees. In 2006, ERP will develop a broadened procedure for communication with its wide array of stakeholders. At present, such communication is being formalized with Program Offices and Regions through an ERP Multi-Year Plan Discussion Group which assesses research gaps (from an Agency perspective) through Tiger Teams. Five of these teams were developed in 2005 to assess the need for research and types of research needed (gaps) for Ecological Accountability (determining a measure of the success of Agency ecological policies), Ecological Tools (primarily models and methods to determine population and community-level impacts), Ecological Forensics (determining causation at multiple spatial and temporal scales), Ecological Services (development of a LTG 3 Research Program), and Mississippi Basin/Gulf of Mexico (a broadly place-based research program examining the application and further development of all aspects of LTGs 1, 2 and 3).

In 2006, ERP will look to further develop its ability to brief decision-makers regarding the results of the research efforts and provide an established timely and regular mechanism for feedback from a variety of ERP stakeholders.

6. *LTG 3 is a newly reorganized program element, and there is an opportunity to develop an explicit research plan. The Subcommittee suggests that the plan include specific programs and projects with specific deliverables and timelines such that, in the future, progress can be tracked and the quality, efficiency, and impact of the program elements can be evaluated. Furthermore, the BOSC should review the MYP when it is developed.*

In FY06 ORD/ERP is investing \$2.0M and numerous FTEs in the development of a LTG 3 research plan and the initiation of LTG 3 research. As described above, an Ecological Services Tiger Team was established to develop a research prospectus drawing input and feedback from Program Offices, Regions, and all five ORD Labs/Centers. This “new” investment will include a \$1.5M grants/cooperative agreements solicitation that will be released in late FY06 or early FY07. ERP is focusing its efforts on, not only the development of LTG 3, but the infusion of LTG 3 concepts (ecological services) in many of its LTG1 and LTG 2 research efforts. ERP expects that the detailed outlook of its LTG 3 research program will be completed with its revision of the ERP Multi-Year Plan in 2006 and that the details for the ERP Ecological Services Research Plan will be completed by calendar year 2006.

All ORD Multi-Year Plans (including ERP) are reviewed by an established protocol – first internal review by the ORD Science Council and then external review by the Science Advisory Board (SAB). The potential for review of the ERP MYP by the BOSC will be discussed with ORD Senior Management and the Chair of the BOSC.

7. *LTG 3 requires better integration with, and articulation of, outcomes at the local levels. This is essential to achieve EPA’s mandate, but the Agency must be aware of the dangers of asking a good research organization to take on responsibilities that it is not structured to accomplish. Responsibilities for communication and dissemination of results certainly rest with the ERP, but other elements of EPA also have responsibilities for client and stakeholder communication. It is important to recognize that ORD has a primary research mission. There is a danger in assigning other priorities to ORD because the research mission may be compromised. The time and talents of ORD’s research scientists need to be focused on the research mission. At the same time, careful tracking of outcomes is essential to assure that the research conducted by the ERP is appropriate and that it addresses customer priorities.*

In general, no comment is necessary and ORD agrees. Senior Leadership in ERP and ORD are discussing approaches for tracking outcomes and promoting client and stakeholder communication. The ERP will continue a close relationship with EPA Program Offices, particularly the Office of

Water and Office of Air and Radiation, and will transfer mature programs to these offices, as in the case of the transfer of “Coastal EMAP” and “National Wadeable Streams” to the Office of Water. The parties involved include the Ecology National Program Directors, the Associate Directors of Ecology from the five ORD Labs/Centers, the Communications Office in ORD, and senior ORD Headquarters personnel. As a start, potential tools for tracking outcomes and promoting communications include annual client surveys, Program Office ERP Results Communication Workshops, and electronic and hard-copy communications newsletters. By the end of 2006, an established procedure will be in place for the communication of research results and the fostering of client/stakeholder communications. Leadership in ERP shares the BOSC Subcommittee’s concern that its research scientists cannot be “saddled” with this responsibility. However, all elements of the ERP (managers, communications staff and researchers) realize that refocusing ERP’s portfolio to outcome-oriented research and the communication of that research is of paramount importance within the existing PART and GPRA processes.

8. *Currently, there is no plan for an extramural component to LTG 3. The Subcommittee members believe that, historically, partnering with other federal, state, and tribal agencies; academic institutions; and NGOs has been very successful. This has increased the productivity of the program by leveraging the resources and creativity of these partners. The Subcommittee understands that difficult decisions need to be made relative to resource allocations, but suggests that the elimination of extramural programs will result in disproportionately less productivity and creativity. The Subcommittee recommends that some form of extramural cooperation be re-established to leverage resources and continue to provide flexibility in the research program.*

ORD agrees with the Subcommittee’s finding and is working to establish a small, but vital, grants/cooperatives program within LTG 3. At the same time, the Subcommittee must realize that ERP has had its extramural resources reduced (or planned for reduction) by \$5-15M in each of the budget years, 2004 through 2007. It is very difficult to initiate “new” extramural programs. The \$1.5M investment in an extramural grants/cooperatives program for Ecological Services through the STAR Program is a needed start and represents a diversion of funds from other extramural needs in LTGs 1 and 2.

9. *More rigorous program-wide mechanisms should be in place to maximize collaborations between EPA researchers and external scientists. This assures that the ERP research is of the highest scientific quality and of utmost relevance to EPA’s mission. Close collaborations between EPA researchers and external scientists are vital. Mechanisms for forging and maintaining such collaborations need to be in place to assure intellectual vitality and openness to new ideas. For*

*example, open grant competitions, such as STAR, should be slightly modified with an explicit requirement for collaboration with EPA researchers. Such collaborations make the best use of intellectual and logistic resources within and outside EPA; facilitate high-quality scientific output that is intimately tied with the goals of the ERP; and promote scholarly exchanges and information sharing that enhance EPA's research capacities. For the ERP to be most productive and relevant, it is crucial to create a research environment in which the ERP's own researchers can feel excited about, and rewarded by, external collaborations rather than feeling pressured for competing resources with outsiders.*

While ORD largely agrees with the Subcommittee's observation, it must be made clear that ERP's own researchers do not "compete" with external researchers for resources. As in any organization, a certain level of resources is needed to maintain the research personnel and structure within the organization. This level of resources is "put aside" to provide this maintenance and the remaining extramural resources are evaluated against all of the research needs within ERP and ORD. These research needs might include contractual assistance to ERP researchers, cooperative agreements between ERP researchers and external researchers, or STAR initiated grants or cooperatives.

While ERP had no "new" investment in STAR initiated grants/cooperatives in FY05, it does have several STAR grants/cooperatives in place through 2008 representing a substantial investment of extramural resources. In addition, ERP (through NCER) will initiate "new" STAR grants/cooperatives RFA in FY06 associated with the Ecological Services Research Program (LTG 3). LTG 1 and LTG 2 have numerous grants and cooperatives programs still in place including cooperatives with resource agencies in approximately 40 states. These assistance agreements will continue to plan "all-investigator meetings" and inhouse staff will be encouraged to attend and share information.

10. *EPA and ORD must increase involvement of stakeholders (especially external stakeholders) in setting research priorities and targeting research efforts (adaptive research management).*

As stated above, in 2006, ERP will develop a broadened procedure for communication with its wide array of stakeholders. At present, such communication is being formalized with Program Offices and Regions through an ERP Multi-Year Plan Discussion Group which assesses research gaps (from an Agency perspective) through Tiger Teams. Five of these teams were developed in 2005 to assess the need for research and types of research needed (gaps) for Ecological Accountability (determining a measure of the success of Agency ecological policies), Ecological Tools (primarily models and methods to determine population and community-level impacts), Ecological Forensics (determining



causation at multiple spatial and temporal scales), Ecological Services (development of a LTG 3 Research Program), and Mississippi Basin/Gulf of Mexico (a broadly place-based research program examining the application and further development of all aspects of LTGs 1, 2 and 3).

In 2006, ERP will look to further develop its ability to brief decision-makers regarding the results of the research efforts and provide an established timely and regular mechanism for feedback from a variety of ERP stakeholders, targeting external as well as internal stakeholders.

*11. Effective communication is vital and must be viewed as an essential step in turning research results into outcomes. Moreover, those charged with administering the organization must receive timely and appropriate measures of research effectiveness.*

- Clearly articulate specific outcomes of research projects, including linked performance indicators.
- Institute a formal process for sharing and disseminating research results to stakeholders.

As described above, ERP and ORD are developing a variety of mechanisms for the effective communication of research results including program office-level workshops to present research results, internal planning and progress committees to communicate progress, electronic and hard-copy research newsletters, and the development of more cooperative/interactive research programs. The leadership within ERP will develop a formal process for sharing and disseminating research results with stakeholders in 2006.

*12. Critical scientific peer review is the standard measure of quality in judging among potential research investments and this standard has served our nation very well. The ERP utilizes peer review in judging many, but not all, aspects of its research portfolio. There is room for improvement in the application of peer review to potential projects within the organization. At the same time, EPA should be generally complimented on its dedicated efforts to implement peer review across the organization.*

ERP presently uses peer review for all of its major programs (EMAP, ReVA, CADDIS, RePLUS, STAR grants/cooperatives) and all of its research products (manuscripts and reports). ERP will explore the extension of the use of peer review in other aspects of its research portfolio. ERP and ORD leadership would be interested in any specific instances of research activities the Subcommittee believed would benefit by additional peer review. If the reference in this finding was to the development of new programs, then ERP and ORD commit to utilizing the

peer review process in the development of new research plans. As an additional element of the peer review process, the ERP will use bibliometric analyses to track community citations to its publications.

*13. The ultimate concern of EPA is to measure and improve the health of the nation's environment, yet some things are missing from what might be viewed as a well-balanced research portfolio.*

- The ERP program is heavily oriented towards aquatic ecosystems and EPA's mission of conserving the nation's water resources justifies this focus. Moreover, many terrestrial issues are indirectly addressed through the aquatic program. Nevertheless, a balanced research portfolio also requires attention to impacts on terrestrial ecosystems, especially relative to clean water and nonpoint source pollution. It is important to better integrate ERP research with assessments of terrestrial ecosystems done by other entities, especially other federal agencies.

The ERP is broadly oriented to aquatic ecosystems at present. This has not always been the case and ERP has conducted extensive terrestrial research examining the impacts of ozone and air toxics on flora, the role of nutrient cycling in forest ecosystems, the linkages of riparian systems and adjoining aquatic ecosystems, and landscape ecology. Completion of many of these research programs and funding reductions in the 1990s resulted in a heavier focus on aquatic ecosystems. ERP does support significant air research targeting the effectiveness of air pollution programs and policies as well as pesticide/toxics research targeted at agricultural ecosystems and bordering terrestrial/aquatic systems. Presently, much of ERP's research efforts regarding terrestrial ecosystems focus on landscape interactions indirectly as described above. ERP will examine approaches to better integrate its research with the terrestrial research efforts performed by other federal and non-federal agencies.

- Improving the health of the environment clearly requires a better understanding of human motivations and behavior. Some projects such as MAIA involve a social science component, yet this dimension of science is largely absent from the ERP portfolio. It may be that these responsibilities lie elsewhere in ORD and Subcommittee's review failed to see the full picture. Nevertheless, we urge the ERP to be mindful of a full spectrum of research required to meet the goals of EPA.

The use of social sciences is a cornerstone of ORD's Sustainability Research Program (a research effort outside ERP). However, ERP will address social science needs within its developing LTG 3 research program (Ecological Services) and avail itself of ORD researchers in several of its Labs/Centers (primarily NRMRL) and STAR grants/cooperatives to fill this needs. At the same time, ERP is cognizant

of its primary mission (conducting research to protect and enhance the environment) and will avoid “mission creep” by examining only those social sciences needs required to address our Ecological Services and Restoration Research Efforts. In addition, EPA has recently completed an “Ecological Benefit Assessment Strategic Plan”, which identifies high priority ecological economics research needs, and the “Environmental Economics Research Strategy”. A joint effort between ORD and EPA’s National Center for Environmental Economics, identified valuation of ecological benefits as a critical research need across program offices. These strategies will result in increased emphasis on valuation in EPA’s economics programs and a closer link between ecology and economics is already emerging in LTG 3 planning.

*14. More could be done to improve the tracking of outcomes. Specifically EPA, ORD, and the ERP need to work harder to foster better communication among EPA offices, with the other elements of the Executive Branch of government, and with external stakeholders. The Subcommittee urges that more be done to integrate new research paradigms into an “outcomes-based mentality” and that these efforts include specific provisions for tracking on-the-ground outcomes. Somewhere in EPA, but not necessarily within ORD, there needs to be a focus on better integration of scientific results into stakeholder education and decision-making.*

ERP and ORD agree with the Subcommittee’s finding. Much has already been provided above regarding this issue. Regardless, it is paramount that all aspects of ERP research efforts (existing and developing research, ERP managers and researchers) embrace an “outcome-based mentality” and strive to communicate research results and track “on-the-ground outcomes.”

*15. The recent budget reductions have been difficult for the ERP, and the decision to take these reductions in extramural programs is understandable when viewed from the perspective of salvaging an effective research organization. This may appear to be a reasonable short-term response to weathering a storm, but it is dangerous. EPA and ORD should take a broader view and consider how to achieve maximum results in a new permanent budgetary environment. Clearly, abandoning extramural research grants is not a cost-effective strategy in this circumstance. Competitive research grants, as embodied in STAR and other programs, leverage considerable resources as well as bring new thinking and approaches into the organization. They also connect the organization to one component of the external customer base. The lost leveraging capability, reduced connection to other sources of innovation, and weakening of communication channels, over the long-term, will disproportionately diminish the cost-effectiveness of EPA’s research.*

ERP has had its extramural budget reduced significantly (about \$30M) in FY05 and FY06 with projected further reductions (about \$5M) in FY07. Even within this period of extensive reductions, ERP has maintained several STAR grants/cooperatives programs, numerous state-based resource agency cooperatives, and initiated in FY06 a “new” STAR grants/cooperatives Ecological Services Research RFA. ERF and ORD realize that additional research funding through the STAR program would be advantageous and we are doing everything possible to re-develop and sustain viable ERP grants/cooperatives research programs. While “abandoning extramural research grants is not a cost-effective strategy” for the long-term, neither is abandoning ERP’s internal research structure and the support of its researchers. ERP leadership is examining approaches that will promote leveraging of EPA and non-EPA funds to optimize the mix of ERP intramural and extramural research activities.

**Ecological Research Program  
Summary of BOSC Comments From August 2005 Final Report and Proposed ORD  
Actions**

Recommendation	Action Items	Timeline
<p><b>RELEVANCE:</b> Charge Question 1: Is the focus of the Program relevant to and consistent with EPA’s strategic goals? Does it develop a scientific foundation what will lead to attainment of the Program’s stated environmental outcomes? Are potential public benefits of the program clearly articulated? What would be the minimum research program that would be effective and successful?</p> <p>Charge Question 4e: Does the research reflect the current state-of-the-science, and meet the current and future needs of EPA, science, and the ERP’s customers?</p>		
<p><i>Question 1: The focus of the ERP is entirely relevant and consistent with EPA’s strategic goals. (p.6) Results of ERP research are relevant and of direct use to states and tribes in protecting and restoring ecological resources. (p.7) LTG 3 is a highly relevant activity that is central to EPA’s mandate of improving environmental quality and protecting and restoring the health of the nation’s ecosystems. ORD and particularly the ERP are uniquely suited and positioned to address these issues. (p. 8)</i></p> <p><i>This developing scientific foundation is appropriate for achieving the ERP’s expected environmental outcomes. (p. 7) The projects presented during the site visit demonstrate an excellent balance between development of new information and conceptualizing new analytical methods for the future, while providing clients with tools for addressing current issues. (p.8)</i></p> <p><i>The potential benefits to the public of the ERP’s research are evident and clearly articulated [for LTG 1]. (p. 7) Although there are numerous</i></p>	<p>ERP will continue to develop relevant research projects that are consistent with EPA’s strategic goal structure and address PART requirements.</p> <p>ERP will continue to strive to maintain a strong scientific foundation for its research activities.</p> <p>ERP will strive to make the public benefits of its research activities evident and clearly articulated throughout the</p>	<p>Ongoing</p> <p>Ongoing</p> <p>Ongoing with tracking system developed by December,</p>

Recommendation	Action Items	Timeline
<p><i>potential public benefits of the ERP's research, these benefits are not always clearly articulated even at the program level [for LTG 2], and are rarely explicitly included as a goal in individual research projects. (p. 8) Although examples were given in the onsite presentations of states routinely and effectively applying ERP-derived tools, no formalized tracking system that quantifies the extent of this application was evident and no specific uses by tribal entities were highlighted. (p. 8) In some cases, projects at an earlier stage of development have not yet manifested public benefits, but potential benefits are articulated. (p. 9)</i></p> <p><i>It is difficult to define the minimum research program for protecting the environment. All of the ERP's present research projects seem necessary to understand and deal with the nation's different environmental issues across different scales. Removing any part of the program would certainly not enhance the functionality and outputs/outcomes of the ERP. (p. 7) Conversely, the important outcomes of LTG 3 will not be realized unless the decision support systems and analytical techniques to project and communicate alternative future development scenarios are available and applied. Thus the entire research and technology development program is necessary. (pp. 9-10)</i></p>	<p>program. In addition, ERP will develop a tracking system to document the use of ERP-derived tools and methodologies by states and tribes. While no specific examples of tribal use of ERP-derived tools were presented during the review, several tribes including training sessions using EMAP methods (resulting in a monitoring application in Neah and Makah Bays, WA) and the development of a NCER cooperative training program through the University of Northern Arizona.</p> <p>As is evident from ERP funding in FY05 and FY06, significant extramural resources have been removed from the program. This has been partly the result of poor performances by ERP in the PART process. ERP will focus its efforts to secure a good PART result and begin to rebuild its reduced extramural resources as is possible. IN FY06, ERP received an additional \$2.9M in Congressional funding and targeted it largely at LTG 3 development and the development of an integrated pace-based effort across all three LTGs. In FY07, further directed budget reductions are possible and, through the</p>	<p>2006</p> <p>Completed in 2006 and Ongoing</p>

Recommendation	Action Items	Timeline
<p><i>Question 4e:</i>  <i>The research of LTG 1 is evidently of high scientific quality, and reflective of the state of the art in broad-scale environmental research, particularly in developing statistical design and sampling strategies fro measuring and monitoring ecosystem conditions. (p. 7)</i></p> <p><i>The ERP has developed a suite of such indicators [landscape] in recent years, and this research represents cutting-edge science. Empirical testing of these indices as well as additional core research in this extremely important area, however, are (sic) clearly needed. (p. 7)</i></p>	<p>coming years, ERP will work to limit resource reductions and to enhance extramural resources through “new” research initiatives focused at the three LTGs.</p> <p>ERP will continue to strive to achieve excellent quality in its research programs.</p> <p>ERP is continuing its empirical testing and further development of these indicators through EMAP with available resources.</p>	<p>Ongoing</p> <p>Ongoing</p>
<p><b>SCIENTIFIC AND COMPETITIVE QUALITY:</b>  Charge Question 2: Does the ERP have a logical and comprehensive design with clear goals, priorities, and schedules to track progress toward these goals?</p> <p>Charge Question 3: Do the design and implementation of the ERP’s structure facilitate attainment of outcomes through integration of research across the ERP?</p> <p>Charge Question 4a: Do the research results address the key research questions?</p> <p>Charge Question 4b: Is the rationale to address the questions clearly articulated?</p> <p>Charge Questions 4c: Does the ERP follow a long-term plan to address the logical sequence of the questions?</p> <p>Charge Question 4d: Is Progress to address the questions being made in a timely fashion?</p> <p>Charge Question 5: What is the scientific quality of the ERP’s research products? Does the ERP ensure high quality research through competitive, merit-based funding? If funds are not competitively awarded, what process does the ERP use to allocate funds? Does this ensure that quality is maintained?</p>		

Recommendation	Action Items	Timeline
Charge Question 6: Will the ERP's completed and planned outputs lead to the intended outcomes that are protective of our ecological resources?		
<p><i>Question 2:</i>  <i>The priorities of LTG 1 activities are clearly placed at the national level, which is appropriate because LTG 2 and LTG 3 deal mainly with the state and local levels, respectively. In other words, each goal has its own focal level of organization and corresponding spatial scale, and this scheme is, in principle, both scientifically sound and practically feasible. LTG 1 is particularly important because it provides an overall conceptual framework and technical guidelines for the other LTGs. (p. 11)</i></p> <p><i>To ensure both high scientific quality and relevance to EPA's mission, LTG 1 projects should encourage close collaborations between EPA's own researchers and external high-caliber scientists who have broad visions and pertinent knowledge and skills. (p. 11)</i></p> <p><i>In addition, although the design principles in LTG 1 are sound, improved planning and better-coordinated cross-level integration are needed. (pp. 11-12)</i></p>	<p>No action necessary. ERP will continue to focus its research efforts in this manner.</p> <p>To the extent possible, collaboration between LTG 1 scientists and high-caliber external scientists is encouraged. Several STAR cooperative agreements are in place for further indicator development and testing. However, ERP budget reductions have resulted in no "new" agreements of this type being targeted for FY06 and beyond. ERP will examine other manners of collaboration for LTG 1 scientists that do not require significant extramural resources.</p> <p>In 2005, ERP developed an ongoing interaction among the ORD Labs/Centers to promote better planning and integration. Also in 2005, ERP developed</p>	<p>Ongoing</p> <p>Ongoing</p> <p>Completed in 2005 and Ongoing</p>



Recommendation	Action Items	Timeline
<p><i>Also, more systematic plans and mechanisms for increased tracking of the outputs and outcomes of research projects must be developed as part of the research cycle. (p.12)</i></p> <p><i>Question 3: The new structure of the ERP with three LTGs seems scientifically sound and practically feasible. (p.12)</i></p> <p><i>[Because each LTG is focused at a different scale] This suggests that in order to achieve desirable outcomes, each LTG must emphasize interactions and collaborations with relevant agencies and stakeholder groups at its focal level. (p. 12)</i></p> <p><i>Products of LTG1 should influence and have influenced activities of LTG 2, which in turn have bearings on LTG 3. The same is true the other way around. To date, the ERP has demonstrated such two-way interactions to some extent with some excellent examples. (p.12)</i></p>	<p>the Ecological Research MYP Discussion Group to further enhance integrate and research planning. This group includes members from all ORD Labs/Centers, relevant Program Offices and Regional Offices. In addition, a “new” research area is being developed specifically focused on cross-integration of the LTGs.</p> <p>In 2006, ERP will develop and establish a systematic procedure for tracking outputs and outcome of research projects.</p> <p>No action necessary.</p> <p>In 2006, senior leadership within ERP, will determine agencies and stakeholder groups that will be targeted for increasing interactions and collaborations.</p> <p>ERP will continue to promote these types of influences and interactions. The development of cross Lab/Center discussion groups and regular meetings of the Associate Directors for Ecology from the Labs/Centers with the Ecology NPD are all working to develop a stronger cross-ORD character to the ERP</p>	<p>December, 2006</p> <p>Ongoing</p> <p>September, 2006</p> <p>Ongoing</p>

Recommendation	Action Items	Timeline
<p><i>The ERP has a logical and comprehensive design, which is adequate for ORD's planning process and for demonstrating progress toward its overall goals. (p. 12)</i></p> <p><i>Questions 4a/b: The results of LTG 1 are quite relevant to its key research questions. (p.12)</i></p> <p><i>Question 4c: The three LTGs are well designed and follow a multiple-scale, hierarchical framework that facilitates addressing environmental issues at the national, state, and local levels. LTGs are well articulated and not only relevant, but also crucial, to the overall mission of EPA. The realization of these LTGs requires continuation of high-quality research conducted by EPA researchers and outside scientists collaboratively as well as secure long-term funding (p. 12)</i></p> <p><i>Question 4d: Research under LTG 1 has made tremendous progress in terms of both research output and environmental outcomes. (p.12)</i></p> <p><i>Question: 5 and 8 Although the implementation of the ERP's structure has demonstrated the capability to achieve</i></p>	<p>Research program.</p> <p>No action necessary.</p> <p>No action necessary.</p> <p>No action necessary.</p> <p>No action necessary.</p> <p>The establishment of regular ADE/NPD meetings, the Ecology MYP Discussion</p>	<p>Ongoing</p> <p>Ongoing</p> <p>Ongoing</p> <p>Ongoing</p> <p>2005 and Ongoing</p>

Recommendation	Action Items	Timeline
<p><i>environmental outcomes, the formal integration between individual research components should be better. Cooperation exists among many projects, but the need for integration between some projects, although implicit, should be better articulated by ORD management. This would improve synergy between investigators and enhance the overall body of research, which is generally of excellent quality. (p. 13)</i></p> <p><i>Based on the quality of research, substantial advances toward achieving LTG 2 are apparent. ... A key to the success of all LTG 2 research efforts will be educating state and local decision-makers on the benefits of the tools, as well as training appropriate end users. (p.14)</i></p> <p><i>The research questions are clearly formulated to address factors most responsible for degrading our environment. The rationale behind the research is scientifically sound and appropriate ... The research is structured in a logical sequence to allow results from projects to build on others, although the formal integration of individual projects should be better articulated and incorporated into the strategic planning process. (p. 14)</i></p> <p><i>The overall body of research generated by the ERP, in terms of quality and ability to produce beneficial environmental outcomes, is superior. (p. 14)</i></p>	<p>Group and the development of a “new” cross-LTG research project beginning in 2006-2007 is helping to foster cooperation across LTGs. ORD management will focus efforts on articulating these research integration opportunities.</p> <p>In 2006-2007, ERP and LTG 2 leadership will examine appropriate venues and opportunities for technical transfer and education at the state and local decision-makers levels.</p> <p>ERP will better establish and articulate this integration and incorporate it into the revised MYP.</p> <p>No action necessary.</p>	<p>July 2006 – Assessment</p> <p>July 2007- Establish</p> <p>2006</p> <p>Ongoing</p>

Recommendation	Action Items	Timeline
<p><i>ORD's Science To Achieve Results (STAR) grants program is an excellent example of the successful implementation of a competitive funding process, which when coupled with the ERP's guidance and understanding of complex environmental issues, can lead to research results that are directly applicable to environmental problems at the state and tribal level. (p. 14)</i></p>	<p>ERP agrees. Unfortunately, budget reductions in 2005 resulted in the elimination of the STAR grants program in ERP. In 2006, ERP began to reconstruct its STAR program with a \$1.5M investment in a grants program in LTG 3. An RFA is expected in late 2006.</p>	<p>2006</p>
<p><i>When funds are not competitively awarded, the ERP appears to use a "best professional judgment" approach to allocate funds, coupled with a post-award assessment of the project's success. Based on the successful results associated with these projects, quality appears to have been maintained, although a more formal evaluation is warranted. (p. 14)</i></p>	<p>Almost all non-competitive awards in ERP have been cooperative agreement to state resource agencies. These awards have been directed and intentional in order to further integrate LTG 1 activities with its clients and customers.</p>	<p>Ongoing</p>
<p><i>Although the initiatives included as elements of LTG 3 are very ambitious, the goals are clearly stated and achievable. Because LTG 3 has not been the subject of an MYP, the specifics of schedules are difficult to evaluate. The three component questions around which the future activities will be developed are clear and should lead to measurable outcomes. (p. 14)</i></p>	<p>The specifics of LTG 3 will be addressed in the revision of the Ecological Research MYP.</p>	<p>2006</p>
<p><i>The research currently being conducted and that which is proposed under LTG 3 represents state-of-the-science in assessing complex systems and developing</i></p>	<p>No action necessary.</p>	<p>Ongoing</p>

Recommendation	Action Items	Timeline
<p><i>tools to understand and enhance ecosystem services. The scientific quality of the program is very good to excellent. (p.15)</i></p>		
<p><b>PERFORMANCE:</b>            Charge Question 2: Does the ERP have a logical and comprehensive design with clear goals, priorities, and schedules to track progress toward these goals?             Charge Question 3: Do the design and implementation of the ERP’s structure facilitate attainment of outcomes through integration of research across the ERP?             Charge Question 4d: Is Progress to address the questions being made in a timely fashion?            Charge Question 6b: Does the ERP have a process for using the results of the research, along with stakeholders’ feedback, to identify key research gaps and to update the ERP’s research agenda?             Charge Question 7: Are the results of ERP research being used by clients and stakeholders? Are these research results consistent with the needs articulated by EPA’s program and regional offices?             Charge Question 8: Will the ERP’s completed and planned outputs lead to the intended outcomes that are protective of our ecological resources?</p>		
<p><i>Question 2: Goals of each [LTG} component are clearly defined. (p. 16) Performance measures of the ERP’s planning process and measures for demonstrating progress toward overall program goals do not appear to be strictly established, although they can be extracted from the body of research. (p.17)</i></p> <p><i>Question 3: LTG 1 program maturation has been accompanied by standardization of the conceptual approaches and the experienced solicitation and involvement of stakeholders. These positive developments have drawn strong support from a core group of statisticians and geographic</i></p>	<p>Actions in the 2005 PART process have resulted in the development of programmatic measures of progress for all LTGs. Performance measures will be incorporated in the revision of the Ecological Research MYP,</p> <p>In 2006-2007, ERP will develop and establish a formal process for tracking progress in the LTG. This process will build from the existing GPRA process which tracks the development, execution, and delivery of products. The additions to the process will</p>	<p>2005 and 2006</p> <p>2006 – Process</p> <p>2007- Implementation</p>

Recommendation	Action Items	Timeline
<p><i>information system (GIS) experts (among others) within the ERP that has an institutional memory, experience, and professional skill that are nationally significant. (p.16) There is a need to develop a formal performance evaluation that assesses the degree of integration between various research projects to help improve cooperation between individual research investigators. (p.17) It is not clear how progress is tracked, but it is assumed that this is the primary responsibility of program managers and lead scientists on the projects. Very good progress in this area has occurred during the past 5 years and it is expected that this progress will continue in the future with adequate funding and scientific resources (p.18)</i></p> <p><i>Question 4d: Progress to address the research questions is being made in a timely fashion, but articulation of those goals and the planning involved in the processes leading to these goals need to more clearly permeate the science culture. (p. 16) Each research component should issue a periodic report that more clearly details the incremental progress made toward expected outcomes. This would allow an adaptive management strategy to keep projects “on track” and internally integrated. (p.17)</i></p> <p><i>Question 6b: The Subcommittee believes that more effective processes and</i></p>	<p>focus on the research period between inception and delivery of a product and track specific elements of progress.</p> <p>ERP leadership will examine the need for the establishment of research progress reports to assist in tracking and adaptive management.</p> <p>ERP and LTG leaders will examine varying options for</p>	<p>2006</p> <p>2006 – Options 2007-2008 -</p>

Recommendation	Action Items	Timeline
<p><i>formal mechanisms are needed that allow better communications between the ERP and its clients. (p.17) Stakeholder input to identify research gaps does occur, but the process of briefing decision-makers on research results as well as on applicability of the research currently is informal or often lacking. The effectiveness of this aspect of the program could be improved by establishing timely and regular communications with a broad array of stakeholders using an established procedure (p.17) To identify key research gaps and to update the projects, the Subcommittee suggests reviews of individual projects by external scientists and stakeholders. (p.18)</i></p> <p><i>Question 7: The stakeholders and clients are using the results in a variety of ways, some of which are obvious and others that are not so obvious. (p.17) The ultimate use of the products is dependent upon factors beyond the control of the EERPO, but the above [established] process [for communication of results] would improve the utilization of pertinent results. (p.17) The results, products, and tools generated by LTG 3 are being used by clients. (p.18)</i></p> <p><i>Question 8: In the opinion of the Subcommittee, the ERP has resulted in the desired outcomes, and its present activities</i></p>	<p>increasing communications between ORD and its clients. These options will be determined in 2006 and implemented, to the extent practical, in 2007-2008.</p> <p>In 2005, ERP began to formally engage its Agency clients in the identification of research needs and gaps. In 2006, ERP leadership will evaluate the appropriateness of expanding this involvement to stakeholders outside the Agency.</p> <p>ERP will continue to use external peer review to evaluate its proposed research activities as well as its research results.</p> <p>No action necessary.</p> <p>No action necessary.</p>	<p>Implementation</p> <p>2005 – Agency 2006 – Determine need for outside stakeholder involvement</p> <p>Ongoing</p> <p>Ongoing</p> <p>Ongoing.</p>

Recommendation	Action Items	Timeline
<p><i>and future (planned) outputs are consistent with the conclusions that protection of the nation's ecological resources is enhanced. (p.17) The results of the ERP are thoroughly consistent with the expresses needs of EPA program and regional offices. (p.18) The research program will lead to intended outcomes if the research products and tools are applied by the regions, states, tribes, and local governments. ... This will require commitment of resources to technology transfer through both in-person and online training. (p.18)</i></p>		
<p><b>LEADERSHIP:</b>            Charge Question 4e: Does the research reflect the current state-of-the-science, and meet the current and future needs of EPA, science, and the ERP's customers?             Charge Question 6a: Does the ERP effectively engage stakeholders in its planning?             Charge Question 6b: Does the ERP have a process for using the results of its research, along with stakeholders' feedback, to identify key research gaps to update the ERP's research agenda?             Charge Question 6c: Are potential public benefits clearly articulated?             Charge Question 6d: What are the impediments, if any, to collaboration with other organizations?             Charge Question 7: Are the ERP's research results being used by clients and stakeholders? Are these research results consistent with the needs articulated by EPA's program and regional offices?</p>		
<p><i>Question 4e:            The research of LTG 1 is evidently of high scientific quality and reflective of the state-of-the-art in broad-scale environmental research, particularly in developing statistical design and sampling strategies for measuring</i></p>	<p>No action necessary.</p>	<p>Ongoing.</p>



Recommendation	Action Items	Timeline
<p><i>and monitoring ecosystem conditions. (p.19) The ERP scientists and collaborators frequently are leaders in their respective scientific fields and ORD has clearly supported outstanding research in many areas of ecosystem science. (p. 20) ORD scientists and collaborators working on LTG 3 are among the leaders in this research in the United States. No other federal research agency has an extensive or advanced program in transferring tools to assess the provision of ecosystem services. (p. 21)</i></p> <p><i>Question 6a:</i>  <i>Stakeholders increasingly are more involved in the process, from implementation of the conceptual designs and sampling protocols to field-testing and regional-application, and then to the stage where there is a firm engagement of LTG 1 products within a formal process. (p.19) The process for stakeholder engagement in research planning is unclear. In many cases, it appears to be ad hoc with fortuitous partnerships formed based on requests from entities or similar interests. (p. 20) Although numerous collaborators and stakeholders already are engaged, the process of identifying and engaging them could be more transparent. (p. 21)</i></p> <p><i>Question 6b:</i>  <i>More effective processes and formal mechanisms appear to be</i></p>	<p>In 2005, ERP established the Ecological Research MYP Discussion Group bringing together ERP scientists and Program/Regional Office personnel to discuss future research directions, current research planning and communicate research results. Through this group, ERP will establish a more formal process for these activities and, in doing so, making the process more transparent.</p> <p>ERP and LTG leaders will examine varying options for</p>	<p>2005 - Establish Group</p> <p>2006 – Establish Process</p> <p>2007 – Implement Process</p> <p>2006 – Options 2007-2008 -</p>

Recommendation	Action Items	Timeline
<p><i>needed that allow better communication between ERP and its clients. These processes and mechanisms may be sufficient, but were not evident to the Subcommittee because of time constraints. (p.20)</i></p> <p><i>Question 6c: The public benefits are well appreciated within the ERP science culture, and among many state agencies. ... The Subcommittee recognizes that the public benefits are numerous and that they are articulated within the culture of EPA and state agencies, but perhaps not clearly articulated to all stakeholders, including the general public, in the same way. (p. 20)</i></p> <p><i>Question 6d: There are no obvious impediments to collaborations with other organizations. (p. 20) It would be very useful if resources were available to fund cooperative development of the pilot projects and if these could be focused on areas with a wide variety of resource management and environmental quality issues. (p. 21)</i></p> <p><i>Question 7: The Subcommittee believes that research results are being used by clients and stakeholders as illustrated in the boxes included in this report. (p. 20) Increased interactions among LTG 3 research scientists with other elements of ORD focusing on socioeconomic research may result in significant opportunities to</i></p>	<p>increasing communications between ORD and its clients. These options will be determined in 2006 and implemented, to the extent practical, in 2007-2008.</p> <p>ERP will focus efforts in its reporting, technology transfer, and varying communications to better articulate the public benefits of its research efforts to all stakeholders, including the general public.</p> <p>ERP, obviously, does not completely control its level of resources. ERP will invest its resources in new pilot projects when possible such as its investment in LTG3 in 2006. ERP will pursue additional research funding for all its LTGs through the appropriate budget channels.</p> <p>ERP will pursue increased interaction with the Sustainability Program to examine leverage opportunities, particularly in the area of socioeconomics. . In addition, EPA has recently completed an “Ecological Benefit Assessment Strategic Plan”, which identifies high</p>	<p>Implementation</p> <p>Ongoing</p> <p>Ongoing</p> <p>Ongoing</p>

Recommendation	Action Items	Timeline
<p><i>further leverage resources. In addition, there was no evidence of interactions with the international community. (p. 21)</i></p>	<p>priority ecological economics research needs, and the “Environmental Economics Research Strategy”. A joint effort between ORD and EPA’s National Center for Environmental Economics, identified valuation of ecological benefits as a critical research need across program offices. These strategies will result in increased emphasis on valuation in EPA’s economics programs and a closer link between ecology and economics is already emerging in LTG 3 planning.</p> <p>In 2005-2006, researchers associated with LTG 1 have been, and are, involved with three international collaborations to develop condition indicators and coastal monitoring programs for the Baltic Sea (collaborators from government and universities in Russia, Estonia, Latvia, Lithuania, Poland, Germany, Denmark, Sweden and Finland), the Gulf of Mexico (Mexico and Cuba), and the Yellow Sea (China, South Korea and North Korea). In the coming years, ERP will strive to improvement international collaboration for LTG 2 and the development of LTG 3. However, this enhancement must be tempered by the availability of travel funds to support such collaboration.</p>	

Recommendation	Action Items	Timeline
<p><b>COLLABORATIONS:</b></p> <p>Charge Question 5: What is the scientific quality of the ERP’s research products? Does the ERP ensure high quality research through competitive, merit-based funding? If funds are not competitively awarded, what process does the ERP use to allocate funds? Does this process ensure that quality is maintained?</p> <p>Charge Question 6a: Does the ERP effectively engage stakeholders in its planning?</p> <p>Charge Question 6b: Does the ERP have a process for using the results of its research, along with stakeholders’ feedback, to identify key research gaps to update the ERP’s research agenda?</p> <p>Charge Question 6c: Are potential public benefits clearly articulated?</p> <p>Charge Question 6d: What are the impediments, if any, to collaboration with other organizations?</p> <p>Charge Question 7: Are the ERP’s research results being used by clients and stakeholders? Are these research results consistent with the needs articulated by EPA’s program and regional offices?</p> <p>Charge Question 8: Will the ERP’s completed and planned outputs lead to the intended outcomes that are protective of our ecological resources?</p>		
<p><i>Question 5: The quality of science is adequate to high, depending on the standards used and the subject area. The results from the congressionally (sic) mandated atmospheric deposition program are exceptionally good, and meet internationally recognized science quality standards among independent scientists active in the field, and have grounded EPA’s policies in science. The monitoring and assessment program has an excellent statistical design and more than adequate sampling protocols, and is well on its way to accomplishing its leadership and implementation goals. (p. 22)</i></p>	<p>No action necessary.</p>	<p>Ongoing</p>

Recommendation	Action Items	Timeline
<p><i>Much of the research is done through noncompetitive funding directly to stakeholders, which are primarily states, as a direct and intentional result of the integration of stakeholders into the field program. (p. 22)</i></p> <p><i>Question 6a: LTG 1 research can be further improved by more systematically and proactively engaging decision-makers and stakeholders at local, state, and national levels. (p. 23) ORD has a superb track record of collaboration with a variety of partners at the level of specific research projects. ... Targeted outreach to nontraditional partners should be pursued as part of a strategic communication process involving stakeholders. (p. 23) Collaboration would be enhanced by the ability to enter into cooperative research projects that address specific resource management issues. (p. 24)</i></p> <p><i>Question 6b: More effective processes and formal mechanisms appear to be needed to allow better communication between the ERP and its clients. (p. 23)</i></p> <p><i>Question 6c: The potential benefits to the public and stakeholders are clearly articulated. (p. 23)</i></p> <p><i>Question 6d: There are no obvious</i></p>	<p>ERP and LTG leaders will examine varying options for increasing collaborations and communications between ORD and its stakeholders. These options will be determined in 2006 and implemented, to the extent practical, in 2007-2008.</p> <p>ERP and LTG leaders will examine varying options for increasing communications between ORD and its clients. These options will be determined in 2006 and implemented, to the extent practical, in 2007-2008.</p> <p>No action necessary.</p> <p>No action necessary.</p>	<p>2006 – Options 2007-2008 - Implementation</p> <p>2006 – Options 2007-2008 - Implementation</p> <p>Ongoing</p> <p>Ongoing</p>

Recommendation	Action Items	Timeline
<p><i>impediments to collaboration with other organizations. (p. 23)</i></p> <p><i>Question 7: The research results of LTG 1 have been widely used by clients and stakeholders. (p. 23)</i></p> <p><i>Question 8: LTG 1 addresses some of the most pressing and challenging environmental research questions today, and is extremely relevant to EPA's mission. (p. 23) Maintaining the strength of LTG 1 is imperative for the continued success of the ERP. (p. 23)</i></p>	<p>No action necessary.</p> <p>No action necessary. ERP will continue to maintain the strength of LTG 1 to the extent practical within the developing fiscal scenarios.</p>	<p>Ongoing</p> <p>Ongoing</p>
<p><b>RESOURCES:</b> Charge Question 1: What would be the minimum research program that would be both effective and successful?</p>		
<p><i>Resources, both intramural and extramural (i.e., STAR), are adequate for measured progress, but are clearly inadequate to undertake other than a handful of extensive projects, such as the Willamette Basin study and ReVA/SEQL. Currently, there are many issues that are important to clients, both intramural and extramural, that cannot be addressed because of resource limitations. (p. 25)</i></p>	<p>ERP lost approximately \$14M in STAR funding in FY05 as a result of budget reductions. In the present budgetary environment, it will take concerted effort and considerable time to re-establish a STAR grants program that would be similar in scope to ERP's pre-2005 efforts. In FY06, ERP is using some recovered resources to initiate a STAR cooperative program in LTG 3 with a small but significant investment of \$1.5M. ERP will pursue whatever means are available to enhance its intramural and extramural programs in the coming years (new budget initiatives, leveraging multiple budget sources, extensive partnering).</p>	<p>Ongoing</p>

Recommendation	Action Items	Timeline
<p><i>The ERP has done an excellent job of leveraging resources, but a fairly poor job of documenting the magnitude of the leveraged resources. The ERP should institute a mechanism to track these contributions so that they can be articulated and reported in a quantitative manner. (p. 25)</i></p> <p><i>Additional project funds are needed to develop more pilot projects. (p. 25)</i></p> <p><i>The loss of the STAR Program [in ERP] would hurt the integrity of the entire ERP. Something similar to STAR must be maintained in accordance with the three LTGs to assure the quality of the ERP's collaboration, efficiency, leveraging of funds, and intellectual capital. (p. 25)</i></p>	<p>ERP leadership will make a concerted effort to document its sources of leveraged funding. In doing so, we Will establish a mechanism to track these leveraged funds and their sources.</p> <p>ERP will pursue whatever means are available to enhance its intramural and extramural programs in the coming years (new budget initiatives, leveraging multiple budget sources, extensive partnering)</p> <p>ERP lost approximately \$14M in STAR funding in FY05 as a result of budget reductions. In the present budgetary environment, it will take concerted effort and considerable time to re-establish a STAR grants program that would be similar in scope to ERP's pre-2005 efforts. In FY06, ERP is using some recovered resources to initiate a STAR cooperative program in LTG 3 with a small but significant investment of \$1.5M. ERP will pursue whatever means are available to enhance its intramural and extramural programs in the coming years (new budget initiatives, leveraging multiple budget sources, partnering).</p>	<p>December, 2006</p> <p>Ongoing</p> <p>Ongoing</p>