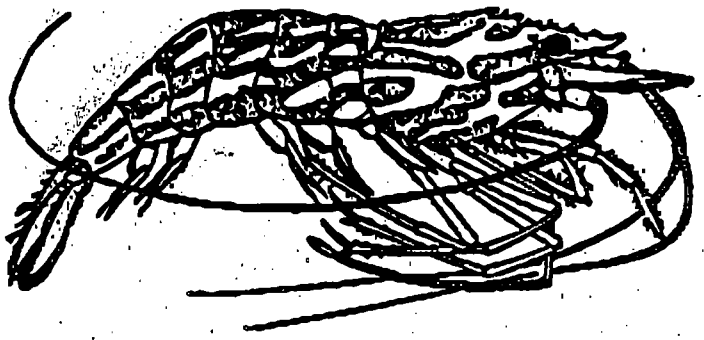

RAPIFAX TRANSMISSION SHEET

National Oceanic and Atmospheric Administration
POLICY AND STRATEGIC PLANNING
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CS/EC, HCHB Room 6222
Washington, D.C. 20230

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URGENT URGENT URGENT

MEMORANDUM FOR: CENR Agency Principals
CENR Executive Committee
CENR Subcommittee Chairs
Subcommittee Points of Contact

FROM: CENR Executive Secretariat

SUBJECT: OMB Budget Summary

In their memo dated August 5, 1994, Alice Rivlin and Jack Gibbons requested that the CENR provide OMB and OSTP a 5 - 10 page assessment and budget analysis summary. The summary must include a description of the environment and natural resources budget and discuss how important goals and policy issues are addressed, including a strategy to measure the progress and performance of achieving these goals. It should identify any funding shortfalls associated with important policy issues and provide options on how they can be accommodated within the agency budget totals. The draft summary (attached) was developed through the subcommittees process and is based on agency program information and presentations.

Please review and comment on the attached draft summary. The summary is due from CENR to OMB by Friday, October 7. We could not receive an extension from OMB and therefore we must get your comments by Thursday, October 6, 3:pm.

Please send your comments, preferably by E-Mail, by [redacted], October 6, to:
3 pm

Donna Wieting/CENR Executive Secretary
202-482-5916 (tel)
202-482-1156 (fax)
dwieting@rdc.noaa.gov

Thank you for your immediate attention to this important effort. Please call me at the number above if you have any questions.

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Committee on Environment and Natural Resources
Summary and Analysis of the Department and Agency
FY 1996 OMB Requests

The overall federal funding for environmental and natural resources R&D in the FY 1996 OMB proposals from agencies has increased three percent over FY 1995 and includes some progress in the priority areas identified in the May 6, 1994 Gibbons/Panetta Budget Guidance to the agencies. Through redirection of resources and new or enhanced budget initiatives many agencies have responded to these priorities. It is critical that these initiatives and programs be protected as the FY 1996 budget process proceeds. Significant shortfalls have been identified as well. To the extent possible, additional resources should be provided to fund these shortfalls. When additional resources cannot be provided, agencies should work together, through the CENR to fill these gaps through resource redirection. The CENR will, through the development of the Federal Environment and Natural Resources R&D Strategy and Implementation Plan, continue to analyze current agency programs for overlaps and gaps and provide guidance for FY 1997 and beyond.

I. Support for National Goals and Priorities

A National Vision

A guiding vision of the Clinton/Gore Administration is to protect the environment for present and future generations by employing policies and approaches that enable development to proceed in a sustainable manner, while preserving ecological integrity and diversity, protecting human health and safety, and enhancing the quality and quantity of food, fiber, energy and water supplies.

The coupling of a sustainable economy with a sustainable environment is a central theme of Clinton/Gore policies. This theme can be expressed by the following principles: 1) long-term economic growth that creates good jobs and protects the environment; 2) world leadership in basic science, mathematics and engineering; 3) continued progress toward implementation of the goals of U.S. environmental statutes and international conventions; and 4) sustainable use of ecological systems.

The Need and Scope

The range of environmental and natural resource issues are diverse and interrelated. World population, agriculture, and industrial activities have increased dramatically during the last century and are affecting the environment at all geographical scales. It is necessary to assure that investments in environmental and natural resource R&D provide the information needed to support the Administration's goals and policies while recognizing the reality of limited fiscal resources. The Committee on Environment and Natural Resources (CENR) hasconducted a coordinated evaluation of current environmental R&D programs within all of the agencies. The CENR also sponsored a National Forum on Environment and Natural Resources R&D in March 1994 at the National Academy of Sciences. The Forum was attended by over two hundred participants from academia, industry, non-governmentalorganizations, and state and local governments.

This analysis of the current agency R&D programs and the input from the Forum formed the basis for setting the R&D priorities under goal four, "Improved Environmental Quality" in the Gibbons/Panetta

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guidance to the Agencies in May 1994. Five areas where additional emphasis in FY 1996 is critical were identified. They are: 1) Scientific Basis for Integrated Ecosystem Management; 2) Socioeconomic Dimensions of Environmental Change; 3) Science Policy Tools; 4) Observations, and Information and Data Management, and; 5) Environmental Technologies. The Global Change Research Program remains a high priority. Each of these areas support overall Administration goals, policies, and initiatives.

The Budget

Agencies have reported over $5.5 billion in focused CENR R&D programs for FY 1996 (Table 1). While we do not yet have all agency reports for FY 1996 contributing programs, we expect it be about $7 billion based on the contributing programs reported for FY 1994. The CENR, through its member agencies have worked hard to assure that the resources reported by the agencies are accurate and consistent in how they are categorized across agencies, but work still needs to be done.

Increases are proposed in each of the CENR issue subcommittees with the exception of Resource Use and Management (Table 2).

II. Strategy for Measuring Performance

To assure that Federal investments in environmental and natural resources R&D contribute effectively to national goals, and to measure progress supporting those goals, the CENR will establish performance standards for the programs conducted under its auspices. The performance standards will include measurement criteria for policy goals, science goals and program goals.

Each of the CENR subcommittees are developing programmatic milestones for a 1-5 year timeframe for the critical R&D priorities that are identified in their strategies and implementation plans, as well as, performance measures that are outcome-based, focusing on results not process.

In addition, the CENR is taking positive steps to assure that 1) the R&D programs that are federally funded are relevant to policy and scientific priorities, and 2) the work is of the highest scientific and technical quality. These are critical to improving performance and ensuring the soundness of federal investments. To help address the former, the National Academy of Sciences has proposed establishing a Board on Sustainable Development. One of the tasks of the Board would be to help the CENR review federal environmental R&D programs for their contributions to science and policy needs. To assure that federal dollars are funding the highest caliber science and technology, the CENR is initiating an interagency effort on competitive selection and peer review, with the view that through competition, we will acquire the best R&D for federal dollars.

III. Agency Responses to the CENR Priorities

There has been general consensus that the CENR has accomplished several important goals: (1) creating the structure and process to undertake a comprehensive review of environmental R&D which has been needed to enable interagency agreements on goals and priorities, (2) providing critically needed guidance for agency budget formulation activities so that highest priority research is supported, and (3) stimulating agencies to work together in new and innovative ways to accomplish jointly

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developed goals. Both the stakeholder input from the National Forum on Environment and Natural Resources R&D and the priority-setting activities by the CENR have had significant positive influence on the research budget formulation by the Agencies for FY 1996. Agencies have addressed priority areas by refocusing R&D efforts from lower priority research, as well as developing new or enhanced budget initiatives as part of their FY 1996 budget requests. Although the agencies participating in the CENR have made tremendous strides in redirecting funding or requesting new initiatives in support of the highest priority initiatives, key gaps remain. These shortfalls in research efforts were not supported in the individual agency requests for FY 1996. Following is a short description of Agency responses to CENR priorities and critical shortfalls for which we are requesting additional FY 1996 resources. For each of the initiatives that are funded, the CENR will continue to provide the framework for interagency panels to establish lead responsibility, develop an integrated plan, manage cooperatively formulated and handle interagency RFPs.

Environmental Priority: Scientific Basis for Integrated Ecosystem Management

Increased Emphasis in FY 1996 Budget Submission

Biodiversity and Ecosystems Dynamics – The Biodiversity and Ecosystem Dynamics is providing the forum for federal agencies to implement a National Partnership for a Biological Survey and to support sustainable development as was recommended by the National Academy of Sciences. The FY 1996 agency budget proposals evidence the progress being made to respond to key priority research areas. Requested increases include:

(a) DOI to further assess the status and trends of our biological resources (Inventory & Monitoring NBS +.9M); develop biological information bases (Info Transfer NBS +.8M); understand and model basic biological processes (Ecosystem Dynamics NBS $6.6M); link physical information (hydrology, contaminants, paleoecology) to ecosystem science issues (Critical Ecosystems USGS +2.5M); and understand regulated aquatic ecosystems (Water BOR +1.6M);

(b) DOC/NOAA to focus on physical and biological processes that influence coastal fisheries (Coastal Fisheries Ecosystems NOAA +3.0M); improve fishery resource assessments (Build Sustainable Fisheries NOAA +12.0M); and assess the status of protected species (Build Sustainable Fisheries NOAA +9.5M); and

(c) USDA to address the structure and function of integrated ecosystems and develop new technologies for biocontrol of pests (Integrated Pest Management and Biocontrol USDA/CSRS +$3.9M); focused research on how forest composition and structure relate to function; how ecological conditions across spatial and temporal patterns interact (Management of Forest Ecosystem Research Program USDA/FS +$0.6M).

All contribute to our ability to provide the knowledge required for an integrated ecosystem approach that can: (1) better anticipate change; and (2) restore the function and integrity and lead to the sustainable management of ecosystems.

Water Resources and Coastal and Marine Environments – Federal agencies have responded positively with initiatives to improve the scientific basis for ecosystem management. This positive response includes improving baseline understanding of aquatic systems, socioeconomic dimensions of

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environmental change, and the development of science policy tools and environmental technologies to protect, restore, and manage critical aquatic habitats and water quality. In FY 1996, specific efforts will be enhanced in the South Florida ecosystem to understand the natural and human forces driving the loss of critical habitat (and biodiversity) and to restore the function and integrity of these areas for the sustainable management of competing ecosystem pressures.

(a) Ecosystem Management Initiatives – In FY 1996, NOAA and EPA are supporting interdisciplinary science plans in the South Florida ecosystem. EPA is focusing on planning and restoration activities in the Florida Keys while NOAA is focusing in Florida Bay. (NOAA– $3.2M Coastal Habitat Protection/South Florida Initiative). NOAA is also supporting an interagency initiative to improve the protection and management of coral reef systems (NOAA – $3.0M Coastal Habitat Protection/Coral Reef Initiative).

(b) Ecological Restoration and Rehabilitation – NOAA is enhancing restoration science and technology to improve NOAA's stewardship responsibilities (NOAA – $1.5M Promote Healthy Coastal Ecosystems/Habitat Restoration Center). The Army Corps of Engineers is starting a new effort to research wetlands structure and the impacts of contaminated dredge material and to develop restoration methods (USACE – $0.68M Wetlands Research II, Long-Term Effects of Dredging).

(c) Water Quality and Aquatic Ecosystem Functions – The USGS is expanding water quality and geologic processes observation, assessment, and data collection efforts (DOI – $6.0M National Water Quality Assessment Program; $3.0M Marine and Coastal Geologic Surveys), and EPA is supporting research on subsurface processes to better understand and manage ground water quality (EPA – $1M Field Evaluation of Subsurface Processes). The Bureau of Reclamation is supporting an effort to effectively manage regulated aquatic systems (DOI – $1.5M Water Technology and Environmental Research Program). The Army Corps of Engineers is supporting research to assist resource managers in assessing and managing environmental impacts of Corps activities on water quality and habitats (USACE – $0.1M Water Quality Research, Environmental Impact Research). The USDA is supporting a management area systems grant program to improve agricultural strategies to reduce nonpoint source pollution and other nutrient/contamination problems (USDA/CSRS – $1.85M Special Research Grant Program).

Global Change – To ensure the health and vitality of ecosystems in an era of global climatic change, the state of ecosystems must be documented and the processes that control changes in composition and biogeochemistry must be understood. The Terrestrial ECOlogical Research (TECO) Program is a joint agency (NSF, DOE, DOI (USGS), USDA, EPA, NASA) effort that focuses on reducing the major uncertainties concerning terrestrial biogeochemical processes, ecosystem responses to climate change, and ecosystem feedback effects back to the climate system. Initial new funding of nearly $5M is included for FY-95 in NSF's Ecological Diversity program and a program redirection of $5M is included in DOE's Program for Ecosystem Research. For FY-96, DOI proposes an additional increase of $2.5M (NBS global change research program). The documentation of the state of global ecosystems is proposed as a new initiative to begin in FY 1996 as part of the proposed Global Ecosystem Mapping Initiative; to start this major initiative, a funding redirection of $1M by EPA (terrestrial carbon flux tracking) is proposed. Both TECO and the proposed terrestrial carbon tracking initiative are directly relevant to the U.S. Climate Action Plan for reducing the concentrations of greenhouse gases in the U.S., and assessing the effects of land-use policies upon global greenhouse gas concentrations.

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Priority Shortfalls in FY 1996

VULNERABLE ECOSYSTEMS IN THE UNITED STATES
Under the direction of the White House Office of Environmental Policy, the Interagency Ecosystem Management Task Force has framed an approach for demonstrating and evaluating the best currently available ecosystem management practices in order to generate valuable lessons on approaches that can be applied more broadly. While endorsing the demonstration and evaluation of the best currently available ecosystem management approaches, the CENR has identified priority research areas that require augmentation to fill the gaps in understanding and practice to support those demonstrations. Without the improvements in the management approaches which science can provide, the long-term success of the targeted ecosystem management efforts can be neither assured nor extended across systems.

MONITORING, ASSESSING, AND PREDICTING CHANGES IN ECOSYSTEM STRUCTURE AND FUNCTION – $40M
Managing ecosystems requires understanding how they function. Very little is known about the role of individual species in ecosystem processes or the extent to which the diversity observed is redundant in the sense that ecosystem function would be unimpaired if diversity were reduced. A principal focus of the efforts described below is to determine the role of species in controlling important ecosystem function and properties, such as nutrient cycling, productivity, resilience, and stability. A second principal focus in these efforts is on physio-chemical processes that determine chemical fluxes throughout the ecosystem; biogeochemical accumulation, transformation, and cycling of carbon, nitrogen, phosphorus, and other nutrient and toxic chemicals; and the impacts of alterations in water, chemical, and biological input on associated ecosystems.

To improve the scientific basis for ecosystem management, the following specific efforts will be applied within each of the priority EMI sites listed below:

- With currently available methods, conduct scientific assessments of the state of ecosystem health and identify primary causes of degradation and impairment.

- Through process-oriented research, improve assessment, modeling, and prediction tools to aid management and policy action with an emphasis on ecosystem and landscape functional relationships at multiple scales, impacts of multiple stressors on ecosystems, and defining ecological end-point criteria which can be used for informed adaptive management and resource restoration performance.

- Improve monitoring strategies to define the integrated status and trends of both biological and water resources to measure progress toward meeting ecosystem management objectives.

These research, monitoring, modeling, and assessment efforts will form science components of the EMI demonstrations. As such, they will be coordinated through regional cross-agency, intergovernmental, and external partnership efforts through a combined EMI/CENR process.

Targeted demonstration sites of the EMI have been identified in South Florida, the Pacific Northwest, the Great Lakes, the Southern Appalachian Highlands, Louisiana Coastal Wetlands, Prince William Sound, and the Anacostia. The Biodiversity and Ecosystem Dynamics and the Water Resources and Coastal and Marine Environments Subcommittees identified additional resources needed for improving

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the scientific basis for ecosystem management at four of these sites. A fifth high-priority ecosystem, South Florida, received considerable attention through initial agency responses (see above).

Great Lakes - (principal agencies: NOAA, EPA, DOI; additional funds needed: $10M). The key issues in the Great Lakes ecosystem relate to the extensive use, economic development, and resource health. Research and management efforts will focus on the structure, function, and Biodiversity of this system, as impacted by transport, fate, bioaccumulation, and cumulative effects on resources of mercury and persistent toxic substances (e.g., dioxin, and PCB's).

Louisiana coastal Wetlands -(principal agencies: DOI, NOAA, COE; additional funds needed: $12M). The key issues for Louisiana coastal Wetlands relate to habitat loss and degradation due to development, reduced water quality, and sedimentation. Research and management efforts will focus on factors affecting wetland health and growth and techniques for marsh management and restoration as impacted by effects of sea level change, subsidence, and erosion, cumulative effects of sedimentation, point, and nonpoint source pollution.

Pacific Northwest - (principal agencies: NOAA, EPA, USDA, DOI; additional funds needed: $12M). The key issues in the Pacific Northwest ecosystem related to managing multiple use of resources, retention of Biodiversity, and sustainable forestry. Research and management will focus on the scientific and ecological basis for that balance the demands of multiple use while minimizing ecological damages or risks, including habitat requirements of anadromous fishes and implications of forestry and water management practices.

Southern Appalachian Highlands -(principal agencies: DOI, USDA; additional funds needed: $6M). The key issues for the Southern Appalachian Highlands ecosystem related to rising populations and extensive use of resources. Research and management will focus on quantifying the cumulative impacts on the regional ecosystem of changes in regional water and air quality, degradation and loss of forests, and introduction of exotic plant and animal species.

GLOBAL ECOSYSTEM AND CARBON INVENTORY -- $60 M

U. S. commitments to the Framework Convention on Climate Change and to the Biodiversity Convention necessitate having a global inventory of terrestrial ecosystems and the biogeochemical and compositional changes that have occurred in the recent past and are projected for the future. For the former, the U. S. must be able to track changes in carbon storage and release in the biosphere, which requires documenting and understanding changes that affecting the release and storage of carbon and other greenhouse gases; for the latter, the U. S. is committed to preserving the global ecosystem base. A two part program is needed: (a) Develop a Global Ecosystem Map using existing remotely sensed high-resolution Landsat and AVHRR imagery, supported by modeling and ground-truthing efforts at long-term ecological reference sites, to provide baseline information that documents current and past changes in vegetation and carbon storage, and extend the map into the future with the planned Landsat continuation, an essential component of this activity; and (b) Supplement the initial FY-95 funding increment for the Terrestrial Ecological Research (TECO) program to fulfill the commitment to understand and document effects of global change forcings on terrestrial ecosystems and to provide the scientific foundation for evaluating consequences of global change and assessments of ecosystem vulnerability, including potential beneficial and adverse effects of changes of intrinsic value to humans. Together,

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these efforts will address questions concerning where carbon is being released and being stored in the biosphere, how these exchanges with the atmosphere affect and are affected by climate, and how the relative extents of ecosystems are changing. Remotely sensed data will be gathered for a full global mapping and ground truthing and research efforts will focus on assembling detailed ecosystem maps
The carbon tracking component of the program will use the ecosystem maps generated from remote sensing data and couple them to past data as well as to in situ and modeling data in order to track the fluxes of carbon to and from terrestrial ecosystems and the atmosphere, contributing to the solution of the "missing carbon puzzle." These activities will be coordinated by an interagency panel (building from the successful TECO panel), with NASA taking the lead on the mapping and carbon-tracking tasks and with DOE, DOI, NASA, EPA, and NSF playing major roles on the ground-truthing and terrestrial ecological research.

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IDENTIFICATION AND CLASSIFICATION OF BIOTA – $15M

To provide the foundation for monitoring the status and trends and changes in the Nation's biota, there is a need for a nationally coordinated program to train systematists, to provide access to modern technologies, and to support systematic activities within targeted study sites. In FY 1996 an augmentation of $5M is proposed (NSF, SI) to encourage museums and the university communities to work in partnerships to develop additional training programs, course work and degree programs to train taxonomists and systematists, targeting those taxonomic groups for which taxonomic expertise is currently under-represented. An augmentation of $5M (NSF, SI, DOI, USDA) should be provided to assist museums and other biological collections to electronically catalogue their collections. Electronic catalogues will significantly improve our capabilities to classify, identify, and catalogue the Nation's biota. An additional $5M (DOI, NOAA, USDA) should be provided to assure that proper taxonomic identification is incorporated within the targeted ecosystems study sites.

Environmental Priority: Socioeconomic Dimensions of Environmental Change

Increased Emphasis in FY 1996 Budget Submission

Investments in social and economic science research in 1994 and 1995 have served to strengthen the research base although this area still represents less than one percent of the CENR total budget. Among the agencies NSF, USDA (ERS), EPA, and NOAA have continuing programs in driving forces of environmental change with strong social and economic science components. Several agencies are investing in expanded data collection to build programs that will enhance sustainable use of resources. However, efforts in this area are still less than 1% of the environment and natural resources R&D efforts and only modest improvements were made in the FY 1996 agency OMB requests. NOAA's efforts in the area focus on recreational and commercial fisheries. USDA's Economic Research Service is also collecting data to support its research programs. Characterizing and studying the performance of the agricultural sector and understanding the social and economic determinants of biodiversity loss are examples. NOAA anticipates increases in 1996.

In the area of impacts and adaptation, agencies continue to fund research supporting CENR goals. Examples include USDA's work in determining the economic impacts of global climate change. Overall investment in this area increased slightly for fiscal year 1996. Examples include the USGS's

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(DOI) program on earthquake hazard reduction. Lastly, agencies are beginning to invest more in the broad area of decision frameworks. Several programs in the budget for fiscal years 1994 and 1995 focus on this area. EPA is sponsoring programs on developing methods for calculating the non-market economic benefits of environmental policies and pollution prevention. DOE and NSF continue to have strong programs on the research and development of tools for integrated assessment with a specific focus on social science. Among the agencies most likely to increase the size and scope of their integrated assessment programs in 1996 are National Biological Survey (DOI), U.S. Geological Survey (DOI), TVA, and the Cooperative State Research Service (USDA)

Nonetheless, the 1996 budget submissions include only modest increases in the socioeconomic dimensions of environmental change across the CENR.

Toxic Substances and Hazardous and Solid Waste – A very high priority focus in this area is to improve our understanding of the social and economic implications from managing toxic materials, including developing new approaches and tools to provide the public with quality data in a form that allows them to evaluate the role of toxic materials in their communities and to participate in the decision-making process; identifying and piloting incentives to encourage private sector development and commercialization of innovative risk management technologies; and developing techniques to identify and survey behavior which impacts exposure levels across different socioeconomic groups. NIEHS has increased its program in this area significantly in FY 1996 and has initiated a number of community outreach and health programs. EPA plans to increase its grants program to support research in these priority areas, with a particular focus on economic valuation tools and support for integrated ecological and environmental assessment tools. In addition, EPA has taken the lead in the development of an environmental justice R&D strategy which will involve strong participation by other agencies.

Global Change – USGCRP agencies, especially NSF, DOE, USDA, and NOAA, are increasingly focusing their research on the human activities that drive global change and that will be affected by it. Programs being augmented in FY-95 will start to focus on a number of areas, including international population trends and the human condition, patterns of trade and global economic activity, and adaptation and mitigation, including environmental resource use and management. Priority attention will be given to issues that confront policy and decision makers, including research on resource management; economic valuation (including non-monetary valuation) of environmental goods, services, and assets; obstacles to and opportunities for diffusion of new technologies (including alternative energy technologies); and data analytic methods, computational issues, and modeling required for quantitative policy analysis. Of particular note, FY 1995 NSF is adding $7M to its program on the Human Dimensions of Climate Change, with emphasis on policy sciences. While these initial efforts will be continued in FY-96, augmentation and broadening of the efforts is needed, as explained below.

Priority Shortfalls in FY 1996

<u>SOCIAL AND ECONOMIC ASPECTS OF DECISION PROCESSES –$20M</u>

Programs developed will consist of both coordinated peer-reviewed grants programs and other focussed inter-agency research activities. Progress in the natural and physical sciences must be complemented by progress in the social sciences if we are to advance our societal goals. Development

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of environmental public policies that can reliably affect the behavior of people depend heavily on a variety of social science research findings. To enhance the effectiveness of government policy makers additional resources are needed to better understand: 1) how societies at all levels interact and come to consensus on environmental policy and how the individuals affected can be informed and involved, 2) how to better place a value on "free goods" such as air and water resources and common property resources such as national parks,3) how to reduce the barriers to the flow of information between sectors of society, critical for long-term environmental decision-making, and 4) demographic, economic, and social factors in resources use.

The highest priority gap in the research agenda as identified by the CENR is the social and economic aspects of decision processes. Included areas are decision tools, valuation of non-market goods and services, and reducing the barriers to the flow of information.

SOCIETAL PROCESSES AND DECISION TOOLS

Areas requiring special attention include: strengthening our understanding of societal decision-making processes, including participatory processes that result in effective involvement by stakeholders; improving decision tools (including cost/benefit analysis, integrated assessment, and multi-attribute criteria analysis) used to define goals in environmental protection and remediation as well as management of public resources; expanding our understanding of how policy instruments lead to modifications of human behavior in pursuit of social objectives; and extending decision-models to directly relate scientific information to decision outcomes, thus establishing the value of additional information about environmental and human processes. Agencies with expertise and mandates in accordance with this research area that can run extramural peer-reviewed research programs include: NSF (SBER), DOE (Energy Research), EPA (Office of Research and Development/Exploratory Research), USDA (CSRS), DOI (Park Service, Mineral Management Service). Agencies with strong reputations for research excellance that conduct internal research in this area include Interior (USGS) and USDA (ERS).

VALUATION OF NON-MARKET GOODS AND SERVICES

Improved valuation estimates, such as those from contingent valuation techniques, are greatly needed for environmental and resource management decisions. Improved estimates of the direct and indirect values for air, water, biota, and other, are required as input to decisions for managing public lands and other common resources such as fisheries, delineating critical habitats for endangered species, valuing ground water, and choosing strategies to reduce risks posed by climate change. Agencies who are beginning to work together to foster this research include NOAA (NOS/NRDA), NSF (SBER), USDA (ERS), OMB, EPA (OPA), and DOE (Energy Research).

BARRIERS TO INFORMATION FLOW AND TECHNOLOGY DIFFUSION

An important strategic research topic is improving the flow of information between the research and policy communities and between and within the public and private sectors. Another research need is a better understanding of the factors responsible for diffusion of technologies in the industrial, commercial, and household sectors for development of policies for environmental problems, such as climate change and remediation of polluted sites and ecosystems. Work is also needed on identifying existing institutional barriers to market penetration and developing strategies to reduce the barriers. Agencies that have mandates and past experience in this area include NSF (SBER), DOE (Energy Research), EPA (Office of Policy Analysis and Exploratory Research), DOI (Bureau of Mines, Park Service), NOAA (NOS/Damage Assessment, Marine Sanctuaries). The

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Policy Sciences initiative at NSF and Human Dimensions Center(s) initiative at NSF can be utilized to support this effort.

DEMOGRAPHIC, ECONOMIC, AND SOCIAL FACTORS IN RESOURCE USE – $5M. This initiative will focus on understanding the factors controlling population growth, migration, and environmental change and will seek to clarify the often ideological and polarized debate on the relationship between population dynamics and resource depletion, including the depletion of global environmental resources related to changes in the climate system. Given the tremendous diversity in demographic conditions and indicators in different countries and regions, comparative approaches to investigating population-environment linkages will be emphasized. It will improve the research community's ability to clarify the interactions of demographics, economic activity, consumption patterns, social structures, and cultural relationships in disrupting the Earth's biogeochemical and other environmental systems. Working with representatives of an interagency panel, the agency most qualified to lead this research grant program, is NSF.

Environmental Priority: Science Policy Tools

Increased Emphasis in FY 1996 Budget Submission

Toxic Substances and Hazardous and Solid Waste – A high priority focus in this area was to ensure better assessment of toxic substances for both human and non-human populations, including the mechanisms of action of toxic materials, the variability of susceptibility within populations, the non-cancer endpoints, and methods and biomarkers for defining exposure history and potential adverse health effects. Agencies have responded strongly in this area, with new initiatives proposed in (1) eight priority areas of research in response to the NAS Report, "Science and Judgment in Risk Assessment" (a redirection of $4.5M in EPA's budget request); (2) effects of endocrine-type disruptor chemicals and pesticides (EPA and NBS) and (2) effects of pesticides in the diets of infants and children (EPA – a redirection of $2M). The endocrine disruptors initiative ($5.0M is requested in FY 1996) will include research to identify sentinel species and their status and trends and to confirm whether wildlife population effects exist or not. In addition, NIEHS has several new initiatives in human effects and exposure areas as well to model human exposures to contaminants.

Water Resources and Coastal and Marine Environments – Agencies have increased their emphasis on the development of science policy tools to predict and mitigate extreme events and improve the management of water resource facilities and aquatic habitats. Efforts to research the socioeconomic dimensions of environmental change include modeling human exposure to contaminants.

(a) Water Availability and Flow – NOAA is supporting the development of an enhanced water resources forecasting system for the Upper Mississippi and Pacific Northwest (NOAA – $3.9M Water Resources Forecasting System).

(b) Predictive Systems Management – The Army Corps of Engineers is supporting several efforts to improve methodologies to assist decision-makers in the selection of management alternatives, along with cost-effective methodologies to assist in the management of aquatic nuisance species and the disposal of contaminated sediments (USACE – $1.4M Dredging Operation and Environmental Research; $1.43M Zebra Mussel Control Research, Natural Resources Research, Evaluation of

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Environmental Investment). NIEHS is supporting a program to evaluate the use of aquatic species as a model for human exposure to environmental contaminants (NIEHS – $0.55M Water Pollution and Aquatic Species Program).

Natural Disaster – FEMA is leading a Federal-wide effort to develop a National Mitigation Strategy. The National Mitigation goal is: "By the year 2020, to engender a fundamental change in public attitude which demands safer communities in which to live and work and, thereby, to reduce by at least half, the loss of life, injuries, economic costs (in 1994 dollars) and destruction of natural and cultural resources which result from the occurrence of natural disasters." Funding for this effort is included in the FEMA FY 1996 budget request. In addition, USGS will initiate a program in Urban Seismic Hazards in FY 1996 to develop real-time early warning systems. A Real-Time Seismic Information and Early Warning System, based on the development and installation of a modern, telemetered digital seismograph network to detect earthquake motion will make it possible to warn users about impending arrival of seismic waves so actions may be taken to save lives and critical infrastructure. In addition, this system will include data processing and operations support for a Global Positioning Satellite (GPS) array in Southern California for continuous monitoring of deformation of the Earth's surface, which may precede, accompany, or follow earthquakes. A strategy for the utilization of real-time information by the emergency management support will be developed. Modest funding has been identified for FY 1996 to initiate this system.

Global Change – The FY 1995 global change initiative on integrated assessment will provide an important start in the development of science policy tools, including integrated assessment methods and capabilities. These methods and tools promise to advance the scientific and policy communities' joint ability to integrate research in the natural and social sciences in the analysis of climate change consequences and responses. To ensure a comprehensive effort, continued high-priority efforts are needed to improve methods and tools, including integrated assessment models that link human forcing functions (such as greenhouse gas emissions and land use change) to changes in climate, and ultimately to consequences for ecosystems and socioeconomic systems. DOE (Integrated Assessment program, up $2M from FY-94 to FY-96), NSF (Methods for Integrated Assessment, up $3.4M in FY-95), and EPA (Developing Predictive Tools program, up $1M in FY-96) are leading in development of an interagency request for proposals as part of the FY-95 initiative. Continued high-priority efforts to improve methods and tools, including integrated assessment models which link human forcing functions such as greenhouse gas emissions or land use change, to changes in climate and resulting consequences for ecosystems and related socioeconomic systems are proposed for FY 1996. DOE is also planning a $2M increase for studies of the Economics of Sustainable Development and Environmental Technologies that would help to more carefully define the conceptual basis by providing measures to rank technologies and processes.

Priority Shortfalls in FY 1996

HUMAN VULNERABILITY IN SUSCEPTIBILITY AND EXPOSURE TO TOXIC AGENTS – $25M
Person-to-person differences in behavior, immune response, genetic makeup, diet, and life history together confer on individual people unique susceptibilities to toxic substances. Such individual differences can be inherited or acquired. Research is needed to understand the ranges of susceptibilities for different diseases and chemical exposures. Such research will better characterize the potentially disproportionate risk borne by minorities because of lifestyle differences in population

DRAFT

exposure and/or genotype. Agencies Involved: ATSDR, EPA, NIEHS, NSF, DOE.

ECOLOGICAL RISK ASSESSMENT RESEARCH INITIATIVE – $30M

Ecological, risk assessments evaluate the likelihood that adverse ecological effects will occur as a result of exposure to stressors related to human activities, such as draining of wetlands or release of chemicals. The term stressor describes any chemical, physical, or biological entity that can induce adverse effects on ecological components, that is, individuals, populations, communities, or ecosystems. This Ecological Risk Assessment Initiative is designed to develop methods to scientifically evaluate the likelihood of adverse effects of exposure to chemical stressors on the environment. The primary goal of this research program is to develop methods for conducting a scientific ecological risk assessment that focuses on toxic materials while putting into perspective a broad array of non-chemical stressors and ecological components.

The research will concentrate on developing methodologies for conducting risk assessments at higher-level systems (communities and ecosystems). Included will be a greater emphasis on the relationship between lower and higher levels of biological organization (issues of extrapolation and calibration) to increase the ability to use lower-level studies to predict higher-level effects. A basic understanding of the mechanisms and processes of community structure and ecosystem function is necessary to interpret and predict ecological impacts from chemical stressors. Community and ecosystem level research objectives will be complimentary to initiatives from other CENR Subcommittees. Agencies Involved: EPA, NOAA, DOI, USDA, DOE, and DOD. Certain aspects of this initiative are well suited to specific agencies. For example, DOI (F&WS) could explore the issue of risks to threatened and endangered species; NOAA could concentrate on risks to coastal systems; EPA could serve to integrate the work and look at cumulative impacts.

POTENTIAL HEALTH EFFECTS OF AIRBORNE PARTICULATE MATTER – $8M

Recent epidemiologic studies suggest that fine particulate matter may be a major contributor to environmentally induced disease. The magnitude of the potential health impact of PM, and the complexity of PM issues warrant a significant increase in funding. Additional resources would be directed at increased understanding of the relationship between health impact and particle characteristics, including mechanism of action, deposition in the respiratory tract, and the relationship of morbidity and mortality to particle size and composition. Agencies Involved: EPA and NIEHS.

URBAN SEISMIC HAZARDS PROGRAM–$6M

Assessment Component

A viable mitigation strategy to reduce human and economic losses will be produced, based on updated models of multiple physical hazards (including earthquakes, landslides and tsunamis) and economic risk. Urban area risk assessments will be combined with geographic information system technologies to communicate earthquake risks for making land use, zoning, business, and consumer decisions about loss-reduction measures. Although some funding has been identified for FY 96 for the Real-Time Seismic Information and Early Warning System, it is insufficient to comprehensively address urban area risk assessment.

Safety Standards for Lifelines Component

Resilient lifelines (e.g., telecommunications, transportation, gas/fuel, water/sewer, and electric systems) are critical in the wake of a natural disaster and a plan for their development, by PL

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101-614, is overdue to Congress. The standards developed under this program, which would be conducted by NIST, would be used by Federal, state, and local policy-makers to increase the resiliency of U.S. urban infrastructure to seismic hazards. The emphasis on upgrading existing systems will have a large, prompt impact on earthquake risk reductions. This effort complements the USGS Urban Seismic Hazards program and is applicable across multiple hazards.

DESIGN CRITERIA FOR WIND RESISTANCE – $2M
The pending National Competitiveness Act (S.4, H.R.820) calls for the establishment of a national wind engineering program, comprising NIST, NOAA, NSF and FAA, which would characterize interactions of wind with the built environment, develop design criteria for wind resistance, and produce test methods suitable for standards and building codes for wind resistance. It would also transfer these technologies to practice at state and local levels so losses are reduced in natural disasters.

Environmental Priority: Observations, and Information and Data Management

Increased Emphasis in FY 1996 Budget Submission

Air Quality Research – The CENR priority-setting process has identified two air quality issues that need greater emphasis. The first priority is to substantially improve the understanding of the formation and impacts of ground-level ozone in urban and rural areas, which will provide the scientific basis for mid-course updates to the State Implementation Plans of the Clean Air Amendments. The other priority is a better characterization of the health impacts of airborne fine particles, which will lead to earlier formulation of a sound particulate-matter control strategy as required by the Clean Air Act. Agencies have responded extremely well to the first priority by identifying significant resources to address this issue in their FY 1996 budget requests, given here by Agency budget levels over FY 1995 and the program title.

(a) EPA: Tropospheric Ozone – +$3.0M
(b) DOI/NPS: National Park Ozone Monitoring – +$2.7M
(c) NSF: Atmospheric Chemistry – +$1.0M
(d) NOAA: Health of the Atmosphere – +$8.6M
(e) TVA: Southern Oxidants: +$1.3M

These research emphases are components of a multi-organization research plan, North America Research Strategy for Tropospheric Ozone (NARSTO). This plan has been developed by public and private stakeholders in the ozone issue. The research, supported by contributing research of several agencies, will be focused on field observations and networks, with associated modeling and analysis to improve our predictive capabilities of the causes and consequences of elevated ground level ozone. With regard to health effects of fine particles, agencies have maintained the 20% increase in effort, which began in FY 1995.

Water Resources and Coastal and Marine Environments – Agencies responded with increased emphasis in integrated monitoring activities, a key research priority. Agencies support observing, collecting, and assessing standardized information on the status and trends in water quality throughout the nation and sharing this data with Federal, State, interstate, and local agencies and Native American and university partners. Agencies also have supported the expansion of water quality,

DRAFT

geologic, and subsurface processes observation, assessment, and data collection efforts.

Global Change – Agencies are continuing their commitment to providing the global change research community with observations to support the science and policy goals of the CENR. NASA is proposing a major redirection of funds out of processes research carried out in support of USGCRP and international research programs; the level is approximately $55M below the FY 1994 R&A levels, of which about $47M of the change occurs from FY95 enacted levels to FY 1996 proposed levels, and is redirected to ensure that launches of Landsat, EOS, and Earth Probes are maintained on their present schedule. NOAA is proposing an additional $3.5M in support for the Global Climate Observation System, which is needed to monitor and detect climatic trends. NOAA and NSF are proposing to phase the TOGA observations array that is used to monitor El Nino occurrences in the tropical Pacific Ocean into the Global Ocean Observation System, an operational observations network that will provide a long-term monitoring capability of the Earth's oceans. As part of its contributing program, the DoD will continue its demonstration of ocean acoustic tomography, needed to detect small temperature trends in the ocean. In addition, the implementation plan for the Global Change Data and Information System (GCDIS) has now been approved, and GCDIS is starting to become accessible over Internet. GCDIS is responsive to recommendations of the National Academy of Sciences, is coordinated with the Federal Geographic Data Committee, and includes data from all USGCRP agencies. Additional agency commitments to GCDIS are needed in order to increase access to data for policy, educational, and research use. An interagency pilot to guide its development in meeting the needs of libraries at all state levels has been initiated; however, efforts need to be expanded.

Priority Shortfalls in FY 1996

U.S. WEATHER RESEARCH PROGRAM – $20-30 million:
NOAA's proposed contribution to the USWRP centers on three elements: observations, prediction, and socioeconomic benefits. Major new efforts that remain unfunded include the North American Upper Air Sounding System; critical information and warning communication project; research and development on NEXRAD, the next-generation weather radar; severe weather prediction research; hurricane prediction research; fire weather research; 4-dimensional data assimilation; dynamic extended range forecasting; experimental forecast facilities, and various federal-state partnerships. These programs are aimed at exploiting and enhancing the on-going National Weather Service Modernization. An appropriate balance between operational requirements and research efforts which take advantage of these new capabilities should be addressed.

UPGRADE OBSERVATION SYSTEM FOR SEISMIC AND VOLCANIC HAZARDS – *$10 million:*
To further develop two promising, emerging technologies with direct application of risk assessment and monitoring and which may assist in mitigation efforts. NASA has the lead under the aegis of the Southern California Earthquake Center, with participation of NSF and USGS, in developing and implementing a 250 station GPS array in the Los Angeles basin to monitor accumulation of crustal strain. SAR interferometry complements the GPS array by providing highly accurate measurements of surface evaluation and spatially-continuous maps of changing in the Earth's surface topography.

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INDICATORS OF ENVIRONMENTAL CHANGE – $15M

A comprehensive archive of variables indicating the extent of environmental change on regional to global scales will be created to provide a documented baseline indicating the changing state of our environment. This program will focus on assembling and integrating existing diverse sets of data into a coherent and consistent record and making the information widely accessible and available. Indicators of environmental change will include terrestrial indicators (e.g., land cover, land use, hydrologic flows, snow and ice cover), climatic variables (e.g., surface temperature, rainfall and snowfall, cloud cover and sunlight, atmospheric gas and aerosol concentrations, ocean circulation and temperature), biological indicators (e.g., species distributions, biological productivity, pest infestations, forest health, human health, etc.), and social science indicators (e.g., population, migration, etc.). Research will be supported to evaluate the reliability, stability and uncertainty of these indicators. Data gathered from regional studies within the U. S. will be an important focus. These data sets will be made available worldwide through the Global Change Data and Information System (GCDIS) and related data and information systems consistent with the national standards for geospatial data inventorying, collection, management, and dissemination of the Federal Geographic Data Committee (FGDC). Fostering enhanced use and analysis of these data for examining environmental, economic, and social issues will be coordinated across CENR subcommittees and with the FGDC. Coordinated by an interagency panel, agencies having the strengths and capabilities needed for cooperatively organizing and sustained participation for specific indicators include DOC/NOAA, DOE, DOI, EPA, and NASA, with other CENR agencies.

Environmental Priority: Environmental Technologies

Increased Emphasis in FY 1996 Budget Submission

Over the last year, the Joint Subcommittee on Environmental Technology, which reports to the CENR and to the Committee in Industrial Technology, has assessed the overall issues and needs associated with environmental technology through the development of the recently released report, Technology for a Sustainable Future. In this assessment, over 100 policy, regulatory, fiscal, educational, market and international issues were addressed. Over 300 specific environmental data needs and technologies were identified. Six key priority objectives were identified: (1) improve the environmental technologies information infrastructure; (2) evaluate and develop pollution prevention technologies, including clean energy; (3) demonstrate and evaluate cost-effective innovative technologies for site characterization and remediation, including bioremediation; (4) support the commercialization and development of markets for environmental technologies; (5) evaluate and develop renewable energy technologies in keeping with the U.S. commitment to the Climate Treaty; and (6) continue the interagency Environmental Technology Initiative begun in FY 1994. In FY 1996, agencies have increased their investment focus consistent with these priority areas. Highlights of FY 1996 efforts in this area include:

(a) DOI has shifted its focus from extraction and materials R&D to pollution prevention and avoidance R&D. For example, the USBM will increase its R&D on remediation technologies, site characterization, and environmental information infrastructure ($10.6M decrease in resource use R&D and a $16.6M increase in toxic substances R&D); the USGS will decrease its efforts in resource R&D by $13.4M to redirect these funds to focus on prevention of acid mind drainage in lieu of coal

DRAFT

resource assessments.

(b) DOE has increased its emphasis on pollution prevention in major energy and waste intensive industries. DOE has also increased deployment of alternative fuel and electric vehicles via the Clean Cities Program. Finally, DOE has increased funding of the bioenergy strategy, using advanced efficient technologies for fuel, power, and chemicals and creating rural development opportunities.

(c) EPA's FY 1996 budget request includes $80M for the President's Environmental Technology Initiative which was initiated in FY 1994; an increase of $5M in the area of commercialization; and continued effort on an new initiative begun in FY 1994, the Common Sense Initiative, which focuses on an integrated approach to environmental improvement in specific industrial sectors, including developing pollution prevention methods and cleaner technologies and processes.

(d) USDA, as part of the ARS program on Methyl Bromide Substitutes intended to help support implementation of the Montreal Protocol on Substances that Deplete the Ozone Layer and the Clean Air Act Amendments, is increasing support for development of alternatives to the use of methyl bromide, which must be phased out over the next few years to ensure long-term protection of the stratospheric ozone layer and the decline of UV radiation. DOE is increasing funding by nearly $35M for environmental technologies, as described by the Environmental Technologies Subcommittee.

Global Change: As stated in the Gibbons/Panetta R&D Budget Guidance to the Agencies, this National Program, which predates the CENR, remains a high priority.

Increased Emphasis in FY 1996 Budget Submission

Comparing proposed budgets for programs included within the FY 1995 USGCRP, the overall agency-approved set of programs is essentially the same as for FY 1995. For the CENR cross-cut on global change, there is, however an increase proposed in the Environmental Technologies area. Within the set of agency programs, there have, however, been both important program reductions and the starting of new programs as successful ones are phased down and important, but lower priority ones, are being reduced or eliminated. Regarding program changes, it should also be noted that some agencies, particularly NASA, have moved what were USGCRP programs in the FY 1995 review to the purview of CENR subcommittees other than SGCR, reducing the baseline level of the USGCRP as presented in the FY 1995 President's budget as described in "Our Changing Planet".

Agency proposals in response to several of the global change priorities are included, as appropriate, in the subsections above. In addition to being responsive to the CENR priorities, the agencies have been responsive to the identified global change priorities for FY 1996 of: sustaining programs in understanding and prediction; evaluating the vulnerabilities of ecological and socioeconomic systems to global change; monitoring the Earth system to detect global change; and cooperating internationally in global change research and assessment. Proposed program changes in several cases cut across these themes:

(a) NOAA (in its Seasonal to Interannual Forecasting program) is proposing an augmentation of $1M, as part of a cooperative international effort, to establish a centralized forecasting center and regional application centers that will focus on documenting and predicting seasonal to interannual climate

DRAFT

fluctuations. These efforts to detect and predict change will provide the information needed for adjusting societal activities (e.g., crop selection, planting schedule) in order to reduce vulnerability and consequences and to improve resilience to climate fluctuations.

(b) NSF and NOAA are phasing their TOGA program research support (totaling about $25M in FY-95) into the new GOALS and CLIVAR programs on climate variability. GOALS will be seeking to extend to higher latitudes the climate forecasting capabilities that are proving valuable in lower latitudes. Internationally, this will couple to the CLIVAR program that is needed also to help detect global change and distinguish changes from natural variations.

(c) DOI (by $5M in FY-96) and NSF (by $2M in FY-95) are proposing significant increases for studies of Earth System history. These research efforts, which contribute to U. S. participation in the international PAGES program, will better define the character of changes and rates of change of the natural climate, providing an important context for detecting human-induced changes, for evaluating their significance, and for checking the performance of global climate prediction models.

(d) DOE is proposing to shift about $3M from a broad-based study of climate feedbacks (Quantitative Links program) to provide more focus on cloud-radiation interactions (its ARM program).

(e) EPA, DOE, DOI, and TVA are proposing to increase their focus on capabilities for conducting regional vulnerability assessments in the U. S. For example, EPA (in its Regional Vulnerability and Impact Assessment program) proposes funding of $9M in FY 1996 compared to $2M in FY 1994; DOI is increasing support for studies of public lands as part of its $2.5M increase for ecosystem research; TVA is increasing resources by about $1M; and the regional centers of DOE's National Institute for Global Environmental Change will substantially increase their attention to potential global change impacts and ecosystem vulnerability in their multi-state areas.

(f) NIH is proposing to increase its studies of the health effects of UV radiation and of CFC replacement compounds by about $1M in support of the U. S. commitment to the Montreal Protocol and later amendments.

(g) All agencies are participating very actively in the international assessments of the Intergovernmental Panel on Climate Change on climate change and of the World Meteorological Organization and United Nations Environment Programme on ozone depletion. The SGCR, on behalf of the agencies, is moving actively to develop a national assessment capability for examining the consequences of global change on regions in the U. S. and sectors of the U. S. economy.

Priority Shortfalls in FY 1996

(a) The SGCR proposed a set of initiatives that together comprise the building of a capability for Global Resource Vulnerability Assessment (GRVA). Most of these requests match closely with the initiative proposals of companion CENR subcommittees; thus, the initiatives requested by SGCR have largely been incorporated into the encompassing set of CENR initiatives, particularly those focusing on the global ecosystem inventory, indicators of environmental change, and socioeconomic dimensions;

(b) The SGCR noted that the set of priorities identified in their FY 1995 review are still not receiving adequate funding, and urged agencies to continue to augment research in these areas. Terrestrial ecology and socioeconomic dimensions are covered in the CENR and initiatives listed above.

DRAFT

Table A
Summary by Agency Contributions
(in millions)*

Focused Programs

Agency	FY 1994	FY 1995	FY 1996	Delta 95/96
DOC	590.7	557.6	636.2	78.6
EPA	539.1	581.4	575.0	(6.4)
USDA	349.1	366.2	376.4	10.2
DOT	19.0	11.6	16.5	4.9
DOI	664.9	654.6	675.5	20.9
NSF	293.0	330.0	326.0	(4.0)
NASA	1036.8	1253.3	1253.1	(.2)
DOE	1288.8	1226.5	1304.7	77.2
Smithsonian	7.3	7.3	7.3	-
NIEHS	306.8	304.5	325.6	21.1
TVA	20.8	36.7	30.0	(6.7)
HUD	7.2	3.3	2.0	(1.3)
TOTAL	5123.5	5333.0	5528.3	194.3

* For FY 1994 total contributing resources for CENR are $7,284.6 million. Contributing resources for FY 95 & 96 are not yet available for all agencies

NOTES: • All DoD CENR related R&D was submitted as Contributing
• Resources were not submitted by FEMA or AID, both of which are expected to have resources in CENR

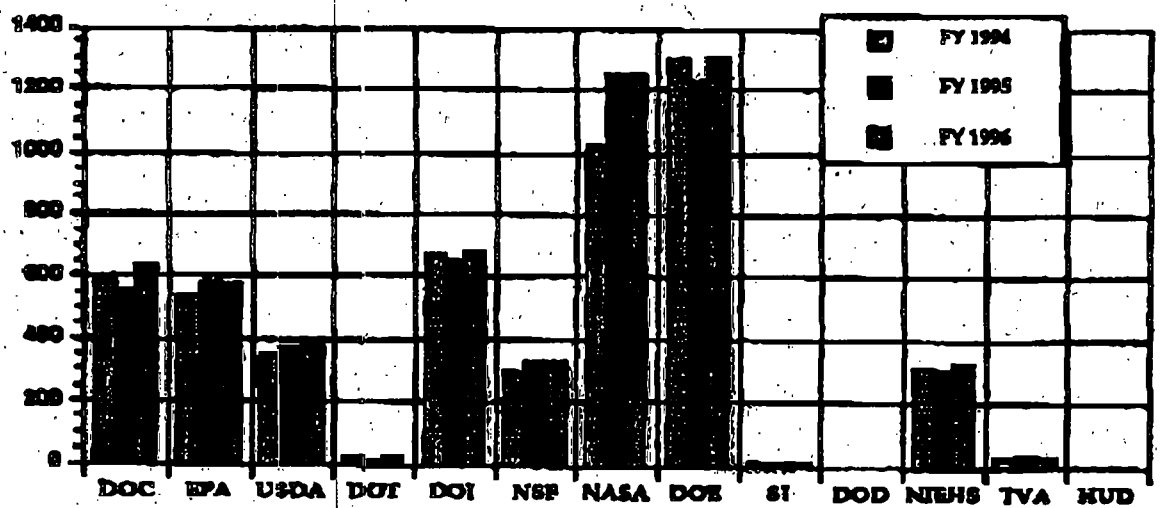

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Table B
Agency Focused* Resources by CENR Environmental Issue Areas
(in millions)

	Global Change			Biodiversity/Ecosystems			Resource Use & Mgmt.			Toxic Substances/Waste		
	FY94	FY95	FY96	FY94	FY95	FY96	FY94	FY95	FY96	FY94	FY95	FY96
DOC	140.3	139.1	140.3	234.2	201.3	228.0	45.1	47.9	74.6	3.3	3.8	3.8
EPA	33.7	24.4	25.6	69.5	108.6	103.5	0.5	0.0	0.0	284.6	313.1	314.7
USDA	40.3	39.6	42.4	60.1	61.0	65.5	148.0	152.6	155.2	13.4	13.7	14.0
DOT	0.4	0.4	1.1	0.6	0.7	0.5	0.2	0.0	0.0	1.6	1.7	1.3
DOI	37.2	39.0	37.6	116.2	120.5	126.6	187.1	175.7	151.3	63.9	61.6	71.1
NSF	143.0	170.0	[illegible]	67.8	68.8	66.0	1.0	1.8	1.0	1.0	0.0	0.0
NASA	904.5	971.9	987.8	105.7	120.0	124.5	7.7	9.4	9.6	0.0	0.0	0.0
DOE	231.4	482.5	493.4	6.4	6.5	5.5	142.4	120.5	117.0	368.9	373.3	414.5
SI	2.1	2.8	2.8	4.5	4.1	4.1	0.0	0.0	0.0	0.0	0.0	0.0
NIEHS	7.6	3.7	4.6	0.0	0.0	0.0	0.0	0.0	0.0	272.0	288.1	292.2
TVA	1.3	2.1	1.3	0.0	5.0	6.0	0.5	4.0	4.5	3.1	13.2	8.9
HUD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.3	3.2	3.0
TOTAL	1805.3	1977.0	1898.4	654.6	714.5	750.4	538.4	524.9	510.6	1058.1	1088.7	1130.5

	Air Quality			Water Qual/Coast & Marine			Natural Hazard Reduction			Generic Crosscutting		
	FY94	FY95	FY96	FY94	FY95	FY96	FY94	FY95	FY96	FY94	FY95	FY96
DOC	5.5	6.4	14.7	32.0	34.7	40.3	111.2	98.4	101.6	0.1	4.1	8.1
EPA	150.0	98.3	98.1	28.3	31.2	32.0	0.0	0.0	0.0	0.0	0.0	0.0
USDA	4.3	4.3	3.9	77.0	73.4	74.3	1.0	1.1	1.1	0.0	0.0	0.0
DOT	3.4	3.1	3.4	3.4	3.2	3.4	0.0	0.0	0.0	1.8	2.7	2.1
DOI	4.4	4.2	4.1	187.3	161.1	154.8	94.9	75.3	86.8	17.1	24.4	26.9
NSF	3.0	3.0	3.0	10.0	11.0	13.0	40.0	39.0	39.0	30.0	31.0	31.0
NASA	21.4	30.7	38.4	68.9	73.0	82.6	28.3	25.2	25.1	0.0	0.0	1.0
DOE	13.1	14.6	20.0	6.6	20.5	28.1	1.1	2.5	2.4	250.8	258.0	264.6
SI	0.0	0.0	0.0	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0
NIEHS	22.5	23.6	24.4	2.1	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TVA	1.7	4.8	3.3	4.3	0.0	0.0	0.0	0.0	0.0	6.6	8.6	11.4
HUD	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.6	0.5	0.0
TOTAL	234.4	239.3	210.4	393.7	414.7	428.3	272.0	245.9	248.4	353.1	378.4	391.7

- For FY 1994 total contributing resources for CENR are $7,284.6 million. Contributing resources for FY 95 & 96 are not yet available for all agencies

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