

ECOLOGICAL MID-CYCLE REVIEW SUBCOMMITTEE**Meeting Summary
Wednesday, May 23, 2007
Newport, Rhode Island****Welcome and Purpose**

Dr. Jim Clark, Exxon-Mobil Corporation, Subcommittee Chair

Dr. Jim Clark, Chair of the Ecological Mid-Cycle Review Subcommittee, called the meeting to order at 10:00 a.m. He welcomed the Subcommittee members to the face-to-face meeting to conduct the mid-cycle review of the Office of Research and Development's (ORD) Ecological Research Program (ERP). He explained that the purpose of the meeting is to review the progress of the ERP in responding to the Board of Scientific Counselors' (BOSC) program review that was conducted in March 2005, as well as the program's accomplishments and any changes that have been implemented by the program since the 2005 review. He reminded the participants that the Ecological Mid-Cycle Review Subcommittee is a Federal Advisory Committee and subject to Federal Advisory Committee Act (FACA) rules and requirements, which will be summarized by Ms. Heather Drumm, the Designated Federal Officer (DFO) for the Subcommittee. As the Chair he will guide the discussion and recognize individuals before they speak. Dr. Clark noted that there is a full agenda so he will be rather strict to keep the meeting progressing. He then asked the Subcommittee members to introduce themselves. A list of the Subcommittee members and other participants is attached to this summary. Following the introductions, Dr. Clark asked Ms. Drumm to provide her remarks.

Charge, Administrative Procedures, and FACA Rules

Ms. Heather Drumm, Designated Federal Officer, EPA/ORD

Ms. Drumm stated that the BOSC is chartered as an independent Federal Advisory Committee and subject to the rules and regulations of FACA. The Ecological Mid-Cycle Review Subcommittee was created by the BOSC Executive Committee to review the progress of the ERP since the BOSC program review that was conducted in 2005, as well as the program's accomplishments and any changes that have been implemented by the program since that review. The Subcommittee has four members, three of whom were present at the meeting; Dr. John Giesy was unable to attend the meeting. The Subcommittee has been tasked with preparing a report for the BOSC Executive Committee. The Executive Committee will review the report, request any changes deemed necessary, review and approve the report, and then submit it to ORD. The rights of decision making on how to respond to the review reside with EPA.

This is the fourth meeting of the Subcommittee. There were three conference calls prior to this meeting, which were held April 12, April 26, and May 8, 2007. A follow-up call to discuss the draft report will probably be held in June, the exact date is to be determined.

As DFO, Ms. Drumm serves as the liaison between EPA and the Subcommittee and ensures that all Subcommittee meetings comply with FACA rules. She must be in attendance at all Subcommittee

meetings, along with the Subcommittee Chair. Any communications, whether in person, by telephone, or by e-mail, that involve at least one-half of the Subcommittee members must be open to the public. Notices for all meetings must be placed in the *Federal Register* at least 15 calendar days in advance of the meeting. The *Federal Register* notice for this meeting appeared on December 8, 2006. In addition, all materials distributed to the Subcommittee members for its meetings must be made available to the public.

Ms. Drumm has ensured that all of the Subcommittee members have filed the required financial disclosure forms and completed the necessary ethics training. A contractor, Beverly Campbell from SCG, was present to take notes to capture the presentations and discussions, and the meeting minutes will be made available to the public on the BOSC Web Site after certification by the Subcommittee Chair. The minutes must be certified by the Chair within 90 days following the meeting.

Ms. Drumm asked the Subcommittee members to submit their travel vouchers to her with receipts for hotel and car rental before leaving the meeting. She noted that there is time for public comment at 2:00 p.m. today. She asked that public comments be limited to 3 minutes.

Dr. Clark thanked Ms. Drumm for her DFO remarks. He noted that the Subcommittee will organize its report around the charge questions. The Subcommittee members must determine how the questions apply to the program's long-term goals (LTGs). He asked that members pose any questions they have about the materials that were received or will be presented at this meeting. Dr. Clark stated that most of the morning session will be devoted to ORD's overview of what already has been presented or provided to the Subcommittee. He explained that Dr. Giesy is recovering from surgery but he was sent the materials and will provide his input in the draft report.

Overall Summary of Progress and Strategy

Dr. Rick Linthurst, National Program Director (NPD) for Ecology, EPA/ORD

Dr. Linthurst identified the key materials for the mid-cycle review, which were the: (1) ORD Response to the BOSC 2005 Report, (2) Progress Report for 2005-2007 Ecological Research and Appendices, (3) Strategy Document, and (4) References.

In 2005, the ERP had three LTGs that served as the foundation of the BOSC program review. These goals were:

LTG 1—National policy makers will have the tools and technologies to develop scientifically-defensible assessments of the state of our nation's ecosystems and the effectiveness of existing national programs and policies (Monitoring).

LTG 2—States and tribes apply improved tools and methods to protect and restore their valued ecological resources (Classification).

LTG 3—Decision-makers understand the importance of ecosystem services and make informed, proactive management decisions that consider a range of alternative outcomes (Ecosystem Services, Forecasting, and Decision Support).

Dr. Linthurst identified the following significant program accomplishments:

- ✧ Program office acceptance and implementation of Environmental Monitoring and Assessment Program (EMAP) concepts.
- ✧ Advancements in Landscape Ecology—Characterization Concepts and Tools.
- ✧ Regional Vulnerability Assessments—Forecasting Alternative Futures (at multiple scales).

- ✧ Productive and leading-edge grants program, which started the process for moving into ecosystem services.

Dr. Linthurst views the new focus on ecosystem services as an opportunity to transform the way we understand and respond to environmental issues by making clear the ways in which our choices affect the type, quality, and magnitude of the services we receive from ecosystems—using what we have learned (measure, map, and monitor services; new and improved predictive models; decision support platforms and tools; new partnerships within the boundaries of ORD research; and new partners beyond the boundaries of ORD research).

For 2008 and beyond, the goal of the ERP is as follows: Decision-makers regularly apply information and methods developed by ORD's ERP to make proactive policy and management decisions that ensure human well-being by conserving and enhancing ecosystem services over time at multiple scales. The challenges are to:

- ✧ Use our scientists to their fullest capacity and capability.
- ✧ Integrate our work under a few common objectives.
- ✧ Identify significant gaps in our ability to meet those objectives.
- ✧ Seek partners in the public and private sectors to fill those gaps.
- ✧ Change the way research implementation might best to be done in the future under similar constraints.

Dr. Linthurst indicated that the next steps are to: (1) receive comments from the BOSC and revise the program plans based on the mid-cycle review, (2) prepare an MYP (research plans) for each element and cross-cutting issue, (3) review the plan in fall 2007, and (4) implement the newly focused program with increasing emphasis beginning in FY 2008 (i.e., October 2007).

In closing his overview, Dr. Linthurst listed the outcomes that he would like to see in the next 5 years. These included the following:

- ✧ A national ecosystem services characterization system is established and accepted in the United States.
- ✧ National, regional, and local policies will all consider ecosystem services, their value, and their relationship to human well-being in decision-making.
- ✧ Those decisions include seeking the best solution to maintain our economic competitiveness while leaving those that follow the same opportunity for a life equivalent to the one we enjoy.
- ✧ Trading of services will become a reality at multiple scales underpinned by a sound science foundation of gains and losses in these transactions.

Discussion

Dr. Clark thanked Dr. Linthurst for his presentation and took a few minutes to set the stage for what the Subcommittee is looking for in the next presentations. The Subcommittee is focused on the charge questions—research, outputs, communication, and outcomes. He noted that communication goes far beyond communicating with EPA program and regional offices. Communication with multiple nontraditional stakeholders/clients is critical for influencing outcomes, and EPA decision-makers may be

minor players in affecting outcomes. The Subcommittee is looking for ways the program will communicate and influence as a key for the future. Has the program staff thought much about this? Dr. Linthurst responded that it has been a topic of discussion but the staff does not yet know how to make that communication happen. ORD has historically relied on scientific publications, conferences, and similar activities, but these approaches are not appropriate for many decision-makers. The program has started the process of meeting with stakeholders but he could not predict the effectiveness of this approach.

Dr. Sue Thompson noted a lack of involvement of final decision-makers and land managers in the process from the beginning. How do you plan to involve such non-traditional stakeholders in the research process from the initial stage? Dr. Linthurst replied that they will start by identifying ecosystem services and how the program can serve the regional and program offices and local managers. For example, we will go to managers who have been making decisions at the place-based level. We did not involve them up front, but we are looking at how to involve them in the science.

Dr. Gene Turner warned that such an approach can be a slippery slope. He referred to the failure to educate fishery managers about the science despite substantial interaction with fisheries regarding fisheries management. He encouraged a joint effort with stakeholders to ensure that the program does not miss what it needs to know. He then asked about ecosystem services, noting that the definition focused exclusively on economics and human well-being issues. The mission of EPA is much broader than that and the definition of ecoservices should be as well. He did not think that the National Academy of Sciences meant for ecosystem services to be defined only in terms of economics and human well-being. Dr. Linthurst responded that the program does not have adequate funds to continue EMAP and large national surveys. Therefore, the program will try to work at locations for which a considerable amount of data exist. He agreed that the definition should not be limited to economics and human well-being, but it seems that economics is a good starting place to influence the Agency. He appreciated Dr. Turner's concern and agreed that the definition should be clarified.

Long-Term Goal 1 Summary

Dr. Mike McDonald, EPA/ORD

Dr. McDonald opened his presentation by stating LTG 1: By 2010 national policy makers will have the tools and technologies to develop scientifically-defensible assessments of our nation's ecosystems and to determine the effectiveness of existing national programs and policies. He then presented responses to each of the BOSC's findings from the 2005 review that pertain to LTG 1.

BOSC Finding 1: Better integration of LTG 1 with the other LTGs. Closer collaboration between EPA and outside researchers at the national, regional, and local levels.

Dr. McDonald referred to the program's work in Mobile Bay regarding improvement of brown shrimp habitat as an example of the ERP's work on national to local linkages. He showed a diagram that identified target areas that require the least additional vegetation (< 500 ha) to improve brown shrimp habitat. He then mentioned several collaborations and partnerships, including:

- ✧ EMAP National Coastal Assessment (NCA) provided the baseline and the approach for interagency sampling for Hurricane Katrina impacts by EPA, the National Oceanic and Atmospheric Administration (NOAA), U.S. Geological Survey (USGS), Food and Drug Administration (FDA), and affected states.
- ✧ U.S. Forest Service (USFS), U.S. Park Service, USGS BEST, NOAA, National Marine Fisheries Service (NMFS), the Ohio River Valley Water Sanitation Commission (ORSANCO), and 25 states all use EMAP approaches.

- ✧ EMAP, USGS, and NOAA designed and developed a National Monitoring Network Design for Coastal Waters in support of the President’s Ocean Action Plan.

BOSC Finding 2: Overall quality of research under LTG 1 is excellent. High transparency in research design, implementation, and evaluation. Close collaborations with external scientists must be maintained to assure that this high-quality research will persist.

The program’s progress in addressing this finding includes:

- ✧ EMAP’s Aquatic Resources Monitoring Web Site—new design and analysis software and new North American Ecoregion maps and GIS coverages.
- ✧ > 70 designs have been produced for multiple entities.
- ✧ EMAP researchers continue to work with interested academic scientists.

BOSC Finding 3: Research for all three LTGs would be improved by collaborations with international scientific communities.

Technology is being transferred to other countries via collaborations with the Global Environmental Facility, World Bank, United Nations Environmental Program, World Conservation Union, United Nations Development Program, and United Nations Industrial Development Organization. The program has collaborated with numerous countries, including Bulgaria, Romania, Georgia, Russian Federation, Angola, Benin, Cameroon, Democratic Republic of the Congo, Equatorial Guinea-Bissau, Ivory Coast, Liberia, Sao Tome and Principe, Sierra Leone, Togo, Albania, Algeria, Bosnia-Herzegovina, Croatia, Egypt, France, Greece, Israel, Lebanon, Libya, Morocco, Portugal, Slovenia, Spain, Tunisia, Turkey, Yugoslavia, Comoros, Madagascar, Mozambique, South Africa, Namibia, Bangladesh, India, Indonesia, Malaysia, Myanmar, Maldives, Sri Lanka, Thailand, Chile, Peru, and Mexico.

Implementation and routine use of the EMAP approach is evidence of its acceptance. EPA’s Office of Water (OW), Office of Air and Radiation (OAR), and Office of Pesticides (OP) have quantitative Annual Performance Measures (APMs) based on an EMAP approach. All 50 states have used an EMAP approach and 25 have adopted it. OW is partnering with EMAP to conduct national surveys in support of the Clean Water Act (CWA) Section 305(b). These national surveys include Lakes, Flowing Waters, Coastal, and Wetlands. Dr. McDonald presented the following timeline for these surveys:

	2007	2008	2009	2010	2011
Lakes	Field	Lab data	Report	Research	Design
Flowing Waters	Design	Field		Lab data	Report
Coastal	Research	Research	Design	Field	Lab data
Wetlands	Research	Research	Research	Design	Field

Policy makers have scientifically-defensible national condition assessments for aquatic ecosystems. Over time, this will lead to more effective policies.

Dr. McDonald concluded his presentation by describing where the program goes from here, which included the following:

- ✧ Determine if ecosystem condition can be used to describe and quantify ecosystem function.

- ✧ Translate ecosystem function to ecosystem goods and services (EGS).
- ✧ Establish current baselines for EGS from the state to national levels.
- ✧ Use baselines as key input variables for alternative futures modeling, and hindcast testing of these models.
- ✧ Ensure quantitative assessments of EGS are available for trading at state or regional levels.

Discussion

Dr. Turner said that he is concerned that EMAP will not be continued by the states, which could be problematic for the program. The materials provided to the Subcommittee indicate that the program intends to document its leveraging efforts. EPA is providing money to the states to conduct these national surveys using the EMAP approach. Dr. McDonald answered that OW has \$17 million of funding for the states; about one-half of this funding will be used for the national surveys and the remainder for upgrading the states' capabilities. As long as OW provides these funds, EMAP will continue. With regard to documenting leveraging, he noted that it is difficult to get numbers from the states regarding their expenditures on these surveys. EPA funds were used to train state staff members as well as for sampling. He estimated that EPA leveraged 50-70 percent of the funds. Dr. Turner asked if the program was tracking the amount leveraged, noting that the Office of Management and Budget (OMB) will want to see that information. Dr. McDonald responded that the program tracks the number of states that use EMAP approaches. Dr. Turner commented that OMB probably will want to know the magnitude of the program's leveraging efforts.

Dr. Thompson asked about the likelihood of states continuing EMAP if no funding is available from EPA or another federal source. Dr. McDonald replied that the 25 states that have adopted an EMAP approach have found that it is better, faster, and cheaper, so it is likely they will continue it even if no federal funding is available. Dr. Thompson asked if there were any discussions with the 25 states that did not adopt EMAP to find out why they decided not to adopt it. Dr. McDonald said that there were discussions and the states cited various as to why they did not adopt it. For example, in some states the legislative body specifies how to monitor and that cannot be changed unless the body approves. Other states thought they were doing a good job and they did not want to change. He noted, however, that all 50 states have tried the EMAP approach, which is a step in the right direction.

Dr. Clark said that the Subcommittee was provided the rationale for moving from quantitative metrics to ecosystem services. Has much thought been given to performance metrics for ecosystem services? Dr. McDonald responded that this is a fairly new area for the program. The past focus has been the national condition assessments required by CWA 305(b). The program is just starting to think about how to move from the historical approach, taking the success of EMAP and establishing some sort of baseline. Dr. Clark commented that the funds from OW are for characterizing drinkable, swimmable, and fishable waters. The program may have to work with OW to get them and the states to understand why ORD is moving to ecosystem services.

Long-Term Goal 2 Summary

Dr. Rochelle Araujo, EPA/ORD

Dr. Araujo explained that she was filling in for Dr. Deborah Mangis, who could not attend the meeting. She began by stating LTG 2: By 2010, states and tribes apply improved tools and methods to protect and restore their valued ecological resources.

The key research questions for LTG 2 from the 2005 program review were: (1) How can states and tribes best assess the condition of their ecological resources? (2) What are the causes of degraded and undesirable conditions? and (3) Which management practices are most successful for the protection and restoration of ecosystems?

Dr. Araujo summarized the BOSC comments on LTG 2 from the 2005 program review as follows:

- ✧ Improved integration across LTGs and with outside investigators
- ✧ Increased stakeholder involvement
 - Tiger Teams (ORD and client participation)
 - Ecological tools (models and methods for population and community-level impacts)
 - Ecological forensics (causation at multiple spatial and temporal scales)
- ✧ Increased international collaboration
 - Interactions were documented in Appendix C of the materials
 - NATO, World Health Organization (WHO), International Treaty interactions [5], Canada [27], Europe [13], Asia [4], South America [2], Central America [1], and New Zealand [1]
- ✧ Increased post-research communications (fact sheets, Web sites, outreach). These communications are designed to reach the public and other non-traditional stakeholders.

With respect to performance measures for planning and demonstrating progress, Dr. Araujo stated that states, tribes, and relevant EPA offices have improved their ability to determine causes of ecological degradation through the application of ORD causal diagnosis tools and methods, resulting in positive environmental outcomes (diagnostic tools). States, tribes, and relevant EPA offices have improved their ability to protect and restore ecological condition and services through the application of ORD environmental restoration and services tools and methods, resulting in positive environmental outcomes (restoration tools and methods).

Dr. Araujo focused her update for LTG 2 on some recently completed work: (1) Landscape Scale Classification and Condition Indicators, (2) Next Generation of Condition Indicators, (3) Diagnostic Decision Support Tools, and (4) ecosystem restoration.

To illustrate how the program has addressed the research question regarding how states and tribes can best assess the condition of their ecological resources, Dr. Araujo described some of the landscape tools that have been developed by the program. In 2001, the land cover database was released, which was based on the 1992 remote sensing data. This database forms the basis for many of the landscape tools developed under LTG 2. The land cover database was used to develop the sampling frames for EMAP, which are being used by the states. It also served as the basis for ORD's watershed research within the water quality program and for OW's BASINS database. In 2005, the final report on the land cover mapping methods for the Southwest Regional Gap Analysis (SWGAP) project was released. This project was the first formal GAP project designed at a regional, multi-state scale.

The program partnered with local, state, and regional scientists to assess the ecological vulnerability of the Lower Mississippi River and the White River, and analyze the impact of ecosystem change on water quality. The program supported development of the 2006 National Landscape Atlas, which allows planners and researchers to include metrics in their analyses. The update of the 2001 National Land Cover Data (NLCD) will be released in 2007. In 2006, the Great Lakes Landscape Ecology Metric Browser was released. The browser is designed to present some key ecological metrics to the Great Lakes Basin public and research communities at a landscape scale. This tool has been used to reduce the cost of monitoring in the Great Lakes Basin. The program partnered with numerous Great Lakes organizations on this effort. In 2006, the data from the Albemarle-Pamlico Estuary System Change Detection effort were released.

Change areas were delineated using the National Aeronautics and Space Administration's (NASA) Moderate Resolution Imaging Spectrometer (MODIS) Normalized Difference Vegetation Index (NDVI) 16-day composite 250 meter data product. The program is considering integrating these data with the NLCD. For this effort, the program partnered with the North Carolina Department of Environmental Resources. Data from the NLCD are used in the Regional Vulnerability Assessment (ReVA), specifically the 2004 Mid-Atlantic Assessment and assessment of future conditions, the Sustainable Environment for Quality of Life (SEQL) project, and the Phase I HAPS (under LTG 3).

Dr. Araujo presented a timeline for the Next Generation of Condition Indicators. She noted that some efforts are yielding results in the short-term but others will take much longer. She mentioned one project involving endocrine disrupting chemicals (EDCs). ORD developed a vitellogenin assay that was used in a lake study that was the first to show an impact of EDCs on wild fish viability. An article on this research has been accepted for publication in the *Proceedings of the National Academy of Sciences* (April 2007). This research was leveraged with the EDC MYP.

A timeline for the development of decision support tools also was presented. One of those tools is CADDIS (Causal Analysis/Diagnosis Decision Information System). The timeline also included the STAR grants focused on national aquatic ecosystem classifications and reference conditions, which were awarded in 2001-2002 and completed by 2007. The STAR grants on watershed classification systems for diagnosis of biological impairment in watersheds, awarded in 2003-2004 and expected to be completed by 2008, also were on the timeline.

Two large demonstration projects—the Minebank Run Stream Restoration Project and the Delaware Wetlands Project—were mentioned as examples of how the program has addressed the research question regarding identifying the management practices that are most successful for the protection and restoration of ecosystems.

In closing her presentation, Dr. Araujo offered three conclusions:

- ✧ ORD's research program on diagnostics and restoration has been improved as a result of implementing BOSC recommendations.
- ✧ ORD produces high quality tools and methods that are used by states and tribes to protect their resources (diagnosis and restoration).
- ✧ ORD capabilities in condition, diagnosis, and restoration provide underpinnings of research on ecosystem services.

She also presented a diagram that showed the relationship between the current ERP and the future Ecosystem Services ERP. All of the ORD capabilities developed in addressing issues of condition, diagnosis, and restoration will be used by the program as it transitions to map, quantify, model, and predict ecosystem services and their benefits and impacts on human populations. The landscape tools work of the current ERP will evolve to mapping of ecosystem services (national/ecosystem/place), and development of landscape tools for estimating changes in nitrogen/ecosystem services. The diagnostic tools work of the current ERP will evolve into ecosystem services' responses to stressors. The restoration tools work of the current ERP will evolve into efforts to protect and enhance ecosystem services.

Discussion

Dr. Thompson asked who participates on the Tiger Teams. Do they include representatives from the EPA regional and program offices as well as state governments? Dr. Araujo replied that EPA regional representatives were included because those individuals work closely with the states. One of the goals of the Tiger Teams is to ensure that the products are useful and can be employed by others with similar

problems. For some of the place-based research projects, there are consortia of stakeholders that include non-governmental organizations (NGOs), EPA regional office representatives, and states. Dr. Turner asked about the focus of the Tiger Teams. Dr. Araujo responded that there was a Tiger Team for each LTG. The activity was driven by LTG 2 but the other teams were responsible for ensuring that the work done under LTG 2 would support LTGs 1 and 3.

Dr. Clark commented that the diagnostic support tool efforts have focused on condition but not function. Dr. Araujo answered that the diagnostic support tool work has taken two paths—one was to interpret data to diagnose impairments at a site and the other path was to understand the integrated data (e.g., whole watershed approaches to understanding impairments). This information ultimately feeds to the ecoservices program.

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Dr. Clark commented that the diagnostic support tool efforts have focused on condition but not function. Dr. Araujo answered that the diagnostic support tool work has taken two paths—one was to apply data from one site to other sites and the other path was to understand the integrated data (e.g., whole watershed approaches to understanding impairments). This information ultimately feeds to the ecoservices program.

Long-Term Goal 3 Summary

Dr. Iris Goodman, EPA/ORD

Dr. Goodman identified the four categories of ecosystem services defined in the Millennium Ecosystem Assessment (2003). The categories include: (1) provisioning services (e.g., fresh water, fiber, food, fuel, genetic resources), (2) regulating services (e.g., regulate floods, droughts, land degradation, climate, and air quality), (3) supporting services (e.g., soil formation, nutrient cycling, primary production), and (4) cultural services (e.g., recreational, educational, and spiritual non-material benefits).

Dr. Goodman then reminded the Subcommittee of LTG 3: By 2010, decision-makers apply tools that enable them to make informed, proactive management decisions that consider a range of choices and alternative outcomes, including effects on ecosystem services. The key research questions for this LTG are: (1) What forecasting tools can be developed to evaluate scenarios of future stressors and their associated ecological and social outcomes? (2) How can forecasting tools incorporate information about the production of ecosystem services? and (3) What tools can be developed to enable decision-makers to evaluate trade-offs among alternative management strategies and to better manage for sustained ecosystem services?

Dr. Goodman presented the program's responses to the BOSC findings from the 2005 program review that pertained to LTG 3. In BOSC finding #6, the Subcommittee noted that, because LTG 3 was a newly reorganized program element, there was an opportunity to develop an explicit research plan. The program responded by creating an Agency-wide workgroup in 2005 to develop a research prospectus on

ecosystem services. The definitions of major research products were refined, and the ORD niche for research on ecosystem services was identified and refined.

In BOSC finding #7, the Subcommittee noted that there was no plan for an extramural component for LTG 3. The BOSC pointed out that, historically, partnering with other federal, state, and tribal agencies; academic institutions; and NGOs has been very successful. The program has leveraged, to the maximum extent possible, existing STAR grant funds to support research on conserving ecosystem services. In addition, the program initiated a solicitation with \$1.5 million in new STAR eco funds for FY 2006. For FY 2002-2004, total STAR investments in LTG 3 were ~\$10 million. For FY 2006, total STAR investments in LTG 3 were ~\$3.5 million.

In BOSC finding #8, the Subcommittee commented that LTG 3 requires better integration with, and articulation of, outcomes at the local levels. Careful tracking of outcomes is essential to assure that research conducted by the ERP is appropriate and that it addresses customer priorities. The program responded by defining goals and outcomes at local to federal levels of governance, and identifying roles for private sector and voluntary practices. New approaches for tracking and communicating outcomes are being developed. Dr. Goodman stated that the program took time to clarify EPA's research niche by looking at: how the ERP can help with rulemaking, how the ERP can provide helpful information and technical support to its clients so that they can create their own policies, and how the ERP can create ecological information about services to support innovations in the marketplace and to engage the private sector in this area.

The research portfolio for conserving ecosystem services includes:

- ✧ Forecasting regional vulnerabilities and management scenarios (1999-2008). Funding of ~\$1 million/year, four studies completed from 2005-2007.
- ✧ Developing regional-scale stressor response models for environmental decision-making (2003-2007). Total funding of \$5.6 million for seven studies; annual funding of ~\$1.4 million/year.
- ✧ Models to assess the effects of air pollutants on ecosystems (2002-2007). Funding of ~\$1 million/year, seven studies conducted from 2005-2007.
- ✧ Understanding ecological thresholds in aquatic systems through retrospective analysis (2005-2008). Total funding of \$3.3 million for 11 studies; annual funding of ~\$0.8 million/year.
- ✧ New tools for conserving ecosystem services (2005-2009). Total funding of \$1.5 million for four studies; annual funding of ~\$0.4 million/year.
- ✧ Biodiversity and Human Health: an interdisciplinary approach (2007-2011). Total funding of \$2 million for three to four studies; annual funding of ~\$0.5 million/year.
- ✧ Enhancing ecosystem services from agricultural lands (2007-2011). Total funding of \$1.5 million for three studies; annual funding of ~\$0.38 million/year.

Dr. Goodman noted that the first three areas in the list above began before the 2005 BOSC program review and the last four were initiated after that review. Early efforts focused on tools for forecasting and closing the multimedia loop.

Since the 2005 review, there have been 45 peer-reviewed publications, many of which were published in high impact journals and some of which were highly cited, including papers on modeling, nitrogen eutrophication and the effects on coastal systems, and thresholds.

Dr. Goodman mentioned the SEQL project as an example of the program's research on forecasting regional vulnerability to stressors. The outputs/outcomes of this project include a Web-based decision support toolkit with alternative development scenarios projected out to 2030. Decision-makers representing more than 100 local jurisdictions in the region are using the toolkit to evaluate trade-offs associated with land use alternatives. The partners on this project include: EPA Office of Air Quality Planning and Standards (OAQPS), Centralina Council of Governments, Catawba Council of Governments, North Carolina Department of Environment and Natural Resources, South Carolina Department of Health and Environmental Control, University of North Carolina-Charlotte, Duke University, University of Maryland, and Tennessee Valley Authority (TVA).

Another project highlighted by Dr. Goodman was the nitrogen and mercury studies of the effect of air pollution on ecosystems and human health. These studies were used to support national rulemaking. She also mentioned the Willamette River Study, which involved explicitly defining where desired ecoservices can be enhanced (both locally and economically). The study found that restoring the natural features of the river has the potential for inexpensive cooling of discharges from industry. It was estimated that the savings to municipalities and industry would be \$25-40 million. Those savings could be used by the state to do similar projects at other places.

Dr. Goodman described the conceptual foundation for a new STAR grant focused on enhancing multiple ecosystem services from agricultural lands. The diagram identified the hypothetical landscapes and their "production functions."

In concluding her presentation, Dr. Goodman described how ecological research can help EPA achieve its mission:

- ✧ Create geo-spatial products that describe ecosystem services and potential new ecosystem service production functions.
- ✧ Develop ways to envision alternative combinations of services and to assess trade-offs.
- ✧ Develop methods to restore ecosystem services through restoring ecological structures and/or functions.
- ✧ Identify, quantify, and predict ecological "tipping points" that threaten loss of services.
- ✧ Provide information to catalyze innovations in policies and the private sector.

Discussion

Dr. Clark thanked Drs. Linthurst, McDonald, Araujo, and Goodman for their presentations and he called for questions from the Subcommittee members.

Dr. Thompson asked how individuals at the local level are involved in determining the ERP's goals and outcomes. Dr. Goodman responded that for the Willamette River and other projects, ORD is just one of the collaborators. The proposal for that project grew from a community action. It was carried out using very advanced modeling that could not be done by a local community. This project serves as a good example of marrying local needs with ORD's expertise. Dr. Thompson asked Dr. Goodman if she envisioned groups with no direct connection to ORD using the ERP's tools. How would the Allegheny Land Trust, for example, go about using ERP's tools/products? Dr. Goodman stated that there are many examples where these tools/products have been applied without EPA involvement. She noted that offering Web-based tools will help raise awareness about the tools available.

Dr. Turner said he was concerned about the reductions in funding for the STAR Program. The BOSC program review report emphasized the importance of the STAR contribution to the ERP. He noted that most of the publications were from STAR researchers and bibliometrics has become a factor for the Performance Assessment Rating Tool (PART) review. Elimination of the STAR component of the ERP will reduce the number of highly cited and high impact publications, which could result in the program being penalized by OMB.

Dr. Clark commented that the BOSC does not control the Agency's budget. The Subcommittee must review what the program is doing and evaluate those efforts within the context of the funding. Dr. Turner suggested that the report include this concern along with a statement that the Subcommittee understands that the Agency does not control its budget. Dr. Clark agreed that would be appropriate. Dr. Turner also expressed concern about the absence of social welfare (e.g., health in rural communities, obesity issues, pesticides, etc.) in the ecoservices focus. He did not want such items omitted from the program. Dr. Goodman responded that the SEQL project is addressing social welfare issues. Dr. Turner suggested that these issues be included in the ERP planning documents. Dr. Clark noted that there are social welfare issues associated with drinking water and subsistence fishing. The program should make these linkages. Dr. Goodman commented that the program has been trying to communicate that ecology is a multimedia issue.

Subcommittee Discussion

Ecological Mid-Cycle Review Subcommittee

Dr. Clark stated that the afternoon session will include a discussion of performance metrics. He asked if there were any charge questions that have not been addressed or any other issues that should be discussed. Dr. Turner commented that he thought the materials addressed each of the charge questions but the information was not organized in a way that made it easy to find the information to address each question. He noted that not all of the projects had performance metrics; the ORD culture still is not infused with performance metrics. For example, leveraging is a good metric but the data on what the program has leveraged were not easily found in the materials. Because international collaboration was singled out in the 2005 program review, the materials for the mid-cycle review clearly addressed this issue. According to the program staff, that information was in the materials submitted for the 2005 program review, but the information was not obvious to the reviewers.

Dr. Clark pointed out that the significant funding changes for the program since 2005 have had a profound affect on the ERP, forcing it to shift its focus. This makes it difficult to assess the program's progress.

Dr. Thompson asked about the budget. The 2005 MYP was prepared assuming an annual budget of \$75 million, which the Agency had until FY 2008. Therefore, she did not understand how these reductions affected progress from 2005 to 2007. Dr. Clark suggested that she ask EPA for clarification. Dr. Thompson said she also would like to know who makes the decisions regarding what to cut when budget reductions occur. Dr. Clark added that the Subcommittee needs to know the transparency with which these budget decisions are made.

The afternoon agenda includes 1 hour for discussion of the program rating. This involves applying the rating tool developed by the BOSC Executive Committee in conjunction with ORD and OMB. Dr. Clark said he would like to get closure on the rating before the conclusion of the meeting. He reiterated that the purpose of this review is to provide guidance to help the Agency improve its program. Dr. Turner asked about the consequences of the rating assigned by the Subcommittee. Dr. Clark said this will be addressed in the afternoon discussion. He indicated that the afternoon discussion would include: program rating, performance metrics, and funding decision-makers. The meeting recessed for lunch at 12:00 noon and Dr. Clark asked participants to return promptly at 1:00 p.m.

Subcommittee Discussion

Ecological Mid-Cycle Review Subcommittee

Background on Funding Decisions

Dr. Linthurst provided a brief overview of the budget process. The Agency currently is working on the 2009 budget. The Agency develops a budget that is submitted to OMB. OMB reviews the budget and notifies EPA what will be included in the President's budget request which comes out in January each year. The NPD proposed some changes in the program to accommodate the budget reduction for 2008. He noted that there is about \$67 million in the 2008 budget that is not discretionary. It funds staff, facilities, etc. Only about \$1.48 million of the 2008 budget is discretionary. There was a substantial change in funding from 2004 to 2005, when \$20 million was removed from the STAR Program. Officially, the ERP funding for STAR was \$0, but the program did some reallocations to ensure that there was some funding for extramural research. The ERP budget has been reduced from \$108 million to \$68 million. When the program saw the reduction coming for 2008, it became evident that there would not be sufficient money for the program to continue EMAP and data collection.

Dr. Thompson asked who made the decision to cut the extramural funding. Dr. Linthurst replied that the NPD and the program make a recommendation to the Assistant Administrator for ORD, who makes the final decision. He explained that ORD has tried to protect its employees, accommodating reductions mostly through attrition. Dr. Turner asked if ORD is able to hire new employees. Dr. Linthurst responded that the program hires post-docs to get new people. There also are opportunities to recruit staff at very high levels to fill unique positions that require specific expertise. Dr. Thompson stated that some of the existing staff might not have the expertise to address ecosystem services. Dr. Linthurst agreed, stating that it affects the program's ability to move into a new area, and grants have helped fill these expertise gaps in the past. The program usually looks at what needs to be done and what the staff can currently do. Then they work to gain the expertise needed in the next year or two. Dr. Clark commented that there is flexibility in ORD. The NPDs work with the Laboratory and Center Directors to determine who will do the work. There are multiple opportunities for staff members to apply their skills across various programs.

Dr. Turner asked if the \$68 million budget applies to 200 staff members (about \$340K per person). Dr. Linthurst responded that about 300 people actually charge to the program; when the NPD and managers are removed, the number is about 200 people. Therefore, 300 people are covered by the \$68 million (about \$227K per person).

Dr. Clark noted that a good portion of the performance metrics relies on publications, but there are other metrics as well, such as how many times models are used. Dr. Turner commented that the citation analysis was heavily weighted to the publications of extramural researchers; he calculated that for about 85 percent of the papers, the first author was not an EPA employee. He added that EPA staff usually co-author papers with extramural researchers. The current bibliometric analysis numbers look good and they are driven by the extramural program. In a few years, when the extramural research publications dwindle, the program may appear to be less productive and this could result in a lower PART rating by OMB.

Dr. Linthurst said he calculated that the ratio of extramural publications to intramural publications was 2 to 1. He agrees that the decline in extramural funding will affect these numbers. It is not likely that EPA researchers will be able to publish more papers to avoid this decline. Dr. Turner did not think the publication rate and bibliometrics for EPA scientists should be compared with those for extramural researchers. Academic researchers and EPA staff have different responsibilities. Metrics are necessary and there is a need to track outcomes, but the metrics should not be punitive whenever possible. He

recommended that the Agency consider the long-term consequences of having this metric in PART because it may create unreasonable expectations. Dr. Linthurst agreed.

Dr. Clark noted that the Human Health Mid-Cycle Subcommittee thought it would be helpful to do separate analyses for intramural and extramural researchers. This creates a benchmark for each group. Dr. Turner pointed out that this is not necessarily a measure of quality. He asked if there were plans to analyze productivity (using publications) per person. He cautioned against such a metric. Dr. Linthurst responded that, at this point, they have only looked at separate analyses of the intramural and extramural publications. There are no plans to look at publications per division or individual. Dr. Thompson commented that some of the publications in the program's bibliography did not seem to be relevant. Dr. Linthurst answered that these publications were included because the scientists were funded by the ERP. Some of the work applied to several MYPs.

Dr. Turner noted that the draft progress report indicated that the ERP will document its sources of leveraged funding. Is that effort ongoing? Dr. Linthurst replied that most of the leveraging is done through EMAP and what the states are providing in terms of cost sharing. Program staff members have been contacting states to get the information so that it can be formally tracked. He noted that this is not being used as a measure of success for the program, and added that the number of states using the EMAP design is a clear metric. Dr. Turner asked about new metrics for the program. Dr. Linthurst responded that the program must go back to OMB and propose new metrics for measuring success in ecosystem services. It would be helpful if the BOSC could make some suggestions.

Dr. Turner commented that the three-tiered approach seems to be logical; the three levels of engagement could become the program's milestones. Dr. Linthurst stated that the program is supposed to define its goal and then identify what needs to be done to achieve it. The program needs to look at the cascade of things that should be done and measure if we have completed them. Dr. Turner pointed out that if the program reaches too far it will appear to be underachieving. Dr. Linthurst stressed the importance of updating goals and explaining why they have to change over time. Dr. Turner asked if there are any guidelines for establishing goals. Dr. Linthurst answered that the strategy takes a first cut at defining the goal. Dr. Turner asked if there are any criteria, guidelines, or framework for identifying goals. Dr. Linthurst responded that the greatest difficulty is trying to map out a 5-year program—identifying the tasks that must be done and who will do them. The Agency has verbalized the guidance but it has not been documented.

Dr. Clark noted that performance metrics is a priority area for the BOSC so this should be identified as an issue in the report. He asked if there were any other questions for Dr. Linthurst, and there were none.

Consequences of the Program Rating

Dr. Clark stated that the Subcommittee has been asked by the BOSC Executive Committee to assign an overall rating to the program. The rating communicates to ORD the Subcommittee's assessment of the program. It is not a report card and it is not to be used for or against the program. It is used to assess the program's progress given its budget, resources, etc. It is a measure of how well the program has met our expectations. It is not intended for OMB, but the tool was developed in collaboration with OMB. The rating encompasses the scope of what has been accomplished, the pace at which it has been accomplished, and the quality of what was accomplished. The rating is not an indicator of the effectiveness of the NPD or the other managers and it is not intended to increase or decrease the funding for a program. In 2005, the BOSC made a number of recommendations to improve the program. What progress has the program made in responding to these recommendations? The Subcommittee members must reach consensus on the rating.

The information for the review was presented by LTG and the Subcommittee must address the charge questions. The report can be organized by the LTGs or the charge questions. Dr. Turner suggested

organizing the report by the charge questions, mentioning each LTG as appropriate in the response to each question. Dr. Thompson agreed with that suggestion, adding that items that do not fit under a specific charge question could be addressed in a summary. She said it is not always clear where things should be addressed. For example, in her opinion, communication should fall under the partnerships question. Dr. Clark responded that issues should be addressed under the question that seems most appropriate. He wanted to avoid duplication to keep the report concise.

Dr. Turner said there will be text to accompany the program rating. The LTGs could be mentioned in that text. Dr. Clark thought the rating section should provide the rating and then explain what the program has done well and what it needs to improve, as well as the rationale for the rating.

Charge Question #1: How responsive has the Ecological Research Program been to the recommendations from its 2005 program review?

Dr. Clark had assigned charge question #1 to Dr. Giesy, so he led the discussion in Dr. Giesy's absence. The response from ORD was tabulated well and easy to track. Dr. Thompson stated that there were some recommendations from the 2005 review that have not been addressed; for example, external peer review, commitment to technology transfer, and inclusion of nontraditional stakeholders. Dr. Clark indicated that the report could state that ORD has not responded to certain recommendations. Dr. Thompson said that for some there was no response and for other recommendations there was a limited response. She thought the response regarding nontraditional stakeholders (e.g., NGOs, private sector, business, industry) was inadequate. The program needs to address these groups because the ultimate goal is to get them to use the tools to preserve ecological resources. Dr. Turner pointed out that EPA does not go directly to the public because there is a hierarchy. Dr. Thompson commented that the Subcommittee made that recommendation in 2005. Dr. Turner said that one way to accomplish that is to provide funding to NGOs to get them involved. Dr. Clark pointed out that the Subcommittee should not tell EPA how to do this. The Subcommittee just needs to assess the progress relative to our expectations. Dr. Turner expressed some concern about mission creep; there is only so much the program can do with 300 people and \$68 million.

Dr. Clark asked each member to prepare comments on each charge question and submit their text to Ms. Drumm. The individual assigned to lead that charge question will compile the responses and prepare a draft for everyone to review. He asked that Subcommittee members keep their comments to about 1 page. Dr. Clark indicated that the drafts probably will be discussed by the Subcommittee during a future conference call. Dr. Thompson asked if there was a timeline for submitting the comments. Dr. Clark stated that the comments should be sent to Ms. Drumm by Friday, June 8, 2007. The assigned lead then will compile the comments and prepare a draft to be discussed by the Subcommittee during a conference call in June. After discussing availability, the conference call was scheduled for Thursday, June 28, 2007. Dr. Clark said that a morning call would be better for him. Ms. Drumm agreed to check with Dr. Giesy to ensure that he is available that day. She will notify the Subcommittee members about the date and time of the call.

Charge Question #2: Are there performance metrics the program should be using in addition to the current indicators for regularly assessing research progress?

Dr. Turner said that he was impressed with ORD's response to the 2005 program review; however, the program has not identified outcomes for every project. The ERP needs better metrics and ORD should track and document leveraging. These concepts have not permeated the entire program. With regard to charge question #2, Dr. Turner said that several of the metrics are quite suitable and appropriate, but he suggested that the program analyze where the funds are expended and what efforts are the most productive. He also proposed preparing a combined bibliometric analysis, as well as separate analyses for the intramural and extramural components of the ERP. Dr. Thompson pointed out that the bibliometric analysis is primarily a metric of outputs. The program needs to track how people are using its information

and tools. For example, do not just track the number of hits to the Web site, but track the time each user spent on the site and the number of pages that they accessed. Dr. Turner said that ORD needs a guidance document on establishing metrics for outcomes.

Public Comments

Ms. Heather Drumm, DFO, EPA/ORD

At 2:00 p.m., Dr. Clark paused the discussion so that Ms. Drumm could call for public comments. No comments were offered so the discussion resumed.

Subcommittee Discussion (Continued)

Ecological Mid-Cycle Review Subcommittee

Dr. Thompson stated that to encourage technology transfer, outreach, and communication, ORD needs to include them in the performance measures of the staff. Dr. Turner commented that Dr. Thompson's suggested could be included in the guidance document. He had some concerns, however, about linking program performance metrics to individuals. Not all staff members can be expected to do technology transfer, but it should be the responsible of some staff members. Dr. Clark said that performance metrics need to address outcomes as well as outputs. The ultimate goal is to improve decisions through using the program's tools. Who used the tools to make decisions? What was the impact of using the tool?

Charge Question #3: How clear is the rationale for the proposed Ecological Strategy?

Dr. Clark stated that the rationale for the proposed strategy was presented clearly. Now the program has to work on performance measures for ecological services. How will the program convince the states to change from monitoring concentrations to monitoring ecoservices? Dr. Thompson expressed some concern that ORD may be somewhat late in implementing this change. By the time the program generates products it may be too late.

Charge Question #4: What advice can the BOSC provide to assist in successfully addressing the emerging research in ecological services and their relationship to the selected economic and human health endpoints?

Dr. Giesy was assigned the lead for this charge question. Dr. Clark asked if the program has indicated how stakeholders in the field will be part of the process. Dr. Turner said that he did not think there was enough interaction with the stakeholders to ensure buy-in of the ERP's products. The user groups cannot build the model but they need to be involved so that they will be comfortable using it. Dr. Clark agreed, suggesting that the program continue to pursue partnerships with potential users.

Charge Question #5: What suggestions can the BOSC offer in best achieving needed partnerships to conduct the future research?

Dr. Thompson stated that communication is key to advancing partnerships. Involving partners in the entire process from planning to completion is important to ensure buy-in and use. She noted that there is a difference between partnerships and collaboration. Partnering is more than the sum of the individual units. There are various models in the federal government for partnering that could be helpful.

Dr. Clark suggested looking at other programs within ORD that are connected to the ERP. The program should seek funding from these programs as well as information/data that could be used by the ERP. For example, OW is funding EMAP studies that will generate data for the ERP. There may be other studies in the land restoration or other programs that might be useful to the ERP. Dr. Clark said that he will provide his comments to Dr. Thompson, who was assigned the lead for this charge question.

Charge Question #6: Please rate the progress made by the Ecological Research Program in moving the program forward in response to the BOSC review of 2005 as exceptional, exceeds expectations, satisfactory, or not satisfactory in accordance with the BOSC Research Program Review Guidance for Rating Program Performance.

Dr. Clark suggested that each Subcommittee member look at the program as a whole and assess the progress made by the ERP relative to his/her expectations.

Dr. Turner said that he thought the program exceeded expectations. He was impressed with ORD's response even though there is room for improvement. The program is adapting well to significant budget cuts and has an impressive team of dedicated professionals.

Dr. Thompson indicated that she would assign a rating of satisfactory to the program. She did not think the program was meeting all of its goals. The program is meeting most of its goals and addressing appropriate science questions. She did not think the budget cuts should have affected the program's ability to meet its goals. Dr. Turner pointed out that considerable time was spent in deciding how best to adapt to the budget cuts.

Dr. Clark pointed out that the rating tool was designed for program reviews but it is being applied somewhat differently to the mid-cycle reviews to assess the progress the program has made since the program review.

Dr. Thompson said that in looking at the materials provided she did not see assigning any rating but satisfactory. Dr. Turner asked her to specify the materials she was referring to and Dr. Thompson replied that she was looking at the progress report, action items, timeline, and Tabs G and I in the notebook. Dr. Clark said that he had focused on Tab I.

Dr. Clark said that the program has not exceeded his expectations unless he takes into consideration what has changed since the 2005 program review. He asked if all members could agree that the program should not be rated as unsatisfactory, and everyone agreed. He asked if the members could agree that the program should not be rated as exceptional, and everyone agreed.

Dr. Thompson said she expected more results and less explanation of what the program plans to do. She thought the response on international collaboration was strong, but the program has not fully addressed a number of the more difficult recommendations from the 2005 review. Dr. Turner asked for Dr. Thompson's opinion of the strategy document. She thought that ERP may be a little behind the curve. It would have been leading edge if it was implemented 5 years ago. Dr. Turner said that he was basing his rating on the 2008 strategy. Dr. Clark agreed that he would be more willing to assign an exceeds expectations rating based on the 2008 strategy if it addressed how the research will be implemented. He thought the program should have worked out some of these details by now.

Dr. Clark stated that it will be important to get Dr. Giesy's input on the rating. He asked that each member prepare a write-up for this charge question and specify the rating they would assign to the program and the rationale for that rating. The write-ups will be distributed to the members for discussion. Dr. Clark also asked the members to identify what it would take for the program to receive a higher or lower rating. He indicated that a better balance between terrestrial and aquatics would have helped move him towards an exceeds expectations rating. Dr. Turner said that this imbalance issue was brought up at the 2005 program review. He wanted to ask Dr. Linthurst about it earlier but there was no time. Dr. Turner speculated that the imbalance may be the result of the in-house expertise being weighted more toward aquatic issues because of the CWA 305(b) focus.

Dr. Thompson said that she will be interested in reading the other members' responses. Dr. Clark thought some progress was made in narrowing it down to two ratings. He noted that this will be a topic of the June conference call.

Dr. Clark asked if there were any other issues to discuss. Dr. Thompson commented that there was no discussion of created wetlands versus natural wetlands. Dr. Clark thought such a comment may be too detailed for the report. Dr. Turner noted the need for guidance regarding the format for project proposals. It is clear that there was not a standard format or a list of items that must be included. He also expressed his concern that the definition of ecoservices is too narrow. Another area of concern for Dr. Turner was the elimination of the STAR component. The ERP needs a strong extramural component. Dr. Clark suggested that the report include a statement that the STAR Program has made some key contributions to the program in the past and the elimination of the STAR component will have a serious impact on the ERP.

Referring to several statements in the materials provided to the Subcommittee, Dr. Thompson asked who "we" referred to. Is this the program staff? Are clients involved in decision-making? She noted that communicating with stakeholders is critical for effective partnerships.

Dr. Clark asked that each Subcommittee member complete their write-ups for each charge question and send them via e-mail to Ms. Drumm by June 8, 2007. Ms. Drumm will distribute the write-ups for each question to the assigned lead. The lead for the charge question will be responsible for compiling the comments and preparing a draft response to the question. He asked that these compiled responses be approximately 1 page. Dr. Thompson asked if bullet point comments were adequate input to provide to the assigned lead. Dr. Clark confirmed that bullets would be fine. Dr. Turner asked when the draft will be made available to the public. Dr. Clark replied that the draft would be made public when it is distributed to the Subcommittee for discussion during the June conference call.

Dr. Clark asked the Subcommittee members to identify any questions they may have when preparing their write-ups. As needed, Ms. Drumm will seek responses to these questions from the program staff.

After the write-ups for each charge question are completed, Dr. Clark will compile them into a draft report. This report will be the topic of the June 28 conference call. During that call, any questions will be addressed, issues will be resolved, and consensus will be reached on the rating. Following that conference call, Dr. Clark will write a paragraph that states the rating and provides the rationale for it. This will be incorporated into the report and Ms. Drumm will distribute the revised report to the Subcommittee members. This draft of the report probably will be discussed and approved by the Subcommittee during a call after June 28, but that call may not be necessary if most issues are resolved during the June 28 call. Once it is approved by the Subcommittee, Dr. Clark will present the report to the BOSC Executive Committee for review and approval at the September meeting. The report will have to be distributed to the Executive Committee at least 2 weeks prior to the September meeting. If the report is completed earlier, it may be discussed and approved by the Executive Committee during a conference call in August.

Dr. Clark thanked the Subcommittee members for the work they have done so far and will do to complete the mid-cycle review. He also thanked the ERP staff for their efforts in compiling the materials and presentations for the Subcommittee. He adjourned the meeting at 2:45 p.m.

Action Items

- ◇ Each Subcommittee member should prepare write-ups for each of the charge questions and submit them to Ms. Drumm via e-mail by June 8, 2007.

- ✧ Ms. Drumm will distribute the appropriate write-ups to the assigned leads.
- ✧ The lead for each charge question will draft a 1-page response to the assigned question and submit it to Ms. Drumm. The lead also will identify any remaining questions or issues that need to be addressed by EPA.
- ✧ Ms. Drumm will obtain answers to any questions posed by the Subcommittee and provide them to the members.
- ✧ Ms. Drumm will send the draft responses to Dr. Clark who will compile them into a draft Subcommittee report.
- ✧ Ms. Drumm will contact Dr. Giesy to determine if he is available on June 28 to participate in a conference call. If Dr. Giesy is available, Ms. Drumm will notify the Subcommittee members of the date and time of the call. If Dr. Giesy is not available, Ms. Drumm will contact the members to select another date.
- ✧ Ms. Drumm will distribute the draft report to the Subcommittee members for review prior to the June 28, 2007 conference call.
- ✧ Subcommittee members will review the draft report in preparation for the June 28 conference call. The members will participate in the call during which any outstanding issues will be resolved and consensus on the rating will be reached.
- ✧ Dr. Clark will prepare a write-up on the rating and the Subcommittee's rationale and insert it into the draft report. He also will make any changes agreed upon during the June 28 conference call.
- ✧ Dr. Clark will submit the revised report to Ms. Drumm who will distribute it to the Subcommittee. The report will be discussed on a final conference call if necessary or approved by the Subcommittee members via e-mail.
- ✧ Dr. Clark will make any final changes to the report and present it to the BOSC Executive Committee during an August conference call or at the September meeting.

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APPENDIX A: Meeting Agenda

ECOLOGICAL RESEARCH SUBCOMMITTEE MID-CYCLE REVIEW FACE-TO-FACE MEETING AGENDA

May 23, 2007

Newport Harbor Hotel and Marina
Newport, RI 02840

Wednesday, May 23, 2007

9:30 a.m. – 10:00 a.m.	Registration	
10:00 a.m. – 10:10 a.m.	Welcome and Outline of Purpose	Dr. Jim Clark Chair, Eco Mid-Cycle Subcommittee
10:10 a.m. – 10:15 a.m.	Welcome and Charge - Administrative Procedures/Federal Advisory Committee Act (FACA) Rules	Heather Drumm (EPA) Designated Federal Officer (DFO) Eco Mid-Cycle Subcommittee
10:15 a.m. – 10:35 a.m.	Overall Summary of Progress and Strategy - Discussion and Q&A	Dr. Rick Linthurst (EPA) Eco Mid-Cycle Subcommittee
10:35 a.m. – 10:55 a.m.	Long-Term Goal 1 (LTG 1) Summary - Discussion and Q&A	Dr. Mike McDonald (EPA) Eco Mid-Cycle Subcommittee
10:55 a.m. – 11:15 a.m.	LTG 2 Summary - Discussion and Q&A	Dr. Deborah Mangis (EPA) Eco Mid-Cycle Subcommittee
11:15 a.m. – 11:35 a.m.	LTG 3 Summary - Discussion and Q&A	Dr. Iris Goodman (EPA) Eco Mid-Cycle Subcommittee
11:35 a.m. – 12:00 noon	Subcommittee Discussion	Eco Mid-Cycle Subcommittee
12:00 noon – 1:00 p.m.	Lunch	
1:00 p.m. – 2:00 p.m.	Program Rating Discussion	Eco Mid-Cycle Subcommittee
2:00 p.m. – 2:10 p.m.	Public Comment	
2:10 p.m. – 3:00 p.m.	Wrap-Up and Report-Out	Eco Mid-Cycle Subcommittee
3:00 p.m.	Adjournment	