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FINAL REPORT

FROM THE BLUE RIBBON PANEL CONDUCTING AN
EXTERNAL REVIEW OF THE U.S. DEPARTMENT OF AGRICULTURE

CONSERVATION EFFECTS ASSESSMENT PROJECT

SOIL AND WATER CONSERVATION SOCIETY

A Soil and Water Conservation Society Project

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About SWCS

The Soil and Water Conservation Society (SWCS) is a nonprofit scientific and educational organization that serves as an advocate for natural resource professionals and for science-based conservation policy. Our mission is to foster the science and art of soil, water, and environmental management on working land—the land used to produce food, fiber, and other services that improve the quality of life people experience in rural and urban communities. We work to discover, develop, implement, and constantly improve ways to use land that sustains its productive capacity and enhances the environment at the same time.

SWCS has about 7,000 members around the world. They include researchers, administrators, planners, policymakers, teachers, students, farmers, and ranchers. Nearly every academic discipline and many different conservation institutions are represented within the membership.

Member benefits include the widely respected *Journal of Soil and Water Conservation*, representation in policy circles, opportunities for leadership and networking, and discounts on books and conference registrations.

SWCS chapters throughout the United States, Canada, and the Caribbean Basin conduct a variety of activities at local, state, and provincial levels and on university campuses. These 75 chapters represent the grassroots element of the organization. Each chapter elects its own officers, organizes conservation forums, and formulates local recommendations on conservation and environmental issues.

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EXECUTIVE SUMMARY

The U.S. Department of Agriculture (USDA) has asked the Soil and Water Conservation Society (SWCS) to help design and implement the Conservation Effects Assessment Project (CEAP). One of SWCS's roles is to facilitate an external, policy-level review of CEAP. The external review has two primary purposes: (1) to seek, analyze, and synthesize input from future users of information generated by CEAP as a means of helping USDA understand how best to design CEAP and package its outputs, and (2) to recommend new approaches or refinements of planned approaches that will enhance the capacity to produce comprehensive national assessments in 2006 and beyond. The project is intended to help make CEAP more useful, responsive, and credible and help assure that CEAP's products will have wide utility for policymakers, program managers, and the conservation community.

SWCS has assembled a blue-ribbon panel of academics and leaders of nongovernmental organizations, state agencies, and tribes. The panel was constructed to represent the communities who will use, interpret, and shape opinion regarding the meaning and value of outputs from CEAP. The panel is conducting its work through meetings, teleconferences, and outreach to user groups. The panel is focusing it's work in three areas: (1) understanding the expectations and needs of eventual users of CEAP outputs, (2) scrutinizing detailed plans for CEAP and interacting with those USDA staff members responsible for the national assessment and watershed research projects, and (3) reviewing preliminary outputs generated by CEAP in 2005. Federal agencies involved in the design and implementation of CEAP have assigned a staff liaison(s) to the panel to serve as an information source and point of contact.

The blue ribbon panel met for the first time January 12-14, 2005, in Washington, D.C. to discuss the detailed CEAP study plans USDA had provided and to interact with federal staff through intensive briefings and discussion sessions. In March 2005, the panel issued a report of its preliminary findings that summarized the panel's initial reactions to USDA's overall plans for building and implementing CEAP. In their preliminary findings the panel strongly and unanimously endorsed the purpose of CEAP, but recommended an immediate change in direction and emphasis for the project to ensure CEAP's purpose is achieved.

The panel met for the second time in May 2005 in response to a request from USDA to help identify opportunities to use CEAP to inform the 2007 farm bill conservation title debate. This request from USDA was the panel's first recommendation made in its preliminary findings to change CEAP's direction was for USDA to redirect CEAP in the short-term to strategically inform the 2007 farm bill. The panel issued its second report in September 2005 outlining what they considered the most promising opportunities for CEAP to inform the 2007 farm bill conservation debate.

Copies of both reports can be found on the SWCS website at www.swcs.org.

In this final report, the panel takes up the second major recommendation the panel made in its preliminary findings for changing CEAP's direction: "USDA must also change its stated long term goal for CEAP to ensure the program is built primarily to look to the future—to enable rigorous and science-based evaluation of options to improve conservation efforts in the future."

Panel Strongly Endorses Purpose of CEAP

CEAP's stated purpose is to help policymakers and program managers implement existing, and design new, conservation programs to more effectively and efficiently meet the goals of Congress and the Administration. The panel unanimously endorses this purpose. A coherent and science-based assessment and evaluation system is urgently needed to ensure conservation programs cost-effectively produce the gains in environmental quality taxpayers and agricultural producers expect. The panel commends USDA for taking on this critical and difficult task. The panel hopes its work will help USDA and its partners succeed in their efforts. The panel, however, recommends important changes in direction for CEAP to ensure it achieves its purpose.

CEAP Must Change Direction to Achieve Purpose

CEAP must change direction to become the coherent, science-based assessment and evaluation system policymakers, program managers, and the conservation community urgently needs. The panel found that CEAP was conceived largely as a way to supply annual, quantitative, and generalized estimates of the effects of conservation practices needed to support a suite of program-specific performance measures. The panel concluded this vision of CEAP is too limited and is likely to produce misleading information—even in the long term and after large investments of resources to quantify annual, program-by-program performance.

Solving Problems versus Estimating Effects

The panel found little value in even the best estimate of the environment effects of a conservation program unless that estimate could be (1) compared to established environmental goals and (2) linked to the ecological and economic context in which the estimated effect occurs. As one panel member put it: "What does it mean if we are told EQIP (Environmental Quality Incentives Program) reduced nitrate losses from farm fields by 80 million tons? Was that enough, should we have done more, how much more?"

Monitoring versus Simulation or Extrapolation

Uncertainties and error introduced by broad practice definitions, missing quantitative links between variability in practice application(s) and environmental effects, and the difficulty of simulating real world interactions among conservation practices in process models, will seriously impair the scientific credibility of simulated, quantitative estimates of environmental effects being produced by conservation programs. Simulations and extrapolations cannot—and must not—substitute for on-the-ground monitoring and inventory systems designed to determine if anticipated conservation and environmental benefits are being achieved.

The panel is encouraged by changes USDA has made in its short- and long-term plans for CEAP during the course of the panel's deliberation. The panel commends USDA for making such changes and urges USDA to take additional steps to ensure the investment in CEAP produces the credible, science-based assessment system so critical to the future of USDA conservation programs.

CEAP Must Inform Strategic Resource Management

CEAP should be built to answer the question "What should we do next year?" rather than "What did we do last year?" The panel recommends two critical roles for CEAP: (1) CEAP should become an integral part of a larger, collaborative, and ongoing system to inform and adapt strategic resource management, and (2) CEAP should define and test the science-base for adaptive management of conservation programs.

The panel is also acutely aware that it is recommending a significant change in CEAP and recommending a strategic resource management system be built at a time when agency budgets are tight and likely to get tighter. The panel identified six opportunities to facilitate the change in direction it is recommending, and to reduce the cost and increase the efficiency with which such as system can be built: (1) USDA must achieve a broader consensus on the purpose and future direction for CEAP, (2) CEAP must expand and strengthen collaboration, (3) Congress should update and reauthorize the Soil and Water Resources Conservation Act of 1977 (RCA), (4) the strategic resource management system should initially focus on a few critical environmental goals, (5) the system should look more to regional, rather than national-level assessments, and (6) more weight should be given to strategic components when evaluating program performance.

Blueprint

The strategic resource management system envisioned by the panel must be able to accomplish six tasks: (1) construct and update the conservation baseline, (2) set meaningful goals, (3) evaluate alternative strategies, (4) monitor program implementation, (5) monitor environmental benefits, and (6) reevaluate strategies.

Components Included in Current CEAP Plans

The panel is encouraged that USDA's current plans for CEAP could produce several important components of this strategic resource management system. The CEAP Cropland-CRP national assessment simulation capabilities will enable large-scale estimation of the baseline effects of the conservation effort represented by USDA programs. It will allow for more rigorous assessment and reevaluation of strategies for employing staff and programs to meet goals—at least at large regional and national scales and in the short-term for cropland only. CEAP watershed studies will help refine and validate

the methods used to simulate effects of conservation practices and programs. The panel recommends greater priority be given in CEAP watershed study plans to building the capacity to conduct regional assessments of the environmental benefits of conservation activities. Performance reporting systems, already in place in NRCS and the Farm Service Agency (FSA), will provide the nuts and bolts information about program implementation needed to document the current level of conservation effort supported by USDA. Efforts to more precisely geo-reference program implementation data are essential and should be the highest priority for enhancing current performance reporting systems.

Components Missing from USDA Plans

The panel is concerned that several critical components of a strategic resource management system are not included in USDA's current plans for CEAP.

Monitoring. The most important and troubling missing piece is the absence of plans for on-the-ground monitoring of change in the environmental indicators and outcomes conservation programs and activities are intended to improve. The panel recommends that Congress mandate that at least one percent of the funding for each authorized program—about $40 million of the $4 billion taxpayers are investing in conservation—be set aside to support monitoring and evaluation of those programs.

Conservation Needs and Priorities. The panel did not see any evidence for rigorous and comprehensive identification and assessment of the extent and magnitude of environmental and resource management problems that are not being met through current conservation efforts. The panel strongly recommends that clear links be forged between CEAP staff, USDA strategic planners, and staff responsible for the RCA process. Linked staff should be charged with producing a coordinated plan for data collection, resource inventory, and resource assessment activities that will produce credible assessments of unmet needs and priorities. The Natural Resources Inventory (NRI) system, in particular, should be revisited to determine if and how the system could be revamped to produce statistically valid estimates of the extent and geographic distribution of conservation needs.

The assessment of needs and priorities must be developed in collaboration with other federal and state conservation agencies, nongovernmental organizations, and the private sector. Meaningful and cost-effective assessment can only be completed if they are based on a collaborative effort between federal entities such as USDA, the Environmental Protection Agency (EPA), the National Oceanic and Atmospheric Administration (NOAA), the U.S. Fish and Wildlife Service (USFWS), the U.S. Geological Survey (USGS); state conservation, natural resource, and environmental protection agencies, nongovernmental conservation organizations, and the private sector.

Beyond USDA Programs. Many private and public sector entities contribute to the nation's conservation effort on working land. The CEAP national survey on cropland will collect some information on such efforts, but it is not clear to the panel what plans are in place to regularly update and enrich information available about non-USDA driven conservation on working land. The panel recommends a collaborative effort among USDA and its partners to design and implement a cost-effective system to collect and consolidate information about the level of conservation effort supported by other federal, state, and local units of government, nongovernmental organizations, and the private sector.

Build The Science Base

Building the science-base for strategic resource management on working land must be a primary purpose for CEAP. The panel applauds USDA's commitment to using CEAP to help in building this science base. The panel is particularly enthusiastic about the unique value of the watershed study component of CEAP. CEAP should support a broad, collaborative effort to create a set of "representative" watersheds or other salient geographic units in various agricultural settings on a regional basis. The network of watershed studies should be constructed in a comparative fashion to answer three broad, inter-related, and critical questions: (1) What are the most effective interventions—practices, alternative farming systems, landscape or hydrologic restoration—to achieve specific environmental benefits?, (2) Where should such interventions be placed on the landscape to most effectively achieve specific environmental benefits?, and (3) How can we design cost-effective and cost-feasible systems to monitor changes in core environmental indicators?

Panel members are acutely aware of the importance of the technical services infrastructure—research, education, and technical assistance—as the foundation of the nation's conservation effort on working land. Even the best science base will produce few results unless technically proficient people and technical tools are available to translate that science into on-the-ground changes in farm, ranch, and watershed/geographic unit management. Moreover, rapid scientific advances are improving our ability to understand and manage the spatial and temporal variability in agricultural land-

scapes in ways that could dramatically improve the performance of conservation programs. Taking advantage of these opportunities, however, will require better information and people trained to use that information to more precisely apply conservation treatments at field, farm, ranch, watershed, and other salient geographic scales. An in-depth assessment of the strengths and weaknesses of the current technical services infrastructure should be among the first priorities undertaken by a strategic resource management system.

INTRODUCTION

The U.S. Department of Agriculture (USDA) asked the Soil and Water Conservation Society (SWCS) to help design and implement the Conservation Effects Assessment Project (CEAP). One of SWCS's roles was to facilitate an external, policy-level review of CEAP. The external review had two primary purposes: (1) to seek, analyze, and synthesize input from future users of information generated by CEAP as a means of helping USDA understand how best to design CEAP and package its outputs, and (2) to recommend new approaches or refinements of planned approaches that will enhance the capacity to produce comprehensive national assessments. The project is intended to help make CEAP more useful, responsive, and credible and help assure that CEAP's products will have wide utility for policymakers, program managers, and the conservation community (See "CEAP Fact Sheet" sidebar on page 9).

SWCS assembled a blue-ribbon panel of academics and leaders of nongovernmental organizations, state agencies, and tribes. The panel was constructed to represent the communities who will use, interpret, and shape opinion regarding the meaning and value of outputs from CEAP. The panel conducted its work through meetings, teleconferences, and outreach to user groups. The panel focused its work in three areas: (1) understanding the expectations and needs of eventual users of CEAP outputs, (2) scrutinizing detailed plans for CEAP and interacting with USDA staff members responsible for CEAP national assessment and watershed research projects, and (3) exploring the relationship of CEAP to agency reporting systems and similar assessment efforts undertaken by other federal and state agencies. Federal agencies involved in the design and implementation of CEAP assigned a staff liaison(s) to the panel to serve as an information source and point of contact.

The blue ribbon panel met for the first time January 12-14, 2005, in Washington, D.C. to discuss the detailed CEAP study plans USDA had provided and to interact with federal staff through intensive briefings and discussion sessions. The panel focused its deliberations on what results CEAP should produce rather than how CEAP should produce those results.

CEAP has two components: (1) a national-scale effort—largely based on the NRI sampling frame—to estimate the environmental benefits produced by the conservation practices applied by participants in USDA conservation programs, and (2) a set of watershed research projects to test and enhance the methods used in the national assessment. The Natural Resources Conservation Service (NRCS) and the Agricultural Research Service (ARS) are leading a team of federal agencies to design, build, and implement CEAP.

In March 2005, the panel issued a report of its preliminary findings that summarized the panel's initial reactions to USDA's overall plans for building and implementing CEAP. In their preliminary findings, the panel strongly and unanimously endorsed the purpose of CEAP, but recommended an immediate change in direction and emphasis for the project to ensure CEAP's purpose is achieved.

The panel met for the second time in May 2005 in response to a request from USDA to help identify opportunities to use CEAP as a way to inform the 2007 farm bill conservation title debate. This request from USDA was the panel's first recommendation made in its preliminary findings. The panel issued its second report in September 2005 outlining what they considered the most promising opportunities for CEAP to inform the 2007 farm bill conservation debate.

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CEAP FACT SHEET

Purpose

The Conservation Effects Assessment Project (CEAP) began in 2003 as a multi-agency effort to quantify the environmental benefits of conservation practices used by private landowners participating in selected U.S. Department of Agriculture's (USDA) conservation programs. Project findings and results will be used to report progress on the environmental effects of these programs, aid discussions on conservation policy development, guide conservation program implementation, and ultimately, help farmers and ranchers make informed conservation choices.

Scope

CEAP will assess the benefits of conservation practices associated with the following USDA conservation programs in the 2002 Farm Bill: Environmental Quality Incentive Program (EQIP), Conservation Reserve Program (CRP), Conservation Security Program (CSP), Wetland Reserve Program (WRP), Wildlife Habitat Incentives Program (WHIP), Natural Resources Conservation Service (NRCS) Conservation Technical Assistance Program, and Grassland Reserve Program (GRP). Conservation practices that will be assessed include conservation buffers; erosion control; wetlands conservation and restoration; establishment of wildlife habitat; and management of grazing land, tillage, irrigation water, nutrients, and pests.

CEAP will focus on developing approaches, methodologies, and databases to produce scientifically credible estimates of environmental benefits of conservation. Initially, the project will study water quality, soil quality and water conservation on cropland, including enrolled CRP land. Eventually, CEAP will assess benefits to water quality, soil quality, water conservation and wildlife habitat on cropland, grazing land, and wetlands. Work is underway to develop suitable and affordable analytical approaches for these other land uses and natural resource concerns.

CEAP National Assessment

The National Assessment component of the Conservation Effects Assessment Project (CEAP) will provide scientifically credible estimates of the environmental benefits obtained from USDA conservation programs. The National Assessment component has two goals: (1) Provide NRCS and the conservation community with quantitative estimates of the benefits of conservation practices for national and regional reporting and (2) Assess the potential for existing conservation programs and future alternatives to meet the Nation's environmental and conservation goals.

Currently, there are four active components within the National Assessment:

- Cropland component
- Wildlife component
- Wetlands component
- Grazing lands (pastureland and rangeland) component

CEAP Watershed Studies

Small watershed case studies are being conducted to complement the national assessment. These studies will provide in-depth assessments of water quality and other benefits at a finer scale than is possible for the National Assessment. Presently there are three CEAP watershed categories:

- *ARS Benchmark Watersheds*. These USDA Agricultural Research Service watershed studies will provide information needed to verify the accuracy of models used in the National Assessment. Twelve watersheds were selected with a focus on water and soil quality and water conservation as primary resource concerns on rain-fed agricultural land.
- *Special Emphasis Watersheds*. These have been established by NRCS to address specific resource concerns, such as manure management from animal feeding operation and water use and conservation on irrigated cropland. Nine special emphasis watersheds were established in 2004, with work designated for completion in 2006 and 2007.
- *Competitive Grants Watersheds*. These watersheds established by the Cooperative State Research, Education and Extension Service, will focus on understanding on how best to schedule and locate conservation efforts within a watershed in order to achieve locally defined water quality goals. Four project grants were awarded in 2004. Four additional project grants were awarded in September 2005.

CEAP home page http://www.nrcs.usda.gov/technical/NRI/ceap.

CHANGE DIRECTION

CEAP's stated purpose is to help policymakers and program managers implement existing, and design new, conservation programs to more effectively and efficiently meet the goals of Congress and the Administration. The panel unanimously endorsed this purpose in its preliminary findings. The panel's work in the months since that report was released reaffirmed the panel's conviction that a coherent and science-based assessment and evaluation system is urgently needed to ensure conservation programs produce the gains in environmental quality, taxpayers and agricultural producers expect as cost-effectively as possible. The panel commends USDA for taking on this important task.

The panel's work since its first meeting also reconfirmed the panel's conviction that CEAP *must change direction* to become the desired, science-based assessment and evaluation system. Indeed, the panel's concern that USDA must revisit its long-term direction for CEAP has grown more urgent given growing pressures on conservation policy and programs from deficit reduction, international trade agreements, indicators of environmental degradation, and missed opportunities to realize the promise of increased funding and authorities provided in the conservation title of the 2002 farm bill.

Solving Problems versus Estimating Effects

The long-term goal for CEAP, presented to the panel at its first meeting and embedded in detailed CEAP study plans, was to produce annual, national-level estimates of the environmental effects of individual conservation programs. Such estimates were to be used to populate a diverse set of individual program performance measures that were to be the basis for evaluating the effectiveness of programs. The panel, however, questions the wisdom of relying on such performance measures given the serious scientific limitations of performance measures based on generalized estimates of environmental effects derived by simulating or extrapolating from data on the kind and extent of practices conservation programs funded.

The panel found little value in even the best estimate of the environment effect of a conservation program unless that estimate could be compared to established environmental goals. Knowing what was accomplished, in other words, is not useful unless we also know what should or could have been accomplished. As one panel member put it: "What does it mean if we are told EQIP (Environmental Quality Incentives Program) reduced nitrate losses from farm fields by 80 million tons? Was that enough, should we have done more, how much more?" The panel stressed that simulating or extrapolating the environmental effect of conservation practices must not be confused with evaluating the extent to which conservation programs are solving environmental problems. Quantifying effects and evaluating effectiveness are related, but very different.

Generalized performance measures, such as reduction in nitrate losses from farm fields must be linked to the locations where the reductions occur, the sensitivity of the affected resources, and the threshold levels of such performance measures that must be achieved to produce measurable, on-the-ground environmental improvement. Where environmental effects are produced can be as or even more important than the magnitude of the effect. Small reductions in pollutants or increases in critical habitat that occur in highly sensitive areas or that affect high value resources may produce greater benefits than large reductions in pollutants or increases in habitat that occur in less sensitive areas or affect less valuable resources. Performance measures based on generalized estimates of environmental effects of conservation programs must be presented in the ecological and environmental context in which the estimated effects occur and must be related to quantitative goals for change in that performance measure. Performance measures based on estimates of the environmental effects of conservation programs that are not linked to the relevant context and goals may mislead more than inform analyses of program performance and effectiveness.

Monitoring versus Simulation or Extrapolation

The panel also concluded that unavoidable technical problems—even in the long term and after large investments of resources in data collection and modeling—will seriously impair the scientific credibility of simulated or extrapolated estimates of environmental benefits produced by conservation programs. Uncertainties and error introduced in such estimates by broad practice definitions, missing quantitative links between practice application(s) and environmental effects, variability in practice implementation, and the difficulty of simulating real world interactions among conservation practices in process models, will seriously impair the scientific credibility of simulated, quantitative estimates of environmental benefits produced by conservation programs. Even large investments in additional data collection and modeling may produce results that are still subject to serious question regarding their scientific credibility. Using such estimates to evaluate than effectiveness of programs and the strategies used to employ those programs, may mislead rather the inform work to enhance the nation's conservation effort.

The scientific problems and potential for error are much larger in efforts to estimate environmental effects through simple extrapolations from information about the practices programs have funded producers to adopt. The panel was briefed about—and troubled by—plans to undertake such extrapolations using generalized sets of conservation practices, generalized geographic units, and standardized estimations of the environmental effects of those practice sets. Such extrapolations suffer from the same uncertainties and errors outlined in the previous paragraph that plague simulation efforts. In addition, such extrapolations must assume that effects can be linearly aggregated to larger scales, that is, that environmental benefits increase in direct proportion to the amount of acres treated and/or number of practices employed. Although intuitively attractive, the assumption that the effects of practices can be "added up" is refuted by scientific studies of practice effects at field and larger geographic scales. Estimates of environmental effects derived from such extrapolations from practice information must be treated with caution. The value of such estimates for informing efforts to enhance the efficiency and effectiveness of conservation programs is questionable.

The panel concluded that simulations and extrapolations cannot—and must not—substitute for on-the-ground monitoring and inventory systems designed to determine if anticipated conservation and environmental benefits are being achieved. The absence of plans for such monitoring is the most troubling gap in the long term blueprint for CEAP discussed in the next section.

Strategic Resource Management

As stated earlier, the panel found that CEAP was conceived largely as a way to supply annual, quantitative, and generalized estimates of the effects of conservation practices needed to support a suite of program-specific performance measures. The panel concluded this vision of CEAP is too limited and is likely to produce misleading information—even in the long term and after large investments of resources to quantify annual, program-by-program performance.

CEAP should, be built to answer the question "What should we do next year?" rather than "What did we do last year?" The planned National Resources Inventory (NRI) simulation capabilities and watershed studies are much better suited to, and more properly used to assess and evaluate alternative strategies than to attempt to quantify the effect of past practice implementation. Sensitivity analyses can, and must be used to transparently address the technical uncertainties and errors involved in such forward looking simulations. Substantial investments in data collection and modeling capabilities are anticipated to build CEAP. Making specific recommendation for how and where to make those investments is beyond the panel's scope and expertise. In some cases, the data collection and modeling capabilities needed to assess future options can also be used to estimate past performance. When such "win-win" situations are not apparent, the panel urges USDA to give first priority to investments that will build a system capable of producing rigorous assessments of options for implementing conservation programs *in the future*.

The panel recommends the primary purpose of CEAP should be informing and enabling a strategic approach to program evaluation and resource management. The panel recommends two critical roles for CEAP.

1. CEAP should become an integral part of a larger, collaborative, and ongoing system to inform and adapt strategic resource management.
2. CEAP should define and test the science-base for adaptive management of conservation programs.

The larger strategic assessment system must (1) determine needs based on a core set of indicators of resource and environmental conditions, (2) set goals based on the severity of problems and the magnitude of opportunities tempered by fiscal or technical constraints, (3) develop strategies for deploying people and resources to most effectively achieve goals, (4) evaluate progress, and (5) adjust goals and strategies based on ongoing evaluation of the extent to which problems are being solved and opportunities exploited. The system should enable and inform adaptive management to help policymakers and program managers implement exist-

ing conservation programs and design new conservation programs to more effectively and efficiently meet the goals of Congress and the Administration.

Opportunities to Facilitate Change in Direction

The panel understands the change in direction it is recommending entails a significant departure from the priorities and values embedded in the original plans for CEAP that were communicated to the panel through study plans and briefings. The panel is also acutely aware that it is recommending a strategic resource management system be built at a time when agency budgets are tight and likely to get tighter.

The panel identified six opportunities to facilitate the change in direction it is recommending and to reduce the cost and increase the efficiency with which such a system can be built:

1. USDA must achieve a broader consensus on the purpose and future direction for CEAP.
2. CEAP must expand and strengthen collaboration.
3. Congress should update and reauthorize the Soil and Water Resources Conservation Act of 1977 (RCA).
4. Focus the system on a few critical and explicitly stated national and regional environmental goals.
5. Look more to regional-level versus national-level assessments.
6. OMB should give more weight to strategic components when evaluating program performance.

Aggressively pursuing these opportunities, would, the panel believes, increase the likelihood that the strategic resource management system they recommend could be built even in the face of tight budgets.

Consensus on CEAP Future Direction

Since the panel began its work, USDA has made important changes in its plans for CEAP. In particular, the panel applauds USDA's commitment to redirecting CEAP resources—in the short-term—to informing the debate over the conservation provisions of the 2007 farm bill. CEAP is a multi-agency effort. Lead agencies include USDA's Natural Resources Conservation Service (NRCS), Agricultural Research Service (ARS), Cooperative State Research, Education, and Extension Service (CSREES), Farm Service Agency (FSA), and National Agricultural Statistics Service (NASS). Collaborating agencies include USDA's Economic Research Service (ERS), Forest Service (FS), Office of Risk Assessment and Cost-Benefit Analysis (ORACBA), the U.S. Army Corps of Engineers (ACE), the U.S. Environmental Protection Agency (EPA), the U.S. Fish and Wildlife Service (FWS), and the U.S. Geological Survey (USGS). The panel's briefings from, and interaction with USDA and other federal staff, however, suggests that staff—including top agency leadership—have different visions of the ultimate role CEAP should or could play in their agencies assessment, monitoring, evaluation, and resource management systems. The panel believes the opportunity presented by CEAP to enhance the credibility and meaning of conservation information provided to policymakers, program managers, and the conservation community is large. Disparate visions of the ultimate role for CEAP will reduce the likelihood that this opportunity is realized. The panel urges USDA to work in collaboration with its partners to produce a common vision for where CEAP is headed and the investments needed by USDA and its partners to make that vision a reality. The panel sincerely hopes that its work, and this report, will help in that effort.

Collaboration

All of the panel's recommendations will be easier to implement if USDA aggressively pursues collaboration with other agencies and organizations at federal, regional, state, and local levels. In many cases, collaboration is the only way the panel's recommendations can be implemented.

The panel recommends collaborative efforts be organized around geographically-specified outcomes such as soil quality, water quality, water conservation, wildlife habitat, air quality, and other environmental outcomes. Diverse teams—inside and outside USDA—should be employed to build capacity to do strategic resource management regarding each geographically-specified outcome. Collaborative teams involving expert staff from multiple federal and state resource agencies and non-governmental organizations are the only feasible way to produce the most important strategic components the panel thinks are currently missing: (1) strategies for "smart monitoring," (2) assessment of unmet needs and opportunities, and (3) the evaluation of alternative goals and strategies. Progress will be much faster and cost less if driven by effective and ongoing collaboration. Indeed, given the overlapping and multiple agendas of federal, regional, state, and local units of government and non-governmental organizations involved with managing soil, water, air and wildlife, collaboration is the only hope for strategic resource management on working land.

Reauthorize RCA

The Soil and Water Resource Conservation Act of 1977 (RCA, P.L. 95-192, 16 U.S.C. 2001-2005) calls for the Secretary of Agriculture to (1) conduct ongoing appraisals of the soil, water, and related resources of the United States, (2) develop and periodically update a program to conserve, protect, and enhance soil, water, and related resources "consistent with the roles and program responsibilities of other Federal agencies and State and local governments," and (3) provide reports to Congress and the public outlining the results of its appraisals and the content of it national plan for conservation [See sidebar on page 14.]. The Act identifies six topics on which data should be included in the appraisal, and ten topics that should be addressed in the program, but does not limit either to the identified topics.

In short, RCA envisioned an ongoing, collaborative approach to resource assessment, program evaluation, and evaluation of alternatives that includes many of the components of the strategic resource management system the panel is recommending. The RCA Act, for example requires that the assessment and planning process provide: (1) data on the costs and benefits of alternative soil and water conservation practices, (2) an evaluation of the effectiveness of conservation programs and the progress in meeting conservation objectives, and (3) an evaluation of alternative ways to provide conservation. Current law requires that appraisals be completed by the end of calendar years 1979, 1986, 1995, and 2005, and that the national program be completed by the end of calendar year 1979, and updated by the end of 1987, 1997, and 2007 to fund these products, and no products after 2007. The law does not authorize a specific appropriation level to fund the effort.

The panel thinks the RCA process could and should serve as an umbrella to support the multi-agency collaborative effort needed to assemble data from CEAP, agency Government Performance and Results Act (GPRA) strategic planning, agency performance reporting systems, and related assessment efforts being conducted by CEAP lead and collaborating agencies. The RCA umbrella appears to be a particularly useful way to realize the full potential of CEAP in informing the debate over the conservation provisions of the 2007 farm bill.

More importantly, the panel strongly recommends that the RCA be permanently reauthorized in the 2007 farm bill, and legislative language be included to: (1) authorize sufficient appropriations to support ongoing assessment, evaluation, and planning activities, (2) update the purposes and focus of appraisals and planning activities to address the environmental agenda now confronting owners and managers of the nation's privately owned land, and (3) strengthen provisions for collaboration. Such action should provide new authority and funding to create the strategic resource management system the panel recommends and that is critical to ensuring USDA conservation programs produce the environmental benefits taxpayers should expect from their $4 billion investment in conservation.

Goals

The panel also recommends building CEAP and the strategic resource management system around a handful of critical and explicitly stated national and regional environmental goals. The panel concluded that building CEAP—or a larger strategic resource management system—to address the performance of every program producing every environmental benefit everywhere in the nation is a massive and expensive task that is fraught with problematic assumptions. The panel strongly recommends focusing CEAP and the strategic resource management system a around a few environmental and natural resource objectives that are of critical regional or national significance and that are expected to drive conservation efforts over the coming decades. The panel hopes that such a geographically-focused approach—built around goals and regional assessments—could be built faster and at less expense and could produce more credible and useful results in the short term.

Regionalization

The panel recommends USDA look more to regional-level rather than national-level assessments and reporting of results to reduce the cost and increase the utility and credibility of CEAP and related strategic resource management activities. Panel members are concerned that the demands of national-level reporting planned for CEAP national assessment activities [cropland-CRP, grazing land, wetlands, wildlife] will obscure opportunities to produce more focused and comprehensive regional-level assessments. Moreover, regional-level assessments would likely provide a more specific context for environmental problems, more meaningful interpretations of CEAP simulations and assessments, and more effective strategies for employing USDA people and programs to achieve environmental goals.

Representative regional assessments should be properly designed and executed to produce results that are applicable at larger, even national scales, while reducing the overall cost of CEAP and related activities. Regional assessments should, to the maximum extent possible, be linked to on-the-ground environmental improvement and resource conservation projects in which USDA conservation programs play an important role. The value of investments in on-the-ground monitoring at the project scale—strongly recommended by

the panel earlier in this report—would be multiplied if project-scale monitoring and evaluation was tied directly to regional- and national assessment. Producing a national assessment by aggregating valid regional assessments to the national scale is a more credible and meaningful approach than generalizing from the national to regional scales. Such a system could also draw on past analyses of trends in resource condition and environmental quality. As important, such an approach would allow integrated assessment of the aggregate contribution of multiple programs to environmental quality.

Emphasize Strategic Components when Evaluating Programs

As noted earlier, the panel was struck by the emphasis placed on tracking change in generalized estimates of the environmental effects of programs as the primary indicator of program performance or results. Much less attention appeared to be paid to the strategic components of program implementation: the analyses used to set goals, the rigor employed to evaluate alternative strategies for employing programs to achieve those goals, the systems built to monitor progress on-the-ground, and the commitment to reevaluate and modify strategies based on the results of that monitoring. The unavoidable technical problems in simulating or extrapolating generalized environmental effects from information about practices implemented should caution against over-reliance on such measures in program evaluation. In addition, performance measures tend to be atomistic and highly generalized geographically. Changes in what appear to be quantitative performance measures may be telling us more about the assumptions and methods used to simulate or extrapolate those changes than about what programs are actually accomplishing on the ground. The panel recommends that much more attention be paid to on-the-ground monitoring and the strategic components of program management when attempting to assess the performance of those programs.

The Office of Management and Budget (OMB) uses the Program Assessment and Rating Tool (PART) to evaluate the effectiveness of federal programs. PART is intended to evaluate the performance of programs by asking questions about (1) program purpose and design, (2) strategic planning, (3) program management, and (4) program results and accountability. Answers to those questions are evaluated and aggregated into a PART "score" that rates programs as effective, moderately effective, adequate, ineffective, or results not demonstrated. One of the primary drivers of CEAP, the panel

SOIL AND WATER RESOURCE CONSERVATION ACT OF 1977: SUMMARY OF PROVISIONS

Attainment of policies and purposes

The Secretary shall promote the attainment of the policies and purposes expressed in this chapter by:

1) appraising on a continuing basis the soil, water, and related resources of the Nation;
2) developing and updating periodically a program for furthering the conservation, protection, and enhancement of the soil, water, and related resources of the Nation consistent with the roles and program responsibilities of other Federal agencies and State and local governments; and
3) providing to Congress and the public, through reports, the information developed pursuant to paragraphs (1) and (2) of this subsection, and by providing Congress with an annual evaluation report as provided in section 2006 of this title.

Continuing appraisal of soil, water, and related resources

In recognition of the importance of and need for obtaining and maintaining information on the current status of soil, water, and related resources, the Secretary is authorized and directed to carry out a continuing appraisal of the soil, water, and related resources of the Nation. The appraisal shall include, but not be limited to—

1) data on the quality and quantity of soil, water, and related resources, including fish and wildlife habitats;
2) data on the capability and limitations of those resources for meeting current and projected demands on the resource base;
3) data on the changes that have occurred in the status and condition of those resources resulting from various past uses, including the impact of farming technologies, techniques, and practices;
4) data on current Federal and State laws, policies, programs, rights, regulations, ownerships, and their trends and other considerations relating to the use, development, and conservation of soil, water, and related resources;
5) data on the costs and benefits of alternative soil and water conservation practices; and
6) data on alternative irrigation techniques regarding their costs, benefits, and impact on soil and water conservation, crop production, and environmental factors.

Public participation

The appraisal shall be made in cooperation with conservation districts, State soil and water conservation agencies, and other appropriate citizen groups, and local and State agencies under such procedures as the Secretary may prescribe to insure public participation.

was told by agency liaisons, is providing information needed to get "a good PART score."

OMB is near the end of the first five-year cycle of using PART to evaluate federal programs. The panel understands the OMB may revisit and re-evaluate the PART process at the end of that five-year cycle. The panel recommends OMB give more weight to, and more scrutiny of, the strategic components of program implementation in any plans for a new cycle of PART evaluations or as they take a second look at programs that successfully completed the PART evaluation in the first cycle. Answers to the first three questions posed by PART should be used to focus more attention on the extent to which program design, implementation, and management enables a rigorous, adaptive management approach. The panel outlines the six key components of a strategic resource management system to enable adaptive management in a following section of this report. Future iterations of the PART process should evaluate the extent to which these six components are part of the approach used to implement programs.

A great deal of attention and weight is currently given to answers to the fourth question—program results and accountability. CEAP was clearly intended to simulate the effect of conservation practice application as a way to provide quantitative estimates of program effects to demonstrate and track program results. The panel's concerns about the meaning of generalized indicators of practice/program effects were discussed earlier in this report. The panel recommends that future iterations of the PART process should focus more attention on the extent to which such estimates of effects can be directly compared to specified goals for the simulated effects and on the extent to which such performance measures are linked to ecological and economic context in which the estimated effects occur.

The PART process also allows for combined evaluations of multiple programs in a single PART analysis. The panel recommends OMB explore options to conduct outcome-specific rather than program-specific evaluation of performance. For example, rather than evaluate the performance of EQIP in producing change in multiple environmental performance indicators, evaluations would assess the cumulative effect of multiple USDA conservation programs on water quality, or habitat, or air quality, or other national or regional goals. Such an approach could and should reward efforts to integrate implementation of multiple programs and strategically focus resources from multiple programs to more effectively achieve designated environmental goals.

Soil and water conservation program

The Secretary is hereby authorized and directed to develop in cooperation with and participation by the public through conservation districts, State and national organizations and agencies, and other appropriate means, a national soil and water conservation program (hereinafter called the "program") to be used as a guide in carrying out the activities of the Secretary which assist landowners and land users, at their request, in furthering soil and water conservation on the private and non-Federal lands of the Nation. The program shall also include but not be limited to:

1) analysis of the Nation's soil, water, and related resource problems;
2) analysis of existing Federal, State, and local government authorities and adjustments needed;
3) an evaluation of the effectiveness of the soil and water conservation ongoing programs and the overall progress being achieved by Federal, State, and local programs and the landowners and land users in meeting the soil and water conservation objectives of this chapter;
4) identification and evaluation of alternative methods for the conservation, protection, environmental improvement, and enhancement of soil and water resources, in the context of alternative time frames, and a recommendation of the preferred alternatives and the extent to which they are being implemented;
5) investigation and analysis of the practicability, desirability, and feasibility of collecting organic waste materials, including manure, crop and food wastes, industrial organic waste, municipal sewage sludge, logging and wood-manufacturing residues, and any other organic refuse, composting, or similarly treating such materials, transporting and placing such materials onto the land to improve soil tilth and fertility
6) analysis of the Federal and non-Federal inputs required to implement the program;
7) analysis of costs and benefits of alternative soil and water conservation practices; and
8) investigation and analysis of alternative irrigation techniques regarding their costs, benefits, and impact on soil and water conservation, crop production, and environmental factors.

Utilization of available information and data

In the implementation of this chapter, the Secretary shall utilize information and data available from other Federal, State, and local governments, and private organizations and coordinate his actions to avoid unnecessary duplication and overlap of planning and program efforts.

Termination of program

The provisions of this chapter shall terminate on December 31, 2008.

STRATEGIC RESOURCE MANAGEMENT BLUEPRINT

The panel discussed at length the components that must be part of a strategic resource management system. The panel then evaluated the extent to which CEAP currently provides those components or is anticipated to provide those components. The panel also identified missing pieces—components of a strategic resource management system that are not part of CEAP plans and that were not part of briefings or background material provided to the panel.

Components of a Strategic Resource Management System

The strategic resource management system envisioned by the panel must be able to accomplish six tasks:

1. *Construct and update the conservation baseline*: describe, quantify, and regularly update—at salient spatial scales—the magnitude and extent of environmental problems as well as opportunities to advance conservation efforts on the nation's working land.
2. *Set meaningful goals*: evaluate the feasibility and desirability—at salient spatial scales—of alternative goals for environmental improvement on working land.
3. *Evaluate alternative strategies*: rigorously evaluate the relative effectiveness of and benefits produced by alternative strategies for deploying people and programs to produce the changes in practices and farming systems where they are most needed to achieve established goals.
4. *Monitor program implementation*: assemble and assess program implementation data to determine if people and resources have been employed as per the selected strategy.
5. *Monitor environmental benefits*: assemble and assess program implementation and natural resource inventory and monitoring data to assess whether progress is being made toward established goals and if that progress is sufficient to hit established timelines.
6. *Reevaluate strategies*: rigorously reevaluate strategies based on information generated through monitoring of program implementation and environmental benefits and analysis of the reasons anticipated benefits were or were not achieved.

CEAP, as currently defined and presented to the panel includes the following components: (1) CEAP National Assessments—Cropland-CRP, Wildlife, Wetlands, and Grazing Land, and (2) Watershed Studies—ARS benchmark, CSREES, and NRCS watershed studies. Current plans for CEAP include elements that are well positioned to become part of a strategic resource management system. Critical components of such a system, however, appear to be missing or were not included in the scope of the panel's inquiry. The table on the opposite page summarizes how the planned components of CEAP—as currently envisioned—could contribute to a comprehensive strategic resource management system.

Strategic Resource Management System Components	CEAP National Assessments	CEAP Watershed Studies	Performance Reporting Systems
Construct and Update Conservation Baseline			
Simulated environmental effects at national or regional scale of current conservation effort.	X	?	
Document current level of conservation effort supported by USDA conservation programs.	?		X
Document current level of conservation effort supported by other federal and nonfederal activities.	?		
Assess extent and magnitude of unmet environmental problems and opportunities.			
Set Meaningful Goals			
Evaluate desirability and feasibility of alternative goals.			
Evaluate Alternative Strategies			
Simulate the effect of alternative strategies.	X	?	
Compare simulated strategies to monitoring data.			
Evaluate the relative effectiveness of and benefits produced by alternative strategies.	X	?	
Monitor Program Implementation			
Determine if people and resources have been employed consistent with selected strategies.			X
Monitor Environmental Benefits			
Monitor change in environmental outcomes which programs are intended to achieve.			
Reevaluate Strategies			
Simulate the effect of alternative strategies.	X	?	
Compare simulated strategies to monitoring data.			
Evaluate the relative effectiveness of and benefits produced by alternative strategies.	X	?	

Key:

X Component included in current CEAP plans.

? Priority given to component in current CEAP plans is unclear.

Component missing from CEAP plans.

Components Included in Current CEAP Plans

The panel is encouraged that USDA's current plans for CEAP could produce several important components of a strategic resource management system.

The CEAP Cropland-CRP national assessment simulation capabilities will enable large-scale estimation of the baseline effects of the conservation effort represented by USDA programs. That simulation capability will also allow for more rigorous assessment and reevaluation of strategies for employing staff and programs to meet goals—at least at large regional and national scales and in the short-term for cropland only. Current CEAP plans call for augmenting these capabilities through planned activities in the wetlands and wildlife components of the national assessment and building the capacity to estimate effects of conservation activities on grazing land. The CEAP national assessment simulation capability should be a critical beginning contribution to a strategic resource management system for the nation's working land.

CEAP watershed studies will help refine and validate the methods used to simulate effects of conservation practices and programs. Building the science base to support such simulations will be an important contribution to the strategic resource management system. CEAP watershed study plans also, however, indicate that building the capacity to conduct regional assessments of the environmental benefits of conservation activities is one of the potential outcomes of the watershed study component. It is unclear to the panel, however, what priority is being accorded to building this regional assessment capacity and how CEAP scientists will scale-up from watershed analyses to the regional level. Regional assessments, tied to more specific environmental goals in more specific geographic settings, will produce more credible and useful conservation baselines and evaluations of alternative strategies. Moving to a more regional approach to strategic resource management is one of the promising opportunities and starting point the panel has identified for building a strategic resource management system within the constraints of limited budgets and staff. The panel recommends USDA and its partners to give greater emphasis on, and priority to, building such outcome and region-specific assessment capacity in their overall strategy for CEAP watershed studies.

Performance reporting systems, already in place in NRCS and FSA, will provide the nuts and bolts information about program implementation needed to document the current level of conservation effort supported by USDA. Efforts to more precisely geo-reference program implementation data are essential and should be the highest priority for enhancing current performance reporting systems. Agency staff indicated to the panel that such efforts are already underway. The panel applauds these efforts and encourages USDA to complete this task as soon as possible.

Components Missing from USDA Plans

The panel is concerned that several critical components of a strategic resource management system are not included in USDA's current plans for CEAP. In some cases, the panel has reason to hope that the missing pieces will, or are, being provided by other agency activities beyond the scope of CEAP—and beyond the charge to the panel. In other cases, the panel did not see any evidence that provision was being, or would be, made to provide critical components of a strategic resource management system.

On-the-Ground Monitoring and Inventory Systems

The most important and troubling missing piece is the absence of plans for on-the-ground monitoring of change in the environmental indicators and outcomes conservation programs and activities are intended to improve. Plans for tracking the environmental effects of programs rely largely, if not entirely, on micro-simulations of or extrapolations from practice information. The panel has stressed its concerns about the credibility and utility of such estimates, even if large investments are made to improve their accuracy. There is an urgent need for USDA to revisit and strengthen its plans for on-the-ground monitoring and inventory systems as the primary source of information to evaluate progress toward goals and the environmental benefits of conservation programs. That monitoring system must be built around a core set of environmental/ecological indicators tied to the primary environmental outcomes sought from USDA conservation programs. Monitoring, for example, should be employed to determine whether investments in irrigation efficiency or other water conservation measures are resulting in improved in-stream flows, recharge of aquifers, or water supply reservoirs. On CRP acres, the quality and habitat value of cover should be monitoring to determine if wildlife goals are being met. Many more examples could be listed. In all cases, monitoring systems must be designed at the right scale and around the right core indicators. The objective of all such monitoring efforts must be to determine the extent to which the environmental benefits people and programs were employed to achieve are in fact being achieved.

Simulations and extrapolations cannot substitute for on-the-ground monitoring and inventory systems designed to determine if anticipated conservation and environmental benefits are being achieved. Such monitoring and inventory systems should be—in fact must

be—accomplished through a collaboration of USDA and its federal, state, and local partners. No individual agency or entity has the personnel and resources required to design and implement such monitoring and inventory systems. Large investments in monitoring systems are currently made by multiple federal, state, and local units of government and nongovernmental organizations in the public and private sector. CEAP must harness investments in monitoring already being made by other federal, state, and local entities to the maximum extent possible to provide the on-the-ground monitoring information needed for credible assessment of the environmental benefits of conservation programs.

At a minimum, USDA must carefully compare the results of its own estimates of the effects of its programs to the results of its own and other monitoring programs that track changes in some or all of the environmental indicators USDA conservation programs are expected to improve. USDA must be able to explain discrepancies between its estimates of effects and any measured changes in environmental outcomes or indicators. Moreover, USDA must be able to clearly and effectively communicate the source and meaning of those discrepancies to policymakers, program managers, and the conservation community. Unexplained discrepancies will erode the credibility of both USDA's estimates of the effects of its programs and the decisions made based on those estimates.

USDA and its partner agencies and organizations have designed and implemented their current monitoring programs to meet specific objectives central to the missions of each particular agency and organization. Unfortunately, the collective information gathered through these programs may not be easily transformed to meet the needs of USDA to document the environmental effects of its conservation programs. Even with outstanding interagency cooperation, current monitoring conducted by USDA and its partners may not be enough. It is likely that additional funds and staff resources will be needed to support monitoring and inventory systems. The panel recommends that Congress mandate that at least one percent of the funding for each authorized program be set aside to support monitoring and evaluation of those programs. The funds set-aside for monitoring and evaluation should be pooled to allow cross-cutting evaluations of the contribution multiple programs are making to a single environmental outcome.

On-the-ground monitoring need not be overwhelming complex and expensive. The key to "smart" monitoring is carefully selecting indicators that can be used to tell the story of what is happening in the environment. These indicators can be used to document both the state of the environment and the way that it is responding to the conservation actions that are being implemented. For example, one goal of nutrient management is to provide enough nutrients for good plant growth, but not so much that the excess leaches into groundwater or runs off into adjacent streams and lakes. Soil phosphorus concentrations or index values can indicate both the nutritional status of the soil and the potential for losses that can negatively affect water quality. Likewise, one goal of conservations program to establish riparian buffers is to improve wildlife habitat, by increasing vegetative cover. Percent cover by woody vegetation could provide an indicator of the habitat available to riparian shrub and forest birds, and the effectiveness of conservation programs that support buffer creation.

There are many examples of partnership approaches for managing the costs of on-the-ground monitoring. These include (1) water quality monitoring programs implemented in partnership with watershed organizations and other citizen groups, (2) vegetation and bird habitat surveys implemented in partnership with the conservation and wildlife organizations such as The Nature Conservancy, and (3) biotic surveys conducted with a variety of partners such as the Riverwatch network. Similarly, soils data collected by extension agents and other agricultural partners could be compiled and supplemented with targeted sampling to provide a statistically valid overall picture of nutrient conditions in a watershed. These data could be used both to identify areas that might receive particular emphasis in new conservation efforts and document trends in nutrient status and nutrient losses to the environment over time as conservation programs are implemented.

The panel strongly recommends using—at a minimum—$40 million of the $4 billion taxpayers are investing annually in conservation programs to determine if taxpayers are getting the conservation and environmental benefits they are paying for. In the words of one panel member "nobody builds a $4 billion building without an architect." Moreover, the panel recommends the Administration strongly support such a mandatory monitoring and evaluation fund and ensure such funding, once authorized, is included in the President's annual budget proposal to Congress.

Unmet Needs and Meaningful Goals

The panel did not see any evidence that provision was being made for rigorous and comprehensive identification and assessment of the extent and magnitude of environmental and resource management problems that are not being met through current conservation efforts. Such information is the foundation of a strategic resource management system and the basis for setting

meaningful goals. The panel is aware of tentative plans to use the CEAP cropland-CRP conservation baseline to simulate the extent of such needs by comparing estimates of environmental effects under current treatment to the environmental effects that would be expected under a "full treatment scenario." This is a step forward, but such simulations will not substitute for more comprehensive and on-the-ground efforts to identify unmet needs. The ability to set goals and evaluate alternative strategies will be seriously constrained in the absence of solid information about unmet environmental problems and opportunities.

The panel is aware that strategic planning activities mandated under the Government Performance and Results Act (GPRA) and the national conservation planning process mandated under the Resource Conservation Act (RCA), must include rigorous assessment of unmet needs and opportunities and must set or evaluate meaningful goals in order to meet the mandates of those statutes. The panel made no effort to review, let alone evaluate these strategic planning activities. Such an effort was well beyond the charge to the panel. The panel hopes and expects these efforts will, in fact, produce the rigorous assessment of unmet needs so essential to a strategic resource management system.

The panel strongly recommends that clear links be forged between CEAP staff, USDA strategic planners, and staff responsible for the RCA process. Without such links, many of the benefits of a strategic resource management system will be lost. Linked staff should be charged with producing a coordinated plan for data collection, resource inventory, and resource assessment activities that will produce credible assessments of unmet needs. The Natural Resources Inventory (NRI) system, in particular, should be revisited to determine if and how the system could be revamped to produce statistically valid estimates of the extent and geographic distribution of conservation needs.

Beyond USDA Conservation Programs

Many private and public sector entities contribute to the nation's conservation effort on working land. Meaningful assessment of the effects of those efforts must be part of a strategic resource management system. The CEAP national survey on cropland will collect some information on such efforts, but it is not clear to the panel what plans are in place to regularly update and enrich information available about non-USDA driven conservation on working land. The panel recommends a collaborative effort among USDA and its partners to design and implement a cost-effective system to collect and consolidate information about the level of conservation effort supported by other federal, state, and local units of government, nongovernmental organizations, and the private sector. Such consolidated information would provide a much better basis for strategic decisions about how USDA people and resources could best be deployed to meet conservation goals.

BUILD THE SCIENCE BASE

Building the science-base for strategic resource management on working land must be a primary purpose for CEAP. That purpose is currently overshadowed by more short-term objectives, but in the long-term, building the science base should become among the most important contributions of CEAP to a strategic resource management system. Long after the assessment reports generated by CEAP are out of date, the research findings and CEAP's contribution to scientific understanding and technical know-how will continue to contribute to improving the nation's conservation effort on working land.

The panel applauds USDA's commitment to building the science base through CEAP. USDA Agricultural Research Service estimates that $18 million of their internal funds are directed to CEAP each year. USDA's Cooperative State Research, Education, and Extension Service (CSREES) is providing $2 million and NRCS $1 million annually to support additional watershed studies. The NRCS investment in national assessment work is also contributing to the knowledge base regarding the environmental effects of conservation practices. USDA is also working with The Wildlife Society and the Soil and Water Conservation Society to document, through literature reviews, the state of the scientific knowledge regarding the effect of conservation practices on environmental outcomes. In addition, a workshop entitled, "Managing Agricultural Landscapes for Environmental Quality," is planned for October 2006 to assemble scientific expertise regarding quantification and evaluation of environmental effects of conservation efforts at watershed or other salient geographic scales.

Efforts such as these to build the science base are critical to long-term success of CEAP and to strategic resource management. The scientific momentum CEAP has generated to date must be maintained well beyond the 2007 farm bill if the full benefits of investments to date are to be realized.

Scientific Priorities

Scientific efforts currently underway under the aegis of CEAP appear to focus on two main objectives: (1) validating models used in national assessments to simulate the effect of application of conservation practices on selected environmental outcomes, and (2) refining estimates of effects at regional and/or watershed scales. The panel believes these are important objectives for CEAP in the short-term.

The panel is particularly enthusiastic about the unique value of the watershed study component of CEAP. Studies conducted at watershed or other salient geographic scales, could and should become a rich source of information to improve the effectiveness of conservation programs. Environmental outcomes—soil quality, water quality, water conservation, air quality, and fish and wildlife habitat—are produced at scales larger than the individual field, farm, or ranch. Strategic management of conservation programs to secure those benefits requires knowledge of *where* intervention is needed in the watershed as much as *what* treatment is needed. Watershed studies are uniquely suited to refine our ability to precisely apply conservation treatments to ensure the most cost-effective results at the watershed or other salient geographic scales. The panel strongly recommends the watershed studies be conducted in a fashion that will allow comparisons between studies in regard to methods, measures, and outcome indicators.

The primary objective of the watershed study component of CEAP should be to build the capacity to effectively direct conservation efforts within designated watersheds or other salient geographic units to achieve designated environmental benefits in the most cost-effective and sustainable way. The key scientific issues watershed/geographic unit studies could be designed to address are many, exciting, and detailed below. In short, these multiple issues all lead to answers to three broad, inter-related, and critical questions:

1. What are the most effective interventions—practices, alternative farming systems, landscape or hydrologic restoration—to achieve specific environmental benefits?

2. Where should such interventions be placed on the landscape to most effectively achieve specific environmental benefits?
3. How can we design cost-effective and cost-feasible systems to monitor changes in core environmental indicators?

CEAP should support a USDA-wide agenda of scientific activities designed to determine, in the words of one panel member, "What are we doing that works; what are we doing that doesn't work; and how do we do things better?" That agenda could and should expand the watershed studies component of CEAP over time to (1) increase the land uses and geographic settings covered by such studies, and (2) to expand the scope of watershed studies to include effects on aquatic and terrestrial wildlife. The panel recommends additional USDA-CSREES funds, particularly funds from the National Research Initiative be made available to scientists and institutions to conduct collaborative research associated with CEAP activities and objectives.

The panel urges USDA to take advantage of all opportunities—including additional funding—to create a set of "representative" watersheds or other salient geographic units in various agricultural settings on a regional basis. The network of watershed studies should be constructed through collaboration with multiple partners in the federal, state, and local governments, research and education institutions, nongovernmental organizations, and the private sector and include studies already underway by other federal, state, and local government agencies and other entities in the private commercial and nonprofit sectors. Such a system of watershed/geographic unit studies should create a solid scientific foundation for strategic resource management and provide a basis for more credible assessments of the effect of conservation programs at larger regional or national scales.

The issues such an expanded network of current and new watershed/geographic unit studies and related scientific activities undertaken under CEAP should address include:

- Variable source area hydrology; identifying critical source areas within watersheds for nonpoint source pollutants.
- The contribution of geomorphic instability (stream channel adjustment to changes in hydrologic regime) to resource degradation and effective approaches to managing those effects.
- Wetland functions and values at ecosystem and watershed scales, including contributions to healthy fish and wildlife habitats and populations.
- Quantifying and predicting net quantitative benefits of conservation efforts at watershed and other salient geographic scales.
- Best options for targeting conservation efforts *within* watersheds to enhance effectiveness.
- Integration of fish and wildlife habitat conservation as a critical and contributing component of improving watershed health and the subsequent watershed benefits derived from those actions.
- The quantifiable contributions of applied conservation efforts to improve the quality and health of fisheries habitats and aquatic resources.
- Quantitative benefits of terrestrial wildlife conservation.
- Effective and reliable quantitative measures of progress at watershed and other salient geographic scales.
- Strategies for innovative approaches to monitoring changes in resource and environmental outcomes that are cost-effective and feasible.
- Information needs to enhance or augment adaptive management at watershed/geographic unit scales.
- Elucidation of the economic and social factors that drive application of conservation at farm, ranch, watershed, and other salient geographic scales.

An active and well-focused research agenda is essential to building a strategic resource management system and for ensuring the scientific credibility and legitimacy of CEAP efforts.

Capacity to Deliver Science

Panel members repeatedly discussed the status of the technical services infrastructure—research, education, and technical assistance—during their deliberations. Panel members are acutely aware of the importance of this infrastructure as the foundation of the nation's conservation effort on working land. Even the best science base will produce few results unless technically proficient people and technical tools are available to translate that science into on-the-ground changes in farm, ranch, and watershed/geographic unit management. The best and most rigorously developed strategy for deploying staff and programs will only be as good as the capability to execute that strategy.

Moreover, rapid scientific advances are improving our ability to understand and manage the spatial and temporal variability in agricultural landscapes in ways that could dramatically improve the performance of conservation

programs. Taking advantage of these opportunities, however, will require better information and people trained to use that information to more precisely apply conservation treatments at field, farm, ranch, watershed, and other salient geographic scales. We will miss a major opportunity for cost-effective conservation if our technical infrastructure is too weak to take advantages of the new opportunities science is creating.

An in-depth assessment of the strengths and weaknesses of the current technical services infrastructure should be among the first priorities undertaken by a strategic resource management system. Panel members realize such an in-depth assessment is largely outside the scope of CEAP and outside the scope of the panel's charge. But if CEAP simulations consider the implications of program implementation at higher levels of effort or through more strategic implementation, they will be assuming that that the technical services needed to secure those higher levels of performance are available. Clearly, those assumptions warrant additional scrutiny. Moreover, panel members believe technical assistance and advice is often a more cost-effective means to enhance environmental benefits from conservation on working land than financial assistance, particularly when directed at implementation of management-intensive, annual conservation systems. The most important task USDA should give to its strategic resource management system is a rigorous assessment of alternatives for strengthening the technical services infrastructure that drives the nation's conservation effort on working land.

CAUTIONS

In its preliminary findings, the panel identified four potential "soft-spots" that, if not addressed, could derail CEAP and efforts to build a strategic resource management system. Those soft spots included:

1. Transparency of data, methods, and estimates.
2. Scientific and technical limits on ability to quantify effects.
3. Simulation versus monitoring.
4. Program neutral versus program specific assessments.

In this report, the panel has already reconfirmed and reiterated its concerns about the scientific and technical limits on ability to quantify effects and its concerns about over-reliance on simulation and under reliance on monitoring. The panel would like to also reaffirm its concerns about transparency and program neutrality.

Transparency

Any effort to simulate or extrapolate the environmental effects of conservation programs based on the number and kind of practices those programs fund, faces important hurdles. Estimates of environmental effects must rely on our ability to infer and/or simulate multiple steps between practice implementation and ultimate environmental effects. Every step involves assumptions and has the potential to introduce error in the final estimate.

The panel understands that assumptions and potential error cannot be eliminated from CEAP or agency performance reporting systems. Instead, the panel strongly recommends that USDA ensure that CEAP and performance reporting methods and data be made as transparent as possible so that users of the information understand the assumptions and potential sources of error that are imbedded in the assessment and accounting information generated. Source data and modeling protocols should be shared widely within the conservation and scientific communities to maximize transparency and, therefore, the credibility of results in the short term. USDA must identify the most sensitive assumptions and largest sources of error in its results and explain the implications of that sensitivity analysis for users of CEAP and performance reporting system outputs. In the long term, the panel concluded that one of the most valuable outcomes of the overall CEAP effort may well be identification of gaps in knowledge and data collection that allow pinpointing "what we know and what we don't know." Such knowledge can be used to identify "tractable problems" in our accounting and assessment systems that can be fixed at a reasonable cost.

Program Neutral

The unit of analysis originally envisioned for CEAP is the environmental performance of an individual conservation program. Indeed, the original detailed study plans for CEAP indicate USDA intended to report national estimates of the environmental effects produced each year by the following programs:

- Environmental Quality Incentives Program (EQIP).
- Conservation Reserve Program (CRP).
- Wetlands Reserve Program (WRP).
- Wildlife Habitat Incentives Program (WHIP).
- Conservation Technical Assistance (CTA).
- Conservation Security Program (CSP).
- Grassland Reserve Program (GRP).

The panel remains concerned that focusing on individual programs will produce fragmented assessments and impede strategic resource management. As one panel member put it, "a focus on program may tell us a lot about that particular program, but it might not tell us much about how effectively environmental problems are being solved." CEAP and the strategic resource management system, of which it is an integral part, should be built around a handful of goals and be conducted at geographic scales appropriate to each goal. The system should stress integrated assessment of the aggregate contribution of multiple programs to environmental quality.

This report is part of a larger effort—supported by a cooperative agreement with the U.S. Department of Agriculture (USDA) Agricultural Research Service—to assist with the design and implementation of the Conservation Effects Assessment Project (CEAP). The Soil and Water Conservation Society (SWCS) facilitated an external, policy-level review of CEAP. We relied on input and advice from the CEAP Blue Ribbon Panel, whose members are listed below.

We are indebted to the agency liaisons and presenters who shared their time and expertise during the panels' meetings. The findings and conclusions, however, are solely the responsibility of SWCS.

CEAP Blue Ribbon Panel

Sandra Batie: Professor, Michigan State University-Department of Agricultural Economics.

Otto Doering: Professor, Purdue University-Department of Agricultural Economics.

Ronald Hammerschimdt: Director, Division of Environment, Kansas Department of Health and Environment.

Krysta Harden: Chief Executive Officer, National Association of Conservation Districts.

Jay Hardwick: Farmer, National Cotton Council.

Ferd Hoefner: Policy Director, Sustainable Agriculture Coalition.

Charlie Ingram: Director, Legislative and Regulatory Affairs, National Association of State Departments of Agriculture.

Joe Martin: Director of Congressional Affairs, American Farm Bureau Federation.

Tamara McCann Thies: Director for Environmental Issues, National Cattlemen's Beef Association.

Jennifer Mock: Agriculture Conservation Policy Analyst, International Association of Fish and Wildlife Agencies.

Peter Nowak: Professor, University of Wisconsin-Madison-Department of Rural Sociology and Department of Environmental Studies.

Ross Racine: Executive Director, Intertribal Agricultural Council.

Tim Searchinger: Attorney, Ecosystem Restoration Program, Environmental Defense.

Jeff Vonk: Director, Iowa Department of Natural Resources and SWCS Board of Directors Ex-Officio Liaison.

Mary Watzin: Director, Rubenstein Ecosystem Science Laboratory, University of Vermont-Rubenstein School of Environment and Natural Resources.

Jeffrey Zinn: Specialist in Natural Resources Policy, Congressional Research Service.

SOIL AND WATER CONSERVATION SOCIETY

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