

OFFICE OF SCIENCE AND TECHNOLOGY

Responses of the Federal Departments and Agencies
to the
President's Science Advisory Committee
Report,
"Restoring the Quality of Our Environment"

May 1967

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In his introductory letter to the Report, "Restoring the Quality of Our Environment", President Johnson requested that Departments and Agencies consider the recommendations and report to him on the ways in which the Government can move to deal with the problems and recommendations cited in the Report.

To effect the President's request, Mr. Elmer B. Staats, Deputy Director of the Budget, sent letters on December 8, 1965, to the heads of Departments and Agencies asking that they review the Report and its recommendations. The following is a summary and evaluation of the responses to that request.

The following is a summary and evaluation of the responses to that request. The responses are grouped into four main categories: (1) Air Quality, (2) Water Quality, (3) Noise, and (4) Other Environmental Issues. Each category contains a list of specific actions and programs that have been initiated or planned by the relevant departments and agencies.

1. Air Quality: This category includes responses from the Department of Health, Education and Welfare, the Environmental Protection Agency, and the Federal Aviation Administration. Key actions mentioned include the development of improved methods for disposal of liquid pollutants, the development of alternative alternatives of burning, the establishment of a national air quality standard, and the establishment of a national air quality standard.
2. Water Quality: This category includes responses from the Department of Health, Education and Welfare, the Environmental Protection Agency, and the Federal Aviation Administration. Key actions mentioned include the development of improved methods for disposal of liquid pollutants, the development of alternative alternatives of burning, the establishment of a national air quality standard, and the establishment of a national air quality standard.
3. Noise: This category includes responses from the Department of Health, Education and Welfare, the Environmental Protection Agency, and the Federal Aviation Administration. Key actions mentioned include the development of improved methods for disposal of liquid pollutants, the development of alternative alternatives of burning, the establishment of a national air quality standard, and the establishment of a national air quality standard.
4. Other Environmental Issues: This category includes responses from the Department of Health, Education and Welfare, the Environmental Protection Agency, and the Federal Aviation Administration. Key actions mentioned include the development of improved methods for disposal of liquid pollutants, the development of alternative alternatives of burning, the establishment of a national air quality standard, and the establishment of a national air quality standard.

DEPARTMENT OF AGRICULTURE

The Department of Agriculture generally endorsed the Report, stating that their existing programs are consistent with the objectives and that they are already operating in accord with most of the recommendations. Additional resources are needed, however, to bolster their programs.

Evaluations and Suggestions from Agriculture

1. A Congressional mandate is needed for a full assault on the rural sewage problems.
2. If a polluters' tax system included "all" pollutants, the impact on agriculture would be significant. The concept needs careful study.
3. Although Agriculture's policies and objectives are in harmony with the actions recommended, satisfactory means for full achievement have not yet been attained. Continued and increased research effort is needed to improve the effectiveness of pollution control under present programs. There is specific need for:
 - a. development of improved methods and equipment for disposal of liquid and solid wastes;
 - b. development of satisfactory alternatives to burning slash disposal and control of vegetative growth;
 - c. determination of damages, duration and permissible levels of air pollution from road dust; and
 - d. establishment of pollution criteria and indices.
4. Regarding the recommendation (B21) that Interior undertake a new program to determine the effects of pollution and other environmental changes on aquatic and terrestrial systems, Agriculture points out that the gathering and dissemination of information about the effects of environmental changes on lands and water are already a major part of Agriculture's programs, and are not limited by political, geographic or administrative jurisdictions. A new Interior program would, to a large extent, overlap and unnecessarily duplicate Agriculture's activities. Existing programs should be extended and expanded where needed rather than overlap or duplicate them with new programs in another agency.
5. It is suggested that all Federal agencies concerned with the recommendation (B26) for better scientific basis for establishing environmental quality should participate in a coordinated effort to obtain the necessary information.

6. Concerning the recommendations (C2, B8, and B9) for increased knowledge and surveillance of soil pollutants, Agriculture's current programs do not include all pollutants and, in other cases, effort is not sufficient. The Report's recommendations can be realized by expanding or otherwise altering existing programs.

7. New legislation is required to authorize Agriculture to administer control and abatement programs.

8. The National Environmental Quality Survey recommended for administration under Commerce (D1) should not overlap Agriculture's responsibilities in monitoring, controlling, and abating pollution.

9. Agriculture supports the recommendation for baseline population studies (D5), seeing themselves as the agency to conduct the program.

10. An interagency policy committee should be established to assist in the guidance of interdepartmental research centers for environmental studies such as recommended under G8.

General Remarks

1. Agriculture will further emphasize pollution control and abatement through its technical assistance, cost-sharing, credit, and other programs.

2. Opportunities for training in Agriculture are possibly greater than envisioned by the writers of recommendations G10 and G11.

ATOMIC ENERGY COMMISSION

The AEC endorsed the objectives of the Report and recognized the favorable overall impression of the Panel regarding the adequacy that has been maintained in controlling the release of radioactive materials to the environment. It was noted that none of the recommendations specifically referred to AEC.

The Commission's programs and operations already include provisions which implement or are consistent with virtually all of the recommendations in the Report which are generally applicable to Federal agencies.

The AEC maintains a substantial research program including studies of:

1. The distribution, cycling, and fate of radioactive materials in terrestrial, freshwater, and marine ecological systems.

2. The effects of natural environmental factors, such as temperature, radiation, and combinations of radioactivity in conjunction with other bioenvironmental stresses, upon ecological systems.
3. Mineral and energy cycling in ecological systems.
4. Biological inventories and the establishment of biological baselines.
5. Population dynamics including trends, fluctuations, and periodicities of animals.
6. Total ecosystem dynamics.
7. Marine sciences research with emphasis on biology, circulation and mixing, and biogeochemical processes.
8. Prediction of transport, dispersion, and deposition of atmospheric contaminants.
9. The development of the necessary technology to handle, process, store, and dispose of radioactive liquid, solid, and gaseous wastes.

Evaluations and Suggestions from AEC

1. Areas in which the application of nuclear technology can aid in the study and abatement of environmental pollution:
 - a. Increased use of nuclear energy as an alternate source of electric power production offers a means of reducing environmental pollution from carbon dioxide and other combustion products.
 - b. Radioactive tracer techniques are applicable to many of the research and development problems noted by the Panel in its recommendations.
 - c. The environmental research programs of the AEC have encountered need for expansion of research in areas related to:
 - (1) The cycling of nutrients, elements, and energy in ecological systems.
 - (2) The relationship of atmospheric turbulence, structure, and intensity to topography, buildings, vegetative cover, cloudiness, season, latitude, and large-scale wind systems.

- (3) Atmospheric flow patterns with horizontal dimension of a few miles to hundreds of miles.
 - (4) The general circulation of the stratosphere.
 - (5) The interactions of particles, vapors, and water droplets in clouds and precipitation, including effects of electrical fields.
- d. There is need for development of better guides and standards applicable to the discharge of certain non-radioactive polluting agents to the environment.
2. Operation activities which may require additional expenditure:
- a. Restoration to permit unconditional reuse or transfer to public domain of AEC facilities and areas which have become obsolete or unneeded.
 - b. Stabilization and control of uranium mill tailings piles.

DEPARTMENT OF COMMERCE

The Department of Commerce complimented the Report and concurred with the recommendations that the Department is the logical agency in which to set up a National Environmental Quality Survey. They stated that such a Survey is essential to the success of the environmental pollution program and that it fits readily within their existing activities. Thirty-one areas of common interest were identified from the Report's recommendations.

A task force was established within ESSA to plan and evaluate details of a comprehensive program which was submitted for FY 1968. The details of this program were presented in a proposal titled, "Environmental Pollution. A Proposed Five-Year Plan for ESSA's Activities in Support of National Goals in Alleviation of Air and Water Pollution, September 1966". The proposal, which is responsive to many of the Report's recommendations, describes a primary program providing for research and development, and operational efforts specifically directed toward solving pollution-related geophysical problems in the atmosphere, estuaries and oceans. It is proposed that these activities be funded as a new program.

Commerce already has programs in some of the areas recommended. For example, they are studying the CO₂ content of the atmosphere (D2) and they are monitoring stratospheric temperature (D3).

Evaluations and Suggestions from Commerce

1. Since the total resources for all the activities recommended in the Report will be very large and extend across many agencies, priorities and schedules must be established if a realistic program is to be carried out.
2. ESSA plans to expand the following activities within their authorized program during FY 1967:
 - a. Augmentation of the CO₂ monitoring and evaluation program through the development of necessary sampling techniques and design of the required global network leading to an operational program in FY 1968.
 - b. Augmentation of mathematical modeling to evaluate the global climate and weather effects.
 - c. Preparation of Air Pollution Advisories (the high pollution potential forecast program) will be supported on a test basis by the Weather Bureau at the National Meteorological Center in FY 1967, leading to transfer of the operational program support and responsibility from the Public Health Service to ESSA in FY 1968.

DEPARTMENT OF DEFENSE

The DOD generally agreed with the findings and recommendations of the Report and stated that they will follow its recommendations.

In 1965, DOD established an ad hoc working group on environmental pollution abatement. A pre-publication copy of a Directive was submitted which assigns responsibilities and establishes procedures for Environmental Pollution Control. Among other functions, this Directive replaces the above-mentioned ad hoc group by a permanent Department of Defense Environmental Pollution Control Committee.

Evaluations and Suggestions from DOD

1. DOD wishes to participate in any interagency coordinating efforts.

2. If a National Environmental Quality Survey is undertaken, it is suggested that the facilities and activities of the Army's Environmental Hygiene Agency and the Air Force's Regional Environmental Health Laboratories should be utilized.

3. There is need for early development of Federal criteria and guidelines concerning pollution for use by Federal departments and agencies and their contractors.

4. The DOD military chemical-toxic hazards research program is producing much data which should be valuable to agencies concerned with problems of acute and chronic biological effects of air pollution. These data will be transmitted as they become available.

5. Expansion of the scope and functions of the Advisory Center on Toxicology should be considered.

General Remarks and Actions

1. DOD has already recognized the importance of dealing with air pollution on airshed basis. Their research on air pollution problems associated with missile and rocket propellants is producing considerable information on this subject.

2. DOD would be pleased to cooperate in demonstrations of new methods of pollution abatement, subject to availability of funds.

3. Investigation for development of degradable type container materials for military packaging will be stimulated.

4. The Corps of Engineers, in cooperation with PHS, is preparing a study on the development of a program to control natural and man-made salt pollution in streams of the Arkansas and Red River Basins. The results will be of value elsewhere.

FEDERAL AVIATION AGENCY

The FAA was specifically mentioned in only one recommendation within the Report. That recommendation (B6) concerns issuance and control of licenses for aerial application of pesticides. FAA points out that this matter is fully covered by the Federal Aviation Regulations, Part 137, "Agricultural Aircraft Operations" which was issued by the FAA on June 17, 1965.

The FAA is in agreement with the recommendations for reducing pollution from Government installations and in facilities to which the Federal Government contributes financial support (B13, B14, and B15).

They state that they are complying with the recommendations. Action will be initiated to provide FAA field offices with guidance material in the FAAP Handbook concerning dust reduction during project construction.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

The Department of Health, Education, and Welfare agrees generally with the 13 principles recommended and has taken specific action on several of them.

Actions Taken or Planned in Support of the Report's Recommendations:

1. The recent Executive Orders dealing with water and air pollution control at Federal installations implement the recommendation concerning that subject (A4).
2. Relative to curtailing air pollution from automobiles, the 1965 Clean Air Act Amendments provide for the imposition of exhaust standards in automobiles. Regulations have been issued to provide exhaust controls on the 1968 models. This does not, however, completely solve the problem (A7).
3. The recommendation that departments or agencies should maintain administrative and budgetary separation between pollution research and enforcement was given careful consideration in planning the reorganization of PHS. All the research will be under the newly created Environmental Health Sciences Center within NIH, while the enforcement will rest in the Bureau of Disease and Injury Prevention and Control (A9).
4. The recommendation that the Department of Agriculture implement the principle that in the registration of pesticides the burden of proof should fall on the registrant has been implemented in part by a recent agreement between HEW and Agriculture concerning the "zero tolerance" and "no residue" registration of pesticides (B4).
5. PHS is developing more effective research and monitoring capability to deal with pollution problems concerning lead, borax, phosphorus and other potentially hazardous substances (B8 and B9).
6. The recommendation relating to pollution control at Federal facilities is being implemented (B14).
7. HEW already supports some research into the health significance of noise, and they plan to expand studies directed at determining the psychological and physiological effects of noise (B28).

8. HEW is presently making a detailed study of their network of environmental sampling systems which have the potential for providing generally useful data (D).

9. The recommendation (E10) that HEW utilize its contracts and grants in the sewage treatment field to emphasize the involvement of biochemists and biologists is incorporated in the President's Budget for the Federal Water Pollution Control Administration, which is now in the Department of the Interior.

Evaluations and Suggestions from HEW:

1. While the regulation which has been issued to provide exhaust controls on the 1968 model automobiles will contribute to curbing the automobile exhaust pollution problem, it does not deal with the millions of vehicles presently on the highways. Further steps in the area of inspection and maintenance, as well as in the development of long-range solutions are needed (A7).

2. HEW believes that the field of solid wastes should remain as a responsibility of PHS. This recommendation is supported by their past experience and their present program which includes coordination with HUD and Interior (B11 and B12).

3. Recommendation (B12) for support of community solid waste disposal facilities and for the improvement of technology related to waste disposal should receive emphasis. To be effective, large amounts of money and new approaches will be needed.

4. The recommendation (B26) that efforts be increased to establish the scientific bases upon which standards of environmental quality can be set falls to a large degree within the framework of ongoing environmental health programs, and within the mission of the proposed National Environmental Health Sciences Center of NIH. It is recognized that environmental quality standards may differ for different purposes, but it is HEW's view that critical issues will center around concern for health hazards.

5. Coordination and systems studies are urgently needed in the field of environmental pollution. Increasing use must be made of the resources of private industry in some of the new approaches.

6. The recommended Baseline Measurement Programs (D) is of concern to HEW because the focus is on a single system which may or may not be adequate in terms of the specific missions of HEW. Also the use of the word "average" in relation to the condition of the environment is questioned. HEW assumes that it is intended that any agency could make use of data accumulated by other agencies.

7. HEW agrees in the need for research (F) and points out that this should include additional study by behavioral sciences on problems related to pollution.

Federal Water Pollution Control Administration *

The Administration was generally critical of the Report, although most of the broad objectives presented in it were considered as previously recognized and sound. A summary of their evaluation is as follows:

The Report, although thought-provoking, has major weaknesses and it is not a useful document from the standpoint of guiding, programming and planning for the water pollution control program. These weaknesses are as follows:

1. The Report does not contribute significant fresh insights on the pollution problem. Most of the comments and recommendations refer to concepts already well understood. Acceptance of these concepts is reflected by activities which are underway; which have been planned for initiation or expansion; or for which the necessity for greater effort is well recognized but where means for implementation are still being sought. Some of the recommendations refer to activities which have already been accomplished, and in general the Report appears to reflect a lack of awareness or consideration of existing programs.

2. The Report's recommendations are not structured in terms of priority, relative importance, or related one to another or to the problem as a whole. The Report seems to represent a series of ad hoc views and comments, rather than an objective structured analysis.

The following review deals with those recommendations which most directly concern the programs of the Federal Water Pollution Control Administration.

Forty-two of the Report's recommendations are subjects in which the Administration is already doing substantial work or plans to be doing so within the immediate future. The Administration wants to expand their efforts in some of these areas.

* Prepared while an agency of the Department of Health, Education, and Welfare.

Evaluations and Suggestions by the FWPCA

1. The statement (A9) that pollution research and development should be kept administratively and budgetarily distinct from investigative and enforcement activities is considered misleading because an effective national pollution control program must both coordinate the search for new knowledge and provide means for putting the results into action.
2. The concept of a polluters' tax system (B1) is considered worthy -- along with investigating other means of financing and control. As yet, however, little information exists for developing the suggested tax system.
3. The Report does not recognize the Administration's program, authorized under the 1965 Amendment to the Federal Water Pollution Control Act, which will provide an assessment of the best way to handle the combined sewer problem recommended under B11.
4. Action B15 recommends that Federal agencies not finance any construction projects or programs which do not include effective means for controlling the production of dust and sediments. At the present there are no Federal controls over construction methods in this connection.
5. Because of its complexities, the pollution problem does not lend itself to a single numerical index of pollution as recommended in E14.
6. There is agreement with all recommendations for acquiring and training more and better manpower. The Administration is making progress in this area but needs more funds.

The following needs were pointed out:

- a. The Administration does not have a systematic program to acquaint young people with careers related to water pollution control (G1).
- b. New legislative authority would be required to permit the Administration to support grants for constructing, remodeling, and equipping facilities for research and training in water pollution control (G4).
- c. The Administration should expand its current grant program to include the fields of biochemistry, toxicology, and epidemiology (G5).

- d. The recommended new program of environmental studies research centers at several universities under HEW support (G8) could be initiated under existing programs of the various Departments and Agencies if additional funds were provided.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

HUD fully concurred with all recommendations calling for actions by Federal agencies to help bring about minimization of pollution. They will endeavor to develop appropriate and practical administrative regulations to accomplish these recommendations. A policy statement is being drawn up concerning separation of sanitary and storm sewers.

Evaluations and Suggestions from HUD

1. The Report's recommendations calling for effluent charges (B1 and B10) does not indicate whether they should be imposed by Federal, State, or local governments, nor does it indicate what should be done with the proceeds from such charges.

2. Recommendation B12 calls for HUD to direct a substantial portion of support to assist cities in using available technology to improve solid waste practices. HUD is already carrying out a part of this recommendation. Interest-free advances to municipalities or other local public works, through June 1965 involved 1.3 million dollars. Much larger appropriations of funds than now provided under Section 702 of the Housing Act of 1965 are needed for this purpose.

3. Recommendations G5, G7, and G9 call for training and fellowship programs to deal with pollution problems. The recommendations refer to HEW, Agriculture, and Interior. Reference also should have been made to the training and fellowship programs currently in progress under the jurisdiction of HUD which provides fellowships in institutions of higher learning for graduate training in professional city planning and urban housing.

DEPARTMENT OF THE INTERIOR

The Department of Interior reported that . . . "the philosophy of the report is precisely in keeping with the Department's outlook, . . ." Nearly three-fourths of the 104 recommendations are considered pertinent to the Department.

Activities Planned in Support of the Report's Recommendations

1. The Secretary reported that he will take the following actions to insure that all possible steps are taken to minimize pollution arising from their own or associated activities on lands administered by Interior.
 - a. He will direct each Office and Bureau to examine its programs and to institute actions that will reduce pollution;
 - b. He will direct each unit of the Department to exert its influence to improve environmental quality in each interagency group in which it participates;
 - c. He will direct that public awareness of the problems of pollution and the values of resources damaged by pollution will be stressed in all public information programs using all possible means; and
 - d. He will issue policy directives on a Department-wide basis as appropriate, similar to the pesticide policy issued in August of 1964.
2. The Secretary will propose that Interior be designated as the Federal agency responsible for estuarine and coastal marshes; and that a system of "wild estuaries" be established, patterned after the "wild rivers" concept.
3. To expedite their ability to cope more effectively with pollution abatement and control, Interior plans to increase research and training within their existing programs. This will include:
 - a. Research that will provide a basis for future actions leading to appropriate levels of pollution abatement and control.

Several Bureaus are increasing this research to provide needed information on tolerance levels for pollutants, on transport and behavior of pollutants, and on the measurements of pollutants.

- b. Research that will provide new possibilities for preventing and controlling pollution.
- c. Research to determine the maximum pollution control per dollar for future actions programs. It will include:

Contributions to the environmental measurements required for the National Environmental Quality Survey.

Making available expertise of geochemists of the Geological Survey to assist attacking the problems of lead and nickel pollution of air.

Initiation of studies that will provide quantitative baseline population densities of natural populations of plants and animals to establish bases for comparison with populations under pollution stress.

- d. Substantial contribution to the training of needed manpower in those fields of pollution control that are Interior's particular responsibility.
- e. Extensive training programs for both professional and subprofessional personnel have long been conducted at the Cincinnati facility of the Federal Water Pollution Control Administration. In addition, financial assistance is given to individuals and institutions for training of professional manpower in fields related to water pollution. Interior intends to expand these programs.

Evaluations and Suggestions from Interior

1. Interior should have a series of "model estuaries" which are subject to a variety of uses and environmental pressures. These should be tied-in with the broad river basin programs.
2. A mechanism such as the Interagency Federal Committee on Pest Control will be necessary to assure that HEW is provided information needed from other agencies for establishing pollution standards.

3. Interior needs additional authorization to carry out the following programs:
 - a. Taxation to provide incentive for eliminating long-term holding of junk automobiles (B10). Interior generally agrees with this recommendation, but is not ready to recommend a specific legislative proposal. Alternative forms of taxes and fees designed to accelerate the disposal of automotive junk deserves serious but cautious consideration in view of the economic aspects of present and potential markets for this material. An analysis report is being prepared. The Department is presently examining the merit of a user fee system that would attach to titles and encourage the rapid disposal of inoperable vehicles within foreseeable marketing patterns.
 - b. The Land and Water Conservation Fund Act, 1965, will enable Interior to consider State proposals for the acquisition of coastal marshes, lagoons and estuaries which could serve incidentally as national monuments, wildlife refuges, and public recreational areas (B17), and it will make funds available for this purpose. To the extent permitted by existing law, Interior will acquire these areas as part of their existing program. The present authority of the Department for entering into extramural contracts for research and for making grants for research and to train competent graduate students is fragmented.
 - c. Support of extramural research and training related to pollution missions of Interior (G3).
 - d. Support of grants covering up to 100% of cost to universities or other non-profit institutions for construction, remodeling, and equipping facilities needed for research and research training in environmental health, science and engineering (G4).

Interior now has some authority to make matching grants for supplies, instruments and other equipment necessary to specific research projects. Legislation would be necessary, however, to pay larger shares of the cost, up to 100 percent for materials and facilities. The Department believes that the need for such legislation ought to be carefully considered in light of other Federal educational programs providing grants to universities. Interior is considering the item.

- e. Recommendation B21 in the Report suggests that the Department of Interior undertake a new program for gathering and making available information about effects of environmental changes on those lands and waters that are Interior's responsibility. The Department is awaiting the BOB-OST report on "The best way in which the Federal Government may direct efforts toward advancing our scientific understanding of natural plant and animal communities and their interactions with man and his activities" before submitting proposed legislation. In the meantime, an Ecological Research Coordinator has been appointed to strengthen and coordinate the Department's activities in this area.

NATIONAL ACADEMY OF SCIENCES

A joint reply was submitted by the National Academy of Sciences and the National Academy of Engineering.

Four recommendations in the Report refer specifically to the two Academies. The recommendation (C1) that an Environmental Pollution Board be established by NAS-NRC is welcomed. The other recommendations concerning NAS suggest that NAS-NAE jointly undertake an intensive study of the broad area of sewage, trash and garbage disposal (C5), undertake a similar study of sewage treatment and water supply (C6) and, thereafter, undertake an intensive study of the interactions between various disposal systems as they affect the interrelationship of solid, liquid, and gaseous pollution (C7).

Evaluations and Suggestions from NAS

1. It is suggested that the proposed Environmental Pollution Board should be paralleled by a committee of the Federal Council for Science and Technology.

2. The Academy suggested that, although NAS and NAE may be able to make a real contribution in identifying and analyzing the best courses of action for better treatment and disposal of liquid, solid and gaseous wastes, the depth and scope of the study could vary widely and would be dependent upon the Federal program. The recommended study of sewage treatment and water supply would require a substantial increase in engineering staff. It is believed that the role of the Academies in this major program requires further discussion and it is suggested that it be discussed with the Bureau of the Budget and the Office of Science and Technology.

NATIONAL SCIENCE FOUNDATION

The Foundation is increasing emphasis on environmental problems as indicated by their establishment of a Division of Environmental Science on December 3, 1965. It was concluded that the Report focuses upon almost every aspect of the NSF's program of research and education in the environmental sciences.

Evaluations and Suggestions from NSF

1. Although much of the applied research recommended by the Report is outside of the present mission of NSF, NSF needs to be diligent in supporting basic research leading to increased understanding of the environment.
2. The new Division of Environmental Sciences places NSF in a position to give increased encouragement to scientific study of the environment. They have unique experience for handling complex scientific operations involving severe environmental problems and difficult logistical support.
3. The Report's recommendations that NSF increase support for training new scientists and programs to develop broader recognition of opportunities in the field of environmental pollution is endorsed; however, it is pointed out that careful study is needed regarding means of implementing these recommendations.
4. The Director established a task force to study the Report more thoroughly and recommend appropriate actions to enhance the value of NSF's programs in this field, with emphasis on the transition area between basic research and applied research and development.

SMITHSONIAN INSTITUTION

The Smithsonian Institution endorsed the Report. They identified nineteen of the Report's recommendations which fit within their sphere of interest and competence. They are as follows, with those of particular relevance underscored: B17, B21, C2, C4, D1, F2, F3, F4, F5, F6, F8, F9, F11, F12, F13, F14, F18, and F19.

Evaluations and Suggestions from the Smithsonian

1. The Smithsonian's new program in environmental biology and their oceanography program are planned to encompass wide ranges of ecological research which can be oriented in part towards pollution problems.

2. The Smithsonian Radiation Biology Laboratory which is mainly concerned with environmental physiology of plants can be expanded to include animals and, thereafter, undertake biochemical studies required for an integrated program of basic research on the effects of pollution (see p. 40 of the Report).

3. The Smithsonian plans to assemble a group of highly qualified bioenvironmental scientists to conduct research in their own specialties and function as a coordinated team to work on problems in "ecosystem sciences." It is suggested that this team could tackle basic problems related to pollution -- such as cycling of pesticides in ecosystems and their effects on regulatory mechanisms of populations.

4. The Smithsonian plans to concentrate on:

- a. systems analysis in mathematical modeling and simulation studies of laboratory and field populations,
- b. cycling of energy and materials, and
- c. numerical homeostasis of animal populations with emphasis on the role of social behavior.

5. The baselines, including structure of natural environments, which are needed to compare and evaluate effects of pollutants at all levels of biological organization can be obtained through the Smithsonian's program. Monitoring should be done by other agencies.

6. The Smithsonian could serve as a center for universities, national laboratories, and Federal agencies in the development of an effective national program in environmental biology, including emphasis on pollution problems.

7. The Smithsonian is uniquely qualified to:

- a. coordinate and synthesize research and education programs between the Federal Government and universities,

- b. coordinate efforts of Government and industry in the improvement of our environment,
- c. help educate the public and develop their awareness of environmental problems,
- d. bridge the humanities and natural sciences, and
- e. integrate foreign and domestic problems involving the above factors.

8. They can serve as a focal point for the integration of information in developing a unified national program in restoring and maintaining the quality of our environment. This could include a Smithsonian clearing house on ecosystem science, including pollution.

TENNESSEE VALLEY AUTHORITY

The TVA endorsed the objectives as stated in the Report and illustrated how these principles and many of the recommended actions are consistent with the TVA's policies as practiced for many years.

The Tennessee Valley Authority:

- a. assists planning agencies in considering and pursuing present and potential problems of pollution and waste disposal (B13),
- b. provides for control of dust and sediments during their construction, and maintenance operations,
- c. requires strip mining operations to rehabilitate areas so as to minimize silt runoff (B15),
- d. is engaged in a joint project with PHS for research studies and the construction and operation of a full-scale demonstration project for composting municipal garbage, refuse, and raw sewage sludge (C5),
- e. supports research on the use of electrical energy for powering automobiles (E1),
- f. is studying means for removing sulfur compounds from stack gases and the recovery of sulfur as a by-product (E2 and E3), and
- g. cooperates with private industry in the development of new instruments (E11).

The TVA has conducted extensive studies on the biological effects of heated water discharges from power plants (F9) and is expanding its studies of land-water relationships, with particular reference to the effects of land-use practices, industrial and municipal waste discharges, hydrology, and waste control practices upon water quality and reservoir ecology. Their research over the past fifteen years has contributed substantially to improvement for predicting dispersion of gaseous wastes. The TVA pesticide usage practices are the same as recommended for the Department of Agriculture (B5).

Evaluations and Suggestions from TVA

1. It is suggested that the recommended study of a tax-like system which would subject polluters to "effluent charges" (B1) should be broadened to include consideration of a tax-like system of charges on non-degradable" containers which create solid waste pollution problems.
2. The new Federal Aviation Agency Resolution (part 137) covering agriculture aircraft operations appears to implement recommendation B6 except that local, state, and Federal Government agencies conducting such operations with public aircraft are not required to comply with these new rules.
3. Although the formations of compacts or unified authorities to deal with air pollution problems within natural airsheds appears to be a national approach for metropolitan areas that spread across many jurisdictional boundaries (B20), the need for this approach in low population areas, such as the Tennessee Valley, has not yet been demonstrated.
4. The TVA agrees in the need for improving scientific bases for establishing environmental quality standards (B26), but because of the urgent need for guidelines for pollution abatement and control, processing standards will have to be developed at first on a somewhat empirical basis.
5. The implication that standards should provide a "balance between protection of the community and the economic burden upon those whose easiest course is to pollute" appears inconsistent with principles A1 and A2. To be consistent it seems that standards should be established on the basis of need to protect "individual rights to quality of living, as expressed by absence of pollution" and the cost of eliminating pollution should be sought through a tax-like system such as proposed under B1.

6. It would be a formidable undertaking to devise and conduct surveys comprehensive enough to provide meaningful year-to-year information and the average might well lose its significance because of the wide range of deviations. If a program of baseline environmental measurements is initiated, TVA would expect to help in collecting the needed data from the Tennessee Valley area.

7. While the long-range importance of the proposed CO₂ studies (F18) is recognized, similar studies of other pollutants should not be neglected.

8. "Cooperative" educational programs could be given special support to help stimulate the interest of students in careers in control and enforcement activities as well as in research.

DEPARTMENT OF TREASURY

The scope and scale of the Report's recommendations raise financial and organizational issues which the Treasury believes must be resolved before effective actions can be commensurate with the costs.

They have three general concerns:

1. It appears that the Government is not now organized at Federal or local levels to effectively undertake the programs proposed in the Report. A more fundamental approach may be needed than the appointment of a high-level coordinating committee.

There is a serious problem of control because nearly every agency has some program responsibility in the subject. Although the Treasury is "at a loss" as to where control should be lodged, they believe that it should be in a single agency.

2. They express particular concern because the anti-pollution projects may not be regarded as economically viable for private investors. This may develop pressures for Federal guarantees of tax-exempt obligations as the only means for obtaining adequate financing at reasonable rates of interest.

Consideration should be given to devising a method of financing State and local government borrowing which would not entail the sale of tax-exempt obligations to taxable investors. It is suggested that the financing and tax-exempt problem can be met by establishing a "central financing mechanism."

3. There is need for thorough review of the basis for cost-benefit calculations and the determination of reimbursement requirements for pollution control practices.

A serious deficiency in the water resources approach is the interest rate used for discounting future costs and benefits and for determining reimbursement payments. The Treasury had understood that the Water Resources Council was to review the interest rate question and report on it early this year. Since this review apparently has not been made, the Treasury feels compelled to urge that the President appoint a special committee (composed of the BOB Director, CEA Chairman, and the Secretary of the Treasury) to give full consideration to the interest rate question.

The Treasury supports the general idea of an effluent charge system and wishes to participate in the formation of any specific plans.

The Report's recommendations for disposal of junk automobiles are somewhat contradictory. There is a general recommendation for an annual Federal or state license on automobiles that are not in use and it is suggested (p. 155) that disposal responsibility might be placed upon the manufacturer or purchaser by an excise tax on automobile sales. The Treasury prefers the excise tax method.

4. The Treasury has been and will continue to be taking steps to minimize pollution of air, water, and soil at their own facilities.

EVALUATION AND SUMMARY

Most of the agencies endorsed the broad objectives of the Report. Several stated that the objectives were consistent with their existing programs and several had problems with specific items in the Report.

Agency Activities Reported Consistent with the Report's Recommendations

1. The following agencies indicated that their existing programs already are generally consistent with the Report's recommendations: Atomic Energy Commission, Department of Agriculture, Department of the Interior, Department of Health, Education, and Welfare, National Science Foundation, and the Tennessee Valley Authority.

2. The following new activities are planned in support of the recommendations:

AGRICULTURE

- a. The Department will further emphasize pollution control and abatement through its technical assistance, cost sharing, credit, and other programs.

COMMERCE

- a. A task force which has been established in ESSA to plan and evaluate their program for FY 1968 will consider and be responsive to the Report's recommendations.

DOD

- a. Research will be initiated to develop degradable types of packaging materials. The Corps of Engineers, in cooperation with PHS, is developing a program to study the mechanisms for controlling natural and man-made salt pollution in streams of the Arkansas and Red River Basins.
- b. The DOD will replace their ad hoc working group on environmental pollution abatement by a permanent Department of Defense Environmental Pollution Control Committee.
- c. The DOD toxicology research program is producing data which should be valuable to agencies concerned with air pollution problems. These data will be transmitted to the agencies as they become available.

FAA

- a. Field offices will be provided guidance material in the FAAP Handbook concerning dust reduction during construction operations.

HEW

- a. The recommendations relating to lead, borax, phosphorus, and other potentially hazardous substances has been given special consideration by the PHS. They are developing more effective research and surveillance capability in this field.
- b. HEW plans to expand their research concerning the health significance of noise, including more emphasis on the psychological and physiological effects of noise.

- c. The Department is making a detailed study of their network of environmental sampling systems which have the potential for providing useful data for Baseline Measurement Programs such as are recommended in the Report.

INTERIOR

- a. The Department will take all possible steps to minimize pollution on lands under their domain. For this purpose the Secretary will (1) direct each Office and Bureau to examine its own program for ways to reduce pollution, (2) direct each unit to improve environmental quality wherever feasible, (3) direct that all public information programs shall use all possible means to develop public awareness of pollution problems, and (4) will issue appropriate Department-wide directives to effect control of pollution.
- b. The Secretary will propose that Interior be designated as the responsible agency for estuaries and coastal marshes, and that a system of "wild estuaries" be established, patterned after the "wild rivers" concept.
- c. Research will be increased within existing programs to: (1) provide bases for future actions needed to improve pollution abatement and control, (2) explore new technological methods for controlling pollution, (3) determine methods which will provide maximum control per cost, (4) provide environmental measurements required for the National Environmental Quality Survey, and (5) to initiate studies that will provide quantitative baseline densities of natural populations of plants and animals for comparison with similar populations under stress from pollution.
- d. Manpower training programs will be expanded within existing authority.

Recommendations Concerning the Proposed National Environmental Quality Survey and Baseline Population Studies

1. Standards need to be established for environmental quality (B26) and should be established by coordinating the efforts of all concerned Federal Agencies (Agriculture).
2. The Survey recommended for administration under Commerce should not overlap Agriculture's responsibilities in monitoring, controlling, and abating pollution (Agriculture).
3. The facilities and activities of the Army's Environmental Hygiene Agency and the Air Force's Regional Environmental Health Laboratories should be utilized if the Quality Survey is undertaken (DOD).
4. The Quality Survey is essential to the success of the Nation's environmental pollution program and fits well within the existing activities of the Department of Commerce (Commerce).
5. Baseline population studies (D5) are needed and fit well within the Department of Agriculture's program (Agriculture).
6. The Baseline Measurement Program recommendation is questioned relative to the implication that the focus would be on a single system and that it would be concerned with "the average environment of the people of the United States . . ." Such a single system approach may not be adequate in terms of the specific missions of HEW (HEW).
7. The baseline studies, including definition of the structure of national environments, at all levels of biological organization can be conducted by the Smithsonian Institution (Smithsonian).
8. It would be a formidable task to conduct baseline studies which are comprehensive enough to be meaningful on a year-to-year basis. However, if such a program should be instituted, TVA would expect to contribute to those studies conducted in the Tennessee Valley (TVA).
9. Interior plans to initiate studies within existing authority that will provide quantitative baseline population densities of natural populations of plants and animals to establish a basis for comparison with population stress (Interior).

Recommendations Concerning Proposed Research on Effects of Pollutants and Pollution Control

1. The Report's recommendation that Interior undertake a new program to study pollution effects on terrestrial and aquatic communities duplicates a major part of Agriculture's programs. It would be better to expand existing programs rather than overlap and duplicate them with new programs in another agency (Agriculture).

2. The Atomic Energy Commission's research program includes studies of the effects of natural environmental factors, radioactivity, radioisotope tagged materials, and combinations of radioactivity plus other environmental stresses upon terrestrial freshwater and marine communities. Expansion of this effort would advance knowledge needed to help solve many general pollution problems. (AEC)

3. Coordination and systems studies are urgently needed in the field of environmental pollution. More use must be made of the resources of private industry in this area (HEW).

4. The recommended increased effort to advance scientific basis for establishing standards of environmental quality falls to a large degree within on-going programs of HEW and within the missions of the proposed National Environmental Health Sciences Center of NIH (HEW).

5. The Smithsonian Institution is eager to expand their environmental physiology program (presently in the Radiation Biology Program) to include basic research on the effects of pollution upon plants and animals (Smithsonian).

6. In response to the Report's recommendations, Interior is increasing its research within existing program to (1) develop basis for future actions needed for pollution control, (2) explore for new technological methods for pollution control and (3) to obtain baseline data for detecting and assessing the effects of pollutants upon natural populations of plants and animals (Interior).

Philosophy of Environmental Pollution Standards

1. The needs for environmental quality standards may differ for different purposes, but HEW believes that the critical issues will center around concern for health hazards (HEW).

2. The Report's implication that pollution standards should provide a "balance between protection of the community and the economic burden upon those whose easiest course is to pollute" (B26) does not appear to be consistent with principles A1 and A2 which state that "The public should come to recognize individual rights to quality of living, as expressed by the absence of pollution . . ." and "The responsibility of each polluter for all forms of damage caused by his pollutant should be effectively recognized and generally accepted. There should be no 'right' to pollute." To be consistent, it seems the standards should be established on the bases of aiming to protect individual rights to "quality living" (TVA).

3. Although the criteria for establishing environmental quality standards need to be improved, standards should be developed now on the basis of available data because of the urgent need for guidelines. Improvements can be made later as knowledge is advanced (TVA).

4. The interest in the need for research on CO₂ pollution should not be allowed to cause neglect for other pollutants (TVA).

Problems Concerning Pollution Control Authority

1. The responsibility for pollution control needs study. At the present nearly every agency has some responsibility in this subject. This is ineffective and inefficient (Treasury).

2. HEW believes that the field of solid wastes should remain a responsibility of PHS. This is supported by their past experience and their current program concerning solid wastes (HEW).

3. The recommendation that compacts or unified authorities should be established to deal with air pollution problems over entire airshed areas appears to be a logical approach for metropolitan areas which cross many jurisdictional boundaries. The need for such a system has not been demonstrated, however, for low population areas such as the Tennessee Valley (TVA).

Agencies Evaluations of Pollutor-Tax System

1. The pollutor-tax system recommendation needs careful study. Broadly, the problem involves many sources ranging from municipalities and large industries to domestic wastes from individual homes along streams. Who all would be considered pollutors and subject to tax? If the system includes all pollutors, the impact on agriculture would be very significant (Agriculture).

2. The question of "effluent charges" will appeal to some departments and cause grave problems to others. Such proposed actions raise basic policy issues which can only be resolved on a Government-wide basis (HEW).

3. Interior agrees in general with the recommendation for a tax to provide incentive for stopping long-term holding of junk automobile, but is not yet ready to recommend a specific legislative proposal. Alternative forms of taxes and fees should be considered. The Department is currently studying the merits of a user fee system that would attach to titles and encourage the rapid disposal of inoperable vehicles within foreseeable marketing patterns (Interior).

4. The Report's recommendation does not indicate whether the tax should be imposed by Federal, state, or local governments, nor does it suggest how the proceeds should be used (HUD).

5. Consideration should be given to broadening the polluters' tax system to include charges on "non-degradable containers which create solid waste pollution problems". (TVA)

6. The Department of Treasury supports the general idea of an effluent charge system, favoring an excise tax method to stimulate removal of junk automobiles. The Department wishes to participate in any tax system planning (Treasury).

7. Pressure may develop for Federal guarantees of tax-exemption for anti-pollution projects. It may be argued that this will be the only means for obtaining adequate financing at reasonable rates of interest because anti-pollution projects may not be regarded as economically viable for private investors (Treasury).

Location of Recommended Information Center

The Smithsonian presented reasons why they would be the best site for the collecting and integrating information from the national programs in environmental biology, including pollution (Smithsonian).

Agencies' Needs and Recommendations for Research Expansion

1. Increased research effort is needed to improve effectiveness of pollution control under Agriculture's present programs. Examples of agricultural research needs include (a) development of improved methods and equipment for disposal of liquid and solid wastes, (b) development of satisfactory alternatives to burning for slash disposal and control of vegetative growth, (c) determination of damages, duration and permissible levels of air pollution from road dust, and (d) establishment of pollution criteria and indices (Agriculture).

2. It is recommended that the following environmental research programs of the AEC be expanded: (a) Studies of the cycling of radioactive pollutants, nutrients, and other materials and the flow of energy in ecological systems, (b) Meteorological research on problems such as factors affecting air turbulence, atmospheric flow patterns, general circulation of the stratosphere and interactions of particles, vapors, and water droplets in clouds and during precipitation (AEC).

3. The AEC has found need for better guides and standards for the discharge of non-radioactive pollutants to the environment (AEC).

4. There is urgent need for pollution criteria and control guidelines for use by Federal agencies and their contractors (DOD).

5. Additional study should be given by behavioral scientists to the solution of some of the perplexing environmental pollution problems (HEW).

6. More research is needed and is planned to determine the psychological and physiological effects of noise (HEW).

7. To cope more effectively with pollution abatement and control, there is need for:

- a. better knowledge of the tolerance of various ecological systems to pollutants,
- b. research to improve and develop new methods for controlling pollution,
- c. a National Environmental Quality Survey, and
- d. baseline population studies of natural communities which are unaffected by pollutants (Interior).

Educational and Training Needs

1. The current opportunities for training in Agriculture are greater than apparently envisioned by the authors of the Report (G10 and G11) (Agriculture).

2. HEW shares the concern for manpower and considers this the key bottleneck rather than money. The Department concurs with the recommendations in the Report (HEW).

3. The Report's recommendations (G5, G7, and G9) for training and fellowship programs refer to Agriculture, HEW and Interior, but overlook the training and fellowship programs under HUD for graduate training in professional city planning and urban housing (HUD).

4. More people need to be trained in fields to cope with pollution problems concerning natural communities of plants and animals. The transfer of the Federal Water Pollution Control Agency to Interior provides that Department with additional authority for training and the Department plans to expand the training programs.

5. The FWPCA now lacks a systematic program to attract and acquaint young people to careers in fields related to water pollution problems (Interior).

6. The National Science Foundation concurs with the recommendation that they should increase support for training in fields related to environmental pollution, but point out that careful study is first needed to determine the best means for implementation (NSF).

Needs for New Interagency Studies and Committees

1. An interagency policy committee should be established to consider and assist in planning any interdepartmental research centers for environmental studies such as the Report recommends (G8) for support under HEW (Interior).

2. A mechanism similar to the Federal Committee on Pest Control will be necessary to assure that HEW is provided information needed from other agencies for establishing reliable pollution standards (Interior).

3. The Environmental Pollution Board which is recommended to be established by the National Academy of Sciences-National Research Council should be paralleled by a committee of the Federal Council for Science and Technology (NAS).

4. The recommendation that the National Academy of Sciences and the National Academy of Engineering jointly undertake intensive studies of the broad problems of sewage, trash, and garbage disposal (C5), of sewage treatment and water supply (C6), and of the interactions between various disposal systems (C7) requires further thought and planning. It is suggested that this subject be discussed with the Directors of the Office of Science and Technology and of the Bureau of the Budget (NAS).

5. A more fundamental approach than establishment of a high-level coordinating committee appears to be needed to effectively undertake the programs proposed in the Report. Federal and state governments are not now organized to properly undertake some of the recommended programs (Treasury).

6. The Treasury had understood that the Water Resources Council was to review the interest rate question and report on it early this year, but apparently this has not been done. Consequently, the Treasury feels compelled to urge that the President appoint a special committee, composed of the BOB Director, CEA Chairman, and the Secretary of Treasury, to give full consideration to the general question.

Needs for Additional Funds

1. The Department of Agriculture needs additional funds to bolster their current programs which would help fulfill recommendations that are made in the Report (Agriculture).
2. Additional funds may be needed to restore certain obsolete or unneeded AEC facilities or land holdings so that they may be transferred to public domain and funds may be needed to stabilize and control uranium mill tailings piles (AEC).
3. Much larger appropriations than now provided under Section 702 of the Housing Act of 1955 are needed to comply with the Report's recommendations (B12) that HUD assist cities improve their solid waste elimination practices (HUD).
4. Recommendations for support of community waste disposal facilities and improvement of present technology should receive emphasis. To be effective, large amounts of money -- as well as new approaches -- need to be available soon. "Typical conservative approaches could delay real accomplishments for generations." (HEW)
5. Large sums of money may be required to achieve some of the Development and Demonstration objectives (HEW).
6. The research and training program expansions planned by Interior could require considerable more funds.

Financing Methods

1. Because of the interest and value of the Development and Demonstration objectives (D), to both the public and private industry, financial support for such activities should be required from both the public and private industry (HEW).
2. Consideration should be given to devising a method for financing state and local government borrowing which would not entail the sale of tax-exempt obligations to taxable investors. It is suggested that the financing and tax-exempt problems could be met by establishing a "central financing mechanism" (Treasury).
3. A thorough review is needed of the bases for cost-benefit calculations and for determining reimbursement requirements relative to pollution control (Treasury).

4. There is a serious deficiency in the water resources approach involving the interest rate used for discounting future costs and benefits, and for determining reimbursement payments. The Treasury feels compelled to urge that the President appoint a special committee to give full consideration to the problem (see: Needs for New Interagency Studies and Committees, p. 30).

Needs for Additional Authority

1. A Congressional mandate is needed for a full assault on the rural sewage problems (Agriculture).
2. New legislation is required to authorize Agriculture to administer control and abatement programs.
3. Additional authorization is needed for the Department of the Interior to carry out the following recommended programs:
 - a. Taxation to provide incentive for eliminating long-term holding of junk automobiles (B10). Interior generally agrees with this recommendation but is not ready to recommend a specific legislative proposal. An analysis report is being prepared on this subject by the Department.
 - b. The Land and Water Conservation Fund Act, 1965, will enable Interior to consider State proposals for the acquisition of coastal marshes, lagoons, and estuaries which could serve incidentally as national and state parks, national monuments, wildlife refuges; and public recreational areas (B17). To the extent permitted by existing law, Interior will acquire these areas as part of their existing program.
 - c. Support for extramural research and training related to pollution missions of Interior (G3).
 - d. To provide grants covering up to 100% of cost to universities or other non-profit institutions for construction, remodeling and equipping facilities needed for research and research training in environmental health, science, and engineering (G4)0.
 - e. The Department is awaiting the BOB-OST report on "The best way in which the Federal Government may direct efforts toward advancing our scientific understanding of natural plant and animal communities and their interaction with man

and his activities" before submitting proposed legislation to undertake a new program for gathering and making available information about effects of environmental changes on those lands and water that are Interior's responsibility (B21) (Interior).

- f. New legislation would be required to permit the Water Pollution Control Administration to support grants for constructing, remodeling, or equipping facilities for research and training in water pollution control (G4) (Interior and FWPCA).
4. The new Federal Aviation Agency Resolution (part 137) covering agriculture aircraft operations implements the Report's recommendations (B6) for private users but does not control local, state and Federal government agencies' operations using public aircraft (TVA).