A COMMISSION REPORT

Intergovernmental Decisionmaking for Environmental Protection and Public Works

U.S. Advisory Commission on Intergovernmental Relations

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Executive Summary

As the population and economy of the United States grow, the nation needs new highways, airports, dams, wastewater treatment plants, and solid waste facilities. At the same time, the United States is committed to meeting increasingly rigorous environmental goals to improve the quality of air, water, and wildlife habitat; to halt wetlands conversions; to preserve wilderness areas; and to eliminate the emission of toxic substances.

Federal environmental laws and review processes (permitting, licensing, approval or veto, impact reviews) have helped reduce the adverse environmental effects of public works projects during the past two decades. Yet, Americans' lifestyle choices—how we live, produce, consume, farm, travel—continue to threaten the health of the environment.

This study, ***Intergovernmental Decisionmaking for Environmental Protection and Public Works,*** identifies conflicts between proposed state and local public works projects and the federal environmental decisionmaking process. The two goals of protecting the environment and providing adequate infrastructure are compatible in theory, but often they do not mesh well under existing policies.

The principal findings of the study are:

1. With respect to infrastructure, federal rules and procedures governing decisionmaking for protecting the environment often are complex, conflicting, difficult to apply, adversarial, costly, inflexible, and uncertain.

2. Federal decisionmaking rules and procedures too often result in delay, wasted effort and money, lost opportunities to accommodate both environmental protection and infrastructure objectives, prolonged litigation, and more process without necessarily providing more environmental protection.

3. There are five main reasons for the current difficulties in environmental decisionmaking:
   (a) Some environmental standards, or their application, are unnecessarily arbitrary.
   (b) Federal decisionmaking frequently has too many sequential steps and too many potential veto points, and is too detailed, pervasive, and distant from the site to be efficient, effective, and realistic.
   (c) There are many agencies having different environmental responsibilities, multiple veto points, and diverse triggers for vetoes, but not enough data, analyses, expertise, money, time, and personnel to coordinate their activities.
   (d) Mechanisms for balancing diverse needs and values and avoiding impasses and litigation are underdeveloped.
   (e) Frequently, there is a failure to internalize full environmental costs within the total project costs that should be shared among all of the benefited parties.

Federal legislation establishing a framework for integrating federal environmental review actions has been in place for two decades in the ***National Environmental Policy Act*** **(NEPA).** Federal and state agencies seek to coordinate federal permit, license, and review requirements—including studies and data gathering, public review, and agency consultation—within the environmental impact statement process. Sometimes, public officials have difficulty doing this because of competing and incompatible statutory and regulatory mandates.

Under some federal laws, such as the ***Clean Air Act, Clean Water Act, Endangered Species Act,*** and ***Department of Transportation Act,*** a federal permit, license, or grant may not be approved if the project does not comply fully with specific uniform standards. Federal environmental laws and regulations also encompass two types of criteria for approving a public works project or for selecting the "best" alternative. For example, laws such as **NEPA,** the ***Federal Power Act,*** and the ***Electric Consumers Protection Act*** call for balancing environmental, economic, and *social* objectives. Others, such as the ***Clean Air*** and ***Clean Water*** acts' emissions and effluent standards, the ***Clean Water Act*** Section 404 wetlands "dredge-and-fill" regulations, and the ***Endangered Species Act,*** apply definitive environmental standards regardless of other needs.

Integration and coordination of the federal review and decisionmaking requirements and procedures can reduce project delays and costs while improving services to the public and protecting the environment. Several federal and state agencies have recently demonstrated that coordination, combined with consideration of the environment at every stage of project development, can increase the efficiency and effectiveness of the federal environmental review process.

The intergovernmental review process should clarify the environmental protection and infrastructure responsibilities of the federal, state, and local governments. Moreover, it should recognize a key role for the states in reconciling and mediating the interests of citizens, local governments, states, Indian tribes, and the federal government.

Although federal, state, and local agencies have made progress toward streamlining the process, more could be done within the present regulatory framework. It has been suggested that government officials get diverse public and private parties together early and often; foster and reward cooperation and compromise; conduct a single set of studies, analyses, and public hearings to meet multiple environmental requirements; and integrate review and decision criteria and methods. Other proposals include encouraging the use of administrative dispute resolution in place of litigation ***(Administrative Dispute Resolution Act of 1990*** and the ***Negotiated Rulemaking Act of 1990),*** and allocating adequate federal funding to implement federal environmental review requirements.

Changing our expectations about how public works and environmental goals can mesh satisfactorily will require additional education and training, research and development, and taxpayer/citizen commitment. It will also require changes in government processes.

Preface

Two pressing national goals—protecting the environ-ent and providing public works—are compatible in ieory but frequently conflict under current government olicies. *As* a result, the **U.S.** Advisory Commission on ntergovernmental Relations (ACIR) has become con-rned that intergovernmental decisionmaking in this ea may be approaching gridlock. Certainly, reasonable eople will disagree about solutions, but in this field the rocess itself is often an obstacle to efficient and effective ecisionmaking. ACIR's aim, therefore, is to find better ays to make decisions—ways that will respect both envi-nmental and infrastructure needs.

The Commission has found considerable frustration nerated by overlapping requirements, duplicative regu-tions, and delays that make planning more difficult and stly for public officials and agencies without necessarily ihancing environmental protection.

In developing this report, ACIR consulted widely and nvened a panel of experts who gave the Commission st-hand information about how decisions are made. heir suggestions helped us formulate recommendations at we think are sound, reasonable, and workable.

The ***National Environmental*** *Policy* ***Act*** (NEPA) has propriate procedures for resolving many of the difficul-s, but decisionmakers do not always follow those rules. realize the true potential of this crosscutting environ-ental law—frequently identified with the environmen- impact statement **(EIS)** process—requires new gislation. The aim is make NEPA do the job that the ongress intended when it enacted the law in 1969.

We propose that Congress give the Council on Environmental Quality (CEQ) statutory authority for the EIS regulations. The council is charged with coordinating the implementation of environmental requirements by federal agencies. The CEQ regulations cover many of the problems—integration of interagency requirements, coordination, length of documents, delay, duplication, and arbitration. The council is increasingly innovative in providing better guidance to agencies, but our goal is to strengthen that effort.

ACIR also recommends that public works providers consider the environment at all stages of a project, and that federal, state, and local governments coordinate their overlapping procedures and requirements. Another reform would be to require realistic schedules that give certainty to the process. Policymakers can recognize the need for change. For example, federal agencies responsible for protection of the nation's wetlands are working to streamline the regulatory process relating to transportation programs.

Environmental protection and infrastructure must coexist. We hope this report and our recommendations will aid federal, state, and local governments in their efforts to improve the decisionmaking processes required to protect the environment and provide needed public works.

Robert B. Hawkins, Jr.
Chairman

Acknowledgments

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Members of the U.S. Advisory Commission on Intergovernmental Relations (ACIR) who served on a special committee to review the report and develop the recommendations were Debra Rae Anderson, Dave Durenberger, Robert M. Isaac, Samuel B. Nunez, Jr., Stan Stephens, and D. Michael Stewart.

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Our acknowledgment of the assistance of these persons does not mean that they endorsed the report in whole or in part. The Commission and its staff remain responsible for the final product.

At ACIR, Patti Pride and Sharon Lawrence assisted with the project, and Joan Casey edited the report for publication. Secretarial assistance was provided by Suzanne Spence.

John Kincaid
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PRINCIPLES

1. ***The nation's environment requires protection.***

The nation is committed to achieving increasingly effective protection of the environment. Federal government review processes have reduced the adverse environmental effects of public works projects during the past two decades; yet, our lifestyle choices—howwe live, consume, farm, travel, and produce products—continue to threaten the health of the environment.

2. ***The nation's economic well-being requires public and private infrastructure investment,***

America requires new highways, airports, drinking water supplies, sewage treatment plants, and solid waste facilities to meet growing population, economic development, international competitiveness, and quality of life needs.

3. ***The intergovernmental processes used to achieve environmental protection and infrastructure goals in mutually satisfactory ways should be clear, cooperative, consistent, efficient, flexible, definitive, responsive, and fair to all concerns.***

These two goals—protecting the environment and providing adequate infrastructure—are compatible in theory, but often do not mesh well under existing policies. Changing our expectations about how public works and environmental goals can mesh satisfactorily will require additional education and training, research and development, and taxpayer/citizen commitment. It will also require changes in government processes.

Federal legislation establishing a framework for integrating federal environmental review actions has been in place for two decades in the form of the ***National Environmental Policy Act*** (NEPA). Federal and state agencies seek to coordinate federal permit, license, and review requirements—including studies and data gathering, public review, and agency consultation—within the environmental impact statement (EIS) process. Sometimes, public officials have great difficulty doing this because of competing and incompatible statutory and regulatory mandates.

Integration and coordination of federal review and decisionmaking requirements and procedures concerning state and local public works projects can reduce project delays and costs while improving services to the public and protecting the environment. Several federal and state agencies—especially in highway programs—have recently demonstrated that agency coordination, combined with consideration of the environment at every stage of project development, can increase the efficiency and effectiveness, and decrease the time required for, the federal environmental review process.

4. ***The intergovernmental review process also should clarify the environmental protection and infrastructure responsibilities of the federal, state, and local governments. Moreover, it should recognize a key role for the states in reconciling and mediating the interests of citizens, local governments, states, Indian tribes, and the federal government.***

Although federal, state, and local agencies have made progress toward streamlining the process, more could be done within the present regulatory framework. It has been suggested that government officials get diverse public and private parties together early and often; foster and reward cooperation and compromise; conduct a single set of studies, analyses, and public hearings to meet multiple environmental requirements; and integrate review and decision criteria and methods. Other proposals include encouraging the use of administrative dispute resolution in place of litigation, and allocating adequate federal funding to implement federal environmental review requirements.

FINDINGS

1. ***With respect to infrastructure, present federal rules and procedures governing decisionmaking for protecting the environment often are complex, conflicting, difficult to apply, adversarial, costly, inflexible, and uncertain.***

Federal environmental laws affect the nature and timing of state and local public works by requiring (1) environmental permits (or licenses), (2) approval for grant funding subject to environmental constraints, and/or (3) environmental impact reviews. Although NEPA requires federal and state agencies to integrate and coordinate the review and decision processes, many projects go through a long series of sequential and distinct review and/or decision steps to satisfy federal environmental requirements.

For example, approval for dam construction may include the licensing review requirements of the Federal Energy Regulatory Commission (FERC); the preparation of an environmental impact statement (EIS); a ***Clean Water Act*** Section ***404*** permit from the U.S. Army Corps of Engineers and review of that permit by the Environmental Protection Agency; determination of impacts on endangered species by the U.S. Fish and Wildlife Service; and separate state and local government reviews.

The reasons for lack of coordination include separate and overlapping federal environmental laws, legislative committee jurisdictions, and implementing agency responsibilities; the large number of federal, state, and local agencies involved in decisionmaking; the gap between environmental agency responsibilities and the staff and budget resources to undertake the job; inadequate processes for accommodating differences; and insufficient communication and public participation.

2. ***The present federal decisionmaking rules and procedures too often result in delay, wasted effort and money, lost opportunities to accommodate both environmental protection and infrastructure objectives, prolonged litigation, and more process without necessarily providing more environmental protection.***

Some experts contend that many conflicts between federal environmental decisionmaking and state and local public works projects could be avoided by considering the environment at all stages of planning, design, and implementation; identifying and addressing environmental priorities based on the degree of health and environmental risk; and developing public works designs and nonstructural solutions to public works needs that do not create environmental permit and review problems.

Proponents say these actions will reduce the number of cases in which state and local projects generate difficult or adverse federal environmental funding and permit decisions; help avoid surprises at the permit or funding stage; decrease the potential for conflict between public works needs and environmental needs; and reduce project delays and unnecessary costs. Some public works agencies—but too few—view a healthy environment as a design criterion. The Federal Highway Administration, for example, is sponsoring pilot projects for state and local governments to encourage early and continuing inclusion of environmental considerations in transportation and road planning and design.

3. ***There are five main reasons for the current difficulties with environmental decisionmaking:***

   (a) Some environmental standards, or their application, are unnecessarily arbitrary.

   (b) Federal government decisionmaking frequently has too many sequential steps and too many potential veto points, and is too detailed, too pervasive, and too distant from the site to be efficient, effective, and realistic.

   (c) There are many agencies having different environmental responsibilities, multiple veto points, and diverse triggers for vetoes, but not enough data, analyses, expertise, money, time, and personnel to coordinate their activities.

   (d) Mechanisms for balancing diverse needs and values, and avoiding impasses and litigation, are underdeveloped.

   (e) Frequently, there is a failure to internalize full environmental costs within the total project costs that should be shared among all of the benefited parties.

The EIS and permit processes are fundamentally different from each other. An EIS may provide valuable information for project design, open the review process to public comment, delay a project, add to a project's costs, or stop a project on procedural grounds. The permit (or license or grant review) decision focuses on two alternative results: either a project is allowed to proceed or it is stopped. Although mitigation can be negotiated in the permit process, there is frequently much greater opportunity for affected parties to be involved in the EIS process. In some instances, permitting, licensing, and funding requirements take precedence over the findings of an EIS.

Under some federal laws, such as the ***Clean Air Act, Clean Water Act, Endangered Species Act,*** and ***Department of Transportation Act,*** a federal permit, license, or grant may not be approved if the project does not comply fully with very specific uniform standards for protecting wetlands, endangered species, and air or water purity. Assessments prepared to support federal permits and grantmaking decisions often include data gathering and analysis similar to, but separate from, an EIS. However, the permit or grant review analysis is designed to determine on much narrower grounds whether the proposed project meets specific regulatory requirements.

In addition to these procedural differences, federal environmental laws and regulations encompass two types of criteria for approving a public works project or for selecting the "best" project alternative. First, laws such as NEPA and the ***Federal Power Act*** (and ***Electric Consumers Protection Act)*** call for balancing environmental, economic, and social objectives. But others, such as emissions and effluent standards under the ***Clean Air*** and ***Clean Water*** acts, wetlands "dredge-and-fill" regulations under Section 404 of the ***Clean Water Act,*** and the ***Endangered Species Act,*** apply definitive environmental standards regardless of other needs. These definitive standards emphasize the potential to veto rather than to suitably accommodate public works projects. They may be highly prescriptive and inflexible and may leave little room to account for site-specific differences or for the resource limitations of small communities.

When disagreements over public works projects cannot be resolved through normal channels, alternative dispute-resolution methods offer another means of avoiding costly and lengthy litigation. Dispute resolution has been used in several cases that included political controversies, a long time horizon, many stakeholders, and complex issues. Implementation of the federal ***Administrative Dispute Resolution Act of 1990*** and the ***Negotiated Rulemaking Act of 1990*** may encourage use of dispute resolution in cases where compromise or accommodation can be reached. The agreement recently reached between the Environmental Protection Agency, oil companies, and environmental advocacy groups on the reformulated fuels required by the 1990 ***Clean Air Act*** is an example of how this process can work.

These coordination activities, however, are labor intensive. It takes "up front" money and staff resources to

save money later in the form of reduced project delays and associated costs. The widening gap between growing environmental agency responsibilities and shrinking staff and budget resources to undertake the job (one of the principal causes of conflicts and delays) will make coordination activities increasingly difficult and unreliable in the future, unless changes are made in the system.

Adjustments in federal cost sharing for environmental mandates should be based on objective principles, with the federal government responsible for paying the costs of benefits that cross state lines, adjusting costs among states based on the relative strengths of their combined state and local tax bases, and absorbing the costs of repairing environmental damage done in the past as a result of federal programs and policies. Private parties gaining specific identifiable benefits should pay the costs of providing those benefits, and state and local governments should share in paying the remaining costs.

RECOMMENDATIONS

Recommendation 1
Integrated Administration of Federal Environmental Protection laws through the *National Environmental Policy Act* and the Council on Environmental Quality

The Commission finds that the *National Environmental Policy Act*, administered by the Council on Environmental Quality (CEQ) and frequently identified with the environmental impact statement (EIS) process, provides principles for integrating a wide range of environmental decisionmaking requirements. Most concerns about environmental decisionmaking and public works can be addressed through the **EIS** process. Council regulations cover the following problems: integration of interagency requirements, coordination, length of documents, delay, duplication, and arbitration. However, the Council does not have statutory authority for the regulations, nor does it have adequate resources to properly implement the act. Additional explicit statutory language could make the process work better for all governments—federal, state, and local. Such statutory authority also might help reduce the judicial challenges that frequently cause uncertainty and delay in the decisionmaking process.

The Commission recommends, therefore, that the National Environmental Policy Act *(NEPA) be strengthened to make the intergovernmental decisionmaking process more cooperative, consistent, flexible, definitive, and fair to all concerns. The U.S. Council on Environmental Quality (CEQ) should be given statutory authority over the NEPA regulations and adequate resources for coordinating implementation by agencies. Administrative procedures should be reviewed, under authority of the amended act, to improve decisionmaking by:*

(a) Developing a coherent strategy for avoiding or mitigating conflicts between environmental protection and public works goals, based on:

- *Consideration of environmental protection goals at all stages of planning, design, and implementation, beginning from the earliest stages before alternative projects are developed or considered;*
- *Comparative environmental risk assessments;*
- *Nonstructural and other project designs that do not lead to environmental permit and review problems;*
- *Sound ecosystem management practices; and*
- *A clear, scientifically informed understanding of the environmental and project costs;*

(b) Requiring federal agencies to cooperate with all the parties to identify as early as possible a project-specific list of the criteria to be applied to the evaluation of a project, including the benefits inherent in the need and purpose of the project and the benefits to accrue from mitigating the environmental impacts of projects, The criteria should be clearly related to federal statutory authorization and sufficiently specific for the state or local government project sponsor to make responsive decisions regarding alternatives, mitigation, and project modifications. State and local governments should be able to rely on the fact that these criteria, to be applied to the evaluation of a project, once established, will not change except as required by law or modification of the project application;

(c) Directing each federal agency to exercise its permitting, grantmaking, licensing, and evaluation responsibilities in a cooperative, consultative fashion; to be receptive to state and local requests for administrative dispute resolution under P.L. 101-552; and to provide assistance to state and local governments to advance the public purposes of proposed infrastructure projects by helping to identify cost-effective alternatives that can be granted permits;

(d) Requiring federal agencies to set forth complete information, including all of the required elements for an application and procedures for appeals;

(e) Establishing a single point of contact for processing the application;

(f) Setting a schedule that will be followed—and not arbitrarily extended under threat of a negative decision—to produce timely decisions clearly justified by the record;

(g) Mandating notification at the earliest possible time about any delays in processing the application;

(h) Giving CEQ clear authority to serve as mediator in disputes among federal agencies to resolve and eliminate inconsistencies among policy interpretations, definitions, standards, agency procedures, data requirements, and project evaluation criteria; and

(i) In the event of a proposed federal decision overriding state or local decisions implementing federal environmental standards, require the federal government to provide the parties at interest reasonable access to and time to review and rebut information in the pubic record on which a federal decision is to be based. In addition, the final decision should be required to be accompanied by a written explanation setting forth specifically the decision and the basis for that decision in relation to the criteria established for evaluating the project. The "record of decision" requirement in NEPA provides a good model for this procedure.

Recommendation 2
Administration of Environmental Decisionmaking by Executive Order

The Commission finds that additional coordination of federal environmental decisionmaking activities can be achieved within the statutory framework of the *National Environmental Policy Act* if that goal is supported by strong presidential leadership. Indeed, improved coordination under this act was begun with an executive order in 1977 (E.O. 11991) that expanded the role of the Council on Environmental Quality. Additional steps under this act still need to be taken.

The Commission recommends, therefore, that the President issue an executive order going as far as present law will allow to achieve a coherent strategy within the executive branch for avoiding or mitigating conflicts between environmental protection and public works goals as outlined in Recommendation 1 of this report. This executive order should be administered by the Council on Environmental Quality.

Recommendation 3
Integration of Federal Pollution Control laws

The Commission finds that the nation's pollution control laws are fragmented, overlapping, and often contradictory. State and local governments seeking the best answers to air quality, water quality, and waste disposal problems find it difficult to administer their programs in ways that are responsive to the natural relationships that exist between these three media because they are separated legally. These separations between discharge laws have proven to he counterproductive and frustrating.

The Commission recommends, therefore, that the Congress enact a multimedia environmental law covering discharges to air, water, and land. The Commission recommends, furthermore, that the President issue an executive order directing the Environmental Protection Agency to integrate its regulations for controlling pollution of air, water, and land.

Recommendation 4
State Implementation of Federal Environmental Protection laws

The Commission finds that federal law often provides for state administration of federal environmental laws when the federal government certifies that state administration is substantially equivalent to the federal requirements. The delegation of federal programs to the states was instituted to take advantage of the benefits of decentralization: state and local governments have first-hand knowledge of the project needs, issues, and constituents, and have greater understanding of local conditions; state implementation avoids federal-state agency overlap and duplication of effort; and local approaches stimulate innovation. However, states do not always exploit this opportunity fully.

Federal confidence in its delegation to a state requires that the state have a clear understanding of federal expectations. Only then can there be a phasing out of day-to-day federal involvement. State interest in assuming a federal delegation of authority requires assurance to the states that their good faith and lawful activities under this delegation will not be arbitrarily reversed by the federal government. Increased technical and other support for state programs by the federal government and innovative ways to monitor state activities without undue paperwork are additional factors in encouraging states to seek delegated powers.

The Commission recommends, therefore, that the federal government encourage the states to administer a greater number of federal environmental standards with appropriate safeguards and oversight. Furthermore, to encourage states to accept delegation of federal programs, the federal government should institute funding and program changes and give assurances that the states will not be overruled arbitrarily.

Recommendation 5
Federal and State Use of Environmental Mediation for Dispute Resolution and Negotiated Rulemaking

The Commission finds that when environmental regulations are written with sensitivity to diverse viewpoints on many matters of interpretation, the number and nature of disputes that may arise when the regulations are implemented can be reduced significantly. Negotiated rulemaking procedures are a promising means of achieving this result. The Commission found examples of success with this procedure.

When disagreements over public works projects cannot be resolved through normal administrative channels, alternative dispute-resolution methods offer another means of avoiding costly, lengthy, winner-take-all litigation. Dispute resolution has been used in several cases that included political controversies, a long time horizon, many stakeholders, and complex issues. Dispute resolution can be expected to reduce the need for judicial review in many cases. However, if all else fails, judicial remedies remain available.

The Commission, recommends, therefore, that the federal government (1) create an environmental mediation service to help settle disputes and negotiate new regulations and (2) enhance the capacity of state and local governments to provide for mediation of diverse views. Such a service should provide for public involvement.

The Commission recommends, further, that the federal government take every possible opportunity to rely on state and local governments to convene the parties at interest, help broker suitable compromises, and make the situation-specific decisions necessary to implement standards established by the federal government. Federal agencies participating in this process should respect lawful state and local determinations of infrastructure needs, absent clear evidence of violation of federal law, and refrain from substituting federal agency discretion for the determinations made by the duly elected officials of state and local governments. Means of enhancing the capacity of state and local governments to provide for mediation of diverse views, to help broker mutually satisfactory accommodations of competing goals, to make ecologically and economically sound development decisions, and to apply these decisions fairly, effectively, and efficiently, should include technology transfer, education, training, and financial assistance.

Recommendation 6
Federal Reimbursement of Mandated Environmental Protection Costs

The Commission finds that the costs to state and local governments of complying with many federal environmental protection requirements are high, and that many state and local governments have difficulty financing the necessary expenditures. In some cases, federal standards and regulations do not allow state and local governments to comply with these requirements in the most efficient and cost-effective ways.

The Commission recommends, therefore, that the Congress and the President enact legislation requiring the federal government to reimburse state and local governments for the additional costs of complying with federal environmental standards, over and above the costs of providing strictly state, local, and private benefits. The costs to be shared equitably among all of the benefitted parties should include the full costs of maintaining healthy and stable ecologies over the long run.

Recommendation 7
The Scientific Basis for Ecological Management

The Commission finds that management of specific ecosystems may offer better prospects for balancing environmental protection and public works needs than a series of individual and unrelated standards for protecting single-media environmental resources. Ecosystem management includes a collection of operational strategies and land use decisions that attempt to sustain the functions of a healthy environment, even if parts of the ecosystem are separated by political or land-ownership boundaries. Government agencies and nonprofit and private sector groups are beginning to manage developed and natural areas together as parts of larger regional ecosystems.

The Commission also finds, however, that the operation of natural and man-made ecosystems and their interrelationships are not fully understood. One result of this inadequate knowledge is the substitution of description for analysis. Documents are sometimes longer than needed, but contain little significant ecological analysis.

The Commission recommends, therefore, a strengthening of the scientific basis for understanding the operation, health, and stability of ecological systems through research, long-term data collection, and development of improved analytical, management, and regulatory techniques. This requires cooperative federal-state-local research and information-sharing programs.

Introduction

As the population and economy of the United States grow, the nation needs new highways, airports, dams, wastewater treatment plants, and solid waste facilities. Many, if not most, of these public works facilities are planned, financed, built, and maintained by state or local governments. At the same time, the United States is attempting to meet increasingly rigorous environmental goals to improve the quality of air, water, and wildlife habitat; to halt wetland conversions; to preserve wilderness areas; and to eliminate the emission of toxic substances. Federal environmental laws enacted largely in the 1970s, such as the ***Clean Water Act*** and the ***Clean Air Act,*** established procedures for federal agency environmental review, permitting, and licensing of major public works projects. This review process has helped reduce the adverse environmental effects of public works projects during the past two decades. However, the process has also become complex, confusing, costly, uncertain, and adversarial in many cases.

PURPOSE OF THIS STUDY

The purpose of this study is to identify conflicts between state and local provision of public works and the federal environmental decisions concerning these proposed public works. The federal environmental decisionmaking process includes federal agency permitting, licensing, review (approval/disapproval), and veto of state and local public works projects. Where conflicts are defined and appear unmanageable, this study will propose and assess alternative solutions that could improve the efficiency and timeliness of public works processes while protecting the environment. This study addresses several questions:

1. What kinds of environmental review decisions are made by federal agencies concerning state and local public works projects?
2. How are those decisions made?
3. What problems are encountered in the decisionmaking process?
4. What *can* be done to improve the decisionmaking process and to encourage the implementation of public works projects that meet both development needs and environmental goals?

To respond to these questions this study:

1. Reviews the major legal, economic, and regulatory considerations in the federal environmental review process of state and local public works projects;
2. Identifies the types of environmental review decisions made by federal agencies;
3. Identifies the major veto points, rigidities, and roadblocks in the federal environmental process of approving state and local public works projects;
4. Examines developments in the methods used to analyze public works projects; and
5. Identifies promising ways within the environmental review process of balancing the objectives of growth and environment and of encouraging developments that are environmentally sensitive.

legislation and Public Works

This study examines federal environmental decisionmaking issues for certain types of public works and selected major federal environmental laws. The types of public works are highways, mass transit, airports, wastewater treatment, water resources development, solid waste, and power generation. In addition, the study is limited to the following federal environmental statutes: the ***Clean Water Act,*** the ***Clean Air Act,*** the ***Endangered Species Act,*** the ***National Coastal Zone Management Act,*** the ***National Environmental Policy Act*** (NEPA), the ***National Historic Preservation Act,*** and federal statutes specific to particular public works, such as the ***Department of Transportation Act.***

State and local environmental requirements play an important role in the design and development of public works projects, but they are not the focus of this study. State environmental regulations are increasingly integrated with or based on federal requirements. State water discharge permits, for example, typically include both federal technology-based standards or limits and state water quality standards based on the uses of the water. Some states have permit standards that are more stringent or comprehensive (such as cross media) than federal guidelines. *Also,* about half the states have their own environmental assessment requirements ("little NEPAs") that mirror the requirements of the federal law.

Concerns Raised by Federal Environmental Decisionmaking Processes

State and local governments must obtain one or more federal environmental permits for public works projects,

submit projects to federal environmental review, or obtain federal administrative approvals for projects receiving federal funds. These requirements are specified in many separate and overlapping federal environmental laws and regulations. Each federal agency, following the guidance of the ***National Environmental Policy Act*** (NEPA), has regulations outlining coordination of information gathering, analysis, public and agency review, and separate regulatory requirements so as to avoid unnecessary overlap, paperwork, and delays. Many federal and state agencies attempt to work together to streamline the process. However, many projects still go through distinct, sequential steps. For example, the approval process for a dam may include the licensing review requirements of the Federal Energy Regulatory Commission (FERC), the preparation of an environmental impact statement (EIS), a permit from the U.S. Army Corps of Engineers under Section 404 of the ***Clean Water Act*** if wetlands are involved, and determination of impacts on endangered species by the U.S. Fish and Wildlife Service. These various requirements can create conflicts between public works and environmental quality objectives and impose costly delays on public works projects. The requirements also create the need for interagency cooperation to navigate the federal environmental decisionmaking process and to encourage sustainable development approaches to public works. This combination of potential conflict and need for cooperation is echoed, for example, by water resources managers:

> Disputes among water and environmentally related agencies and/or levels of government have been increasing in frequency, while at the same time these same agencies are becoming more and more dependent on one another for information, resources, and policy decisions. . . . The complexity and fragmentation of the nation's water institutions are undermining their capacity to solve vital water resource and related socioeconomic problems. . . . The challenges of (a) improving intergovernmental relations to provide more efficient and equitable water policy, and (b) developing a new ethic of shared intergovernmental stewardship of the water resource, are becoming more paramount as the 21st Century approaches.'

Concerns about the complexity, costs, and adversarial nature of the federal environmental decisionmaking process have been identified in congressional testimony and in reports issued during the past few years by the Western Governors' Association, the U.S. General Accounting Office (GAO), the Conservation Foundation, Resources for the Future, Project 8 8 Harnessing Market Forces to Protect the Environment, and the Engineering Foundation.[2] The costs and benefits of the federal review and decisionmaking process are discussed is this report and illustrated by examples. However, the report does not attempt to quantify the problems in the federal environmental review of state and local public works in terms of tabulated time delays, number of canceled public works projects, or economic and other societal costs. Nor does the report compare these costs to the numerous benefits of environmental review, such as improved project design and avoided ecological impacts.

There are many reasons why coordinating and accommodating public works needs and environmental goals within the environmental review process have become difficult. As an example in the water area, Water Quality 2000, a consortium of more than 80 public, private, and nonprofit organizations, concluded in 1990 that many of our current lifestyle choices—how we live, consume, farm, transport people, and produce products—threaten the health of the environment. Water Quality 2000 work groups identified shorter term opportunities to address impediments posed by current water programs, including narrowly focused water policy (prescriptive, fragmented, and sometimes inflexible federal and state mandates); institutional conflicts; legislative overlaps; divergence between expectations and levels of funding; and inadequate research and development, education and training, and communications. Differences of opinion between governments and between interest groups about how to implement national environmental goals set by the Congress are inevitable in a pluralistic and geographically diverse society. Unfortunately, some of the federal environmental statutes make no provision for compromise and accommodation of diverse views.

Public Works Needs and Environmental Quality

These concerns about the federal environmental decisionmaking process are likely to be magnified in the future as numerous major public works needs are addressed. A few examples illustrate the magnitude of public works needs, the seriousness of the environmental challenge posed by public works projects, the context within which the federal environmental decisionmaking process takes place, and the importance of resolving difficulties in the review process.

Public works are essential to the nation's well-being. Clean water, efficient transportation, reliable delivery of energy, and safe disposal of wastes are fundamental to an industrialized economy. This infrastructure must be continually repaired, replaced, and improved to maintain America's economic growth, productivity, and high standard of living. However, by several measures, overall capital investment in public works has declined during the last two decades. In addition, current spending is lower than estimates of needed expenditures to maintain public works infrastructure: annual federal, state, and local government spending on public works averaged about $50 billion per year during the 1980s;[3] estimates of annual capital investment needs for public works projects during the next decade range from $63 billion to $143 billion in 1989 dollars.[4] This compares to a net capital asset base of public works in the United States of between $900 billion and $1 trillion.[5] Public works improvements are required in every area of infrastructure:

- Many roads and bridges are aging and require repair and replacement. At the same time, the quality of highway service in terms

of congestion is declining. Highway travel delays in urban areas now total more than two billion hours annually, costing billions of dollars in lost working hours.[6] New roads and mass transit systems are needed to transport people.

- Airport and airspace congestion has increased as a result of traffic growth. Twenty-one primary airports now experience more than 20,000 hours of annual flight delays at a yearly cost to airlines and American businesses of at least $5 billion.[7] New airports or airport expansions are planned in many states.

- Many states are running out of solid waste disposal capacity as old landfills close for capacity and environmental reasons. For example, New Jersey is exporting 60 percent or 5.5 million tons of its solid waste per year to other states while planning new landfills, recycling centers, and waste-to-energy plants?

- Water storage and distribution systems are deteriorating in some older cities, and supplies are limited in some parts of the West and several cities along the East Coast. Additional water supply held in new reservoirs may be needed in fast growing areas of the United States, such as California and the Southwest. A report prepared for the Clean Water Council projects a funding shortfall of over $100 billion by public water utilities attempting to achieve federal water quality and wastewater treatment standards?

- The electric utility industry plans to add 94,000 net megawatts, about 14 percent of current capacity, in the 1990s.[10] A variety of state and local public works projects may be associated with these new power projects.

While state and local governments work to design, site, finance, and maintain public works, they must also be conscious of pressing environmental challenges:

- The National Water Quality Inventory that summarizes state water quality reports indicates that despite significant progress in cleaning up water pollution some persistent pollution problems remain, especially contamination by toxic substances."

- More than half of the 215 million acres of original wetlands in the contiguous 48 states have been filled or drained. During the past 20 years, wetland losses have averaged 458,000 acres annually, an area about half the size of Rhode Island.[12]

- Although great progress has been made in cleaning up the nation's air, tons of air pollutants continue to be emitted from cars, factories, and other sources. Ambitious new goals established in the 1990 amendments to the Clean *Air Act* to cut toxic emissions and reduce smog and acid rain may cost $25 billion a year by 2005.[13]

- Animal and plant species are vanishing on a grand scale. There are 1,116 imperiled species on the Endangered Species List in the United States, with an additional 3,600 species being candidates for listing.[14]

Sustainable Development

Although "sustainability is fast becoming a 'motherhood and apple pie' concept which everyone supports but no one defines consistently,"[15] the concept gets to the crux of many issues debated in this report: ways to distinguish circumstances where economic development and environmental protection are complementary and where trade-offs have to be made. Sustainable growth, sustainable development, and sustainable resource use are terms coined in recent years to describe environmentally friendly economic development.

Sustainable development is defined in a variety of ways depending on the context and the interests of those using the term. Defined by the Bruntland Commission as development that meets the needs of the present without compromising the ability of future generations to meet their own needs, sustainable development recognizes that the human species is part of nature, that our existence depends on our ability to draw sustenance from a finite natural world, and that our survival depends on our ability to abstain from destroying the natural systems that regenerate this world.[16] The goal of sustainability is to adjust economic activity so that it does not damage the natural systems that underpin all functioning economies. Popular uses of the term "sustainable development" stem from E. F. Schumacher's book Small *Is* Beautiful: *Economics as if* People *Mattered*[17] (smaller/flexible projects rather than large inflexible/irreversible ones), as well as calls to maintain biological diversity and to promote ecosystem management, alternative agriculture (using the land on a sustainable basis and minimizing environmental impacts), and a symbiosis between development and environment.[18]

Potential Strategies

Efforts to foster sustainable public works and to reconcile differences between state and local government development of public works and federal environmental protection rules can be grouped into three general approaches:

1. Improve the process through:
   (a) Better use of analytical information to assess project alternatives and use of that assessment in decisionmaking (selecting the "best" alternative);
   (b) Coordinating the current federal environmental decisionmaking process by such means as greater cooperation be-

tween agencies and governments, planning, streamlining the permit/review process, accommodation, and mitigation.

2. Change the decisionmaking rules through new legislation, different definitions of or approaches to federal environmental decisionmaking, different definitions of factors that trigger a need for permit or environmental review, and new methods of cooperation between local, state, and federal agencies.

3. Avoid the need to submit a project to federal environmental decisionmaking by:

   (a) Finding nonstructural solutions (such as conservation or joint or systems operation of water supplies in a river basin);

   (b) Selecting public works designs that do not create environmental permit and review problems; and

   (c) Eliminating federal funding of projects and certain federal decisionmaking that accompanies the funds.

Plan of the Report

Chapter 1 reviews the legal framework for federal environmental review of state and local public works projects. The first section provides an introduction to environmental review requirements in federal legislation and explains how state and local projects become subject to federal environmental reviews. The next section describes the federal assistance, permit, and review programs that make specific types of state and local public works subject to federal environmental review. The chapter then examines the "veto points" in environmental reviews that apply to state and local public works, and concludes by describing the accommodations that have been made in federal legislation and practice to improve environmental reviews, the legal barriers to better accommodation, and how accommodation can be improved.

Chapter 2 reviews the economic and analytical considerations in the federal environmental review process, and identifies the types of economic and analytical information currently gathered during permit and other environmental reviews of public works are identified. Examples include wetlands definitions, threats to endangered species and their habitats, coastal zone management policies, wastewater discharge and air quality standards, and economic impact evaluations. In addition, the types of decisionmaking methods used by the federal agencies for each type of review or permit decision are identified. The chapter then reviews the types of information and techniques that could be included for environmental decisionmaking for public works and environmental goals, and to encourage environmentally sensitive projects and accommodation in decisionmaking. Examples of these economic and analytical techniques include economic and benefit-cost analysis, multiple objective analysis, sustainable development analysis, risk analysis, social impact assessment, and value engineering.

The first part of Chapter 3 identifies the problem areas in federal environmental decisionmaking and the methods that local, state, and federal agencies have devised to navigate the process. Agencies have adopted a variety of methods, including permit streamlining by state agencies; state "primacy" programs to implement federal laws; interstate coordination; general classes of permits; risk management planning; and negotiation, mediation, and environmental dispute resolution. Some of the issues raised by the environmental review process include federal agency deference to state decisions (proper federal role, states' rights), regional flexibility, access to information, funding sources, and burden of cost. The second half of Chapter 3 outlines legislative and administrative reform proposals to change or improve the federal environmental review process. Examples include:

- Reinvigorate the NEPA process;
- Increase regulatory flexibility and the use of "performance" based regulation;
- Address communication, education, media, R&D, and human resource needs;
- Allow greater state implementation of federal environmental goals;
- Employ business and corporate efficiency and management techniques;
- Enact a single federal environmental statute;
- Consolidate federal environmental agencies;
- Raise EPA to cabinet-level status;
- Amend the *Clean Water Act* to make it more attractive for states to adopt the Section 404 dredge-and-fill (wetlands) permitting program;
- Address administrative discretion and decisionmaking consistency issues; and
- Adopt economic and market approaches to environmental programs.

Notes

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[2] ***Status of the Nation's Wetlands and Laws Related Thereto,*** Hearings before the House Committee on Public Works, Subcommittee on Water Resources, April 12, 14, and 18, May 12 and 15, 1989, February 27 and 28, March 13, 1990 (Committee Print 10149, 1991); Water Quality 2000, "Phase II Report Problem Identification" (Alexandria, August 3, 1990); Western Governors' Association, "White Paper on Federal Water Policy Coordination" (Denver, May 11, 1989); U.S. General Accounting Office, ***Environmental Protection Agency: Protecting Human Health and the Environment through Improved Management*** (Washington, DC, August 1988); Teny Davies, "The Environmental Protection Act" (Washington, DC: The Conservation Foundation, September 1988); Paul R. Portney, ed., ***Public Policies for Environmental Protection*** (Washington, D C Resources for the Future, 1990); Timothy E. Wirth and John Heinz, sponsors, ***Project 88: Harnessing Market Forces to Protect Our Environment*** (Washington, DC, 1988); Engineering Foun-

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[3] National Council on Public Works Improvement, *Fragile Foundations: A Report on America's Public Works* (Washington, DC, 1988), p. 7.

[4] Ibid., p. 38.

[5] Ibid., p. 43.

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[7] Ibid.

[8] National Solid Waste Management Association, *Special Report: Interstate Movement of Municipal Solid Waste* (Washington, DC, October 1990), p. 4.

[9] Apogee Research, *America's Environmental Infrastructure: A Water and Wastewater Investment Study* (Washington, D C Clean Water Council, 1991).

[10] "Utilities: Changes Are Thundering Along," *Business Week*, January 14, 1991, p. 96.

[11] U.S. Environmental Protection Agency, Office of Water, *National Water Quality Inventory: 1986* (Washington, DC, November 1987).

[12] U.S. Council on Environmental Quality, *Environmental Trends* (Washington, D.C., 1989), p. 100.

[13] Michael Lemonick, "Forecast Clear Skies: The Revised Clean Air Act Is Costly but Well Worth the Price," *Time*, November 5, 1990, p. 33.

[14] John Lancaster, "3,600 Domestic Species Await Place on Endangered List, *Washington Post*, October 23, 1990.

[15] John Pezzy, *Economic Analysis of Sustainable Growth and Sustainable Development, Environment Department Working Paper No. 15* (Washington, D C The World Bank, 1989), p. 1.

[16] World Commission on Environment and Development, *Our Common Future* (New York Oxford University Press, 1987).

[17] E. F. Schumacher, *Small Is Beautiful: Economics as if People Mattered* (New York Harper and Row, 1989).

[18] National Research Council, *Alternative Agriculture* (Washington, D C National Academy Press, 1989); Jeffrey A. McNeely, et al., *Conserving the World's Biological Diversity* (Washington, DC: The World Bank, 1990); Gunter Schramm and Jeremy J. Warford, eds., *Environmental Management and Economic Development* (Baltimore: Johns Hopkins University Press, 1989).

Chapter 1. The Legal Framework for Environmental Review of State and local Public Works Projects

INTRODUCTION

Environmental review requirements for state and local public works projects changed dramatically between 1970 and 1990.[1] Before 1970, federal assistance for such projects had been available, and some projects required federal permits, but federal agencies usually ignored environmental problems. Federal legislation required agencies with assistance and permit responsibilities to consider only the need for state and local public works projects and did not usually require environmental reviews.

Since 1970, the Congress has created a complex, interlocking matrix of funding, permit, and environmental review programs that apply to state and local public works. Federal agencies must now consider environmental values when they fund or issue a permit for a state or local public works project.

This change in the basis for federal funding and permit decisions is environmentally beneficial, but it also imposes costs. Environmental review requirements overlap and can slow or veto needed state and local public works projects. Provisions for accommodating environmental values without erecting unnecessary barriers to state and local public works projects are needed.

This chapter examines federal environmental review requirements for state and local public works, the veto points they create in federal funding and permitting, and accommodations that could improve the review process. The first section introduces environmental review requirements in federal legislation, explains the constitutional basis for such reviews of state and local public works projects, and describes selected projects. The next sections examine environmental reviews in federal assistance, permit, and review legislation that create "veto points" in federal funding, and permit programs for state and local public works. The chapter concludes by describing the accommodations in federal legislation and practice that have improved environmental reviews, the barriers that exist to better compromises and improvements that can be made in the accommodation process.[2]

The Interlocking Legal Matrix

Federal legislation that applies environmental reviews to state and local public works creates an interlocking legal matrix in which federal assistance and permit programs and environmental review legislation interact. It is important to understand how this legal matrix developed, and the political and policy choices that produced it.

Alternative Choices for Environmental Regulation

Understanding the federal environmental matrix that applies to state and local public works projects requires an examination of the alternatives available to the Congress when it decides to adopt an environmental program. Dan Tarlock has outlined these alternatives as follows:[3]

> i. Agency decisionmakers could be required to consider additional information, including information on environmental consequences. This is the approach taken by the ***National Environmental Policy Act*** (NEPA).[4]
>
> ii. Congress could prohibit or restrictively regulate development in designated natural resource areas or give environmentally sensitive agencies a veto over development. The ***Endangered Species Act*** exemplifies this approach.
>
> iii. Agencies could be authorized to adopt environmental standards and to prohibit development that violates these standards, as is done in the ***Clean Air*** and ***Clean Water*** acts.

The Congress has adopted widely different approaches to ensure environmental protection. Each of these alternatives is used in environmental review legislation that applies to state and local public works.

Environmental legislation produces very different impacts on state and local public works projects. In some cases, as Tarlock indicates, legislation affects decisions about the ***area*** in which a public works project may be located. ***An*** example is the ***Clean Water Act*** Section 404 requirement for dredge-and-fill permits in wetlands.

Other environmental review legislation affects and usually increases the cost of a public works project but does not affect its location, at least not directly. Air pollution emission controls adopted under the ***Clean Air Act*** are an example. These controls may indirectly prompt the relocation of a public works project if it is less costly to do ***so.***

Informal Decisionmaking vs. Adjudication

Federal environmental review decisions may be made either by an informal process, which does not require trial-type adjudication, or in an adjudication that requires

a trial-type hearing. Most of the environmental review programs discussed in this chapter require only informal decisionmaking by the federal agency. This means that the agency makes its decision without first holding a trial-type hearing in which witnesses are heard and cross-examined and a record is made on which the agency's decision is based. Federal assistance programs are in this category. Federal agency decisions under NEPA, such as whether to prepare an environmental impact statement, are another example of informal decisionmaking. Even federal permits for state and local public works, such as the dredge-and-fill permits required under the *Clean Water Act*, may not require an adjudicatory hearing.[5]

These differences make it difficult to reconcile the environmental review processes that different agencies apply to state and local public works. Loosely structured informal decisionmaking by different agencies may make coordination of environmental reviews difficult, while the differences between informal decisionmaking and formal adjudication may frustrate coordination attempts. The absence of a formal administrative record in informal decisionmaking makes judicial review difficult and may also make it hard to know precisely the basis on which the agency made its decision. Formal adjudicative proceedings can be unwieldy and may limit the ability of an agency to consider policy issues.

The Coordination Problem: Fragmented Environmental Review

Coordinating environmental reviews is difficult because requirements are fragmented throughout federal programs. The *National Environmental Policy Act*, which was enacted in 1969, provided an early opportunity and potential for coordination because it was the first statute to impose an environmental review requirement on all federal agencies. This did not happen for a number of reasons. One was that the Congress gave the implementation and administration of NEPA to a newly created Council on Environmental Quality (CEQ). The council is located in the Executive Office of the President, but has limited authority. CEQ's statutory authority does not even allow it to adopt regulations to implement NEPA. Although it now has this authority under a presidential Executive Order, it is limited to NEPA alone.[6] CEQ's regulations have provided a basis for implementing NEPA by federal agencies, but CEQ cannot coordinate the many environmental review statutes adopted by the Congress after NEPA.

Another reason why NEPA cannot provide a coordinating mechanism is that NEPA-like environmental reviews have spread to statutes authorizing federal assistance and permit programs that are outside CEQ's jurisdiction, including the highway assistance and hydroelectric power permit programs.

The proliferation of environmental review requirements in federal assistance and permit legislation creates a number of problems. One is that these review requirements supplement those in NEPA. Some agencies, such as the Federal Highway Administration, combine compliance with all environmental review requirements in a single procedure, but this is not always done.

Another problem is that some of the legislation containing NEPA-like provisions requires only an environmental review of state and local public works projects, while other legislation contains environmental standards that must be met by these projects. One example is a statute that restricts the location of transportation projects in parks, historic sites, and other protected places.[7] This complex set of requirements in federal programs creates a fragmented matrix for environmental reviews of state and local public works.[8]

The Constitutional Basis for Environmental Review Requirements

The application of federal environmental review legislation to state and local public works projects initially raised constitutional issues that now have been litigated and resolved. The constitutionality of these requirements is no longer in doubt.

One set of constitutional issues concerned federal assistance. When the Congress grants federal assistance under the spending clause of the federal Constitution, which authorizes the Congress to "to provide for the . . . General Welfare of the United States,"[9] the constitutional issue is whether the Congress may properly attach environmental review requirements as conditions to federal aid.

The constitutional limits placed on the power of the Congress to attach conditions to federal assistance were considered by the U.S. Supreme Court in *South Dakota* v. *Dole*.[10] The Court upheld a federal highway law provision authorizing highway funds to be withheld from states that allow persons under 21 years of age to purchase alcoholic beverages. The principles set forth in the case are that: (1) an expenditure must serve "general public purposes," but courts should defer to the judgment of the Congress that a public purpose is served by a particular expenditure; (2) the Congress must unambiguously condition the receipt of federal assistance by a state if the condition is to be upheld; (3) conditions on federal grants must be related to the "federal interest" in national projects and programs; and (4) other constitutional limitations can provide an "independent bar" to the conditional grant of federal funds. The Court has not yet invalidated a condition on a federal grant because it violated an independent constitutional provision.

South Dakota v. *Dole* is important to the constitutionality of environmental review requirements attached to federal assistance because any such requirement that is stated unambiguously would clearly be related to a federal interest in the program or project. The federal interest arises from the need to ensure for the general welfare that environmental harm is avoided, or at least mitigated, in the spending of federal funds for state and local public works.

The federal environmental permit process rests on the Congress's constitutional "[plower . . . To regulate commerce. . . among the several States."[11] The constitutional issue is whether this clause authorizes the regulation only of interstate commerce or also of intrastate commerce if interstate commerce is affected. Requiring a water pollution discharge permit for a public wastewater treatment plant, for example, would seem to be a regulation

of intrastate commerce not authorized by the interstate commerce clause if the discharge is to a local body of water.

Nevertheless, the Supreme Court does not take this position. It has been clear for a half-century, since *Wickard* v. *Filburn*,[12] that the power to regulate commerce extends to intrastate activities that might have a substantial effect on interstate commerce in the aggregate. This does not seriously limit congressional jurisdiction over environmental permit legislation, such as the *Clean Air* and *Clean Water* acts, that can apply to wholly intrastate sources of pollution.

More difficult constitutional problems of agency jurisdiction arise under the dredge-and-fill permit program of the *Clean Water Act*, especially as it applies to wetlands. Historically, federal jurisdiction over water resources was limited to "navigable" waters. The requirement for dredge-and-fill permits in wetlands stretches the concept of navigability as it was defined over decades, even though the courts gradually expanded the reach of navigability jurisdiction.

Dredge-and-fill permits are required by the *Clean Water Act* for discharges into "navigable waters," defined as the "waters of the United States."[13] The question is whether this definition goes further than the historic definition of navigability to include the broader interstate commerce clause jurisdiction made available by *Wickard*. If interstate commerce clause jurisdiction applies, there is little difficulty in requiring dredge-and-fill permits for state and local public works projects in wetlands areas.

The Supreme Court held that the dredge-and-fill permit program was based on interstate commerce clause jurisdiction in *United States* v. *Riverside Bayview Homes, Inc.*[14] The Court upheld a U.S. Army Corps of Engineers' definition of wetlands that included areas saturated but not inundated by adjacent bodies of water. *Bayview Homes* means that the Constitution places few, if any, limits on the jurisdiction of the federal government over water resources. The only issue is whether the Congress has restricted the constitutional limits of its jurisdiction.

State and local Public Works Projects

It is not possible in this study to examine all of the state and local public works projects subject to federal environmental review requirements. This chapter is limited, therefore, to a selected group of projects that are important to state and local governments and that have been subject to federal environmental review requirements for some time.

Highway, urban mass transit, and airport projects administered by the Department of Transportation are one such group. All of the federal assistance statutes that provide federal funding for these programs have environmental review requirements.[15] In addition, transportation projects have produced a substantial amount of litigation under NEPA. Highway projects comprise one of the largest groups of federally funded projects that come under NEPA's requirements.

Wastewater treatment plants constitute the second group of projects studied. Although several federal programs fund these projects,[16] the most important is the funding for publicly owned wastewater treatment works in the *Clean Water Act*, administered by the Environmental Protection Agency (EPA).[17] The program for waste disposal projects administered by the Rural Development Administration of the Department of Agriculture (formerly by the Farmers Home Administration),[18] although not funded as extensively as the *Clean Water Act* program, is important because of its availability in rural areas and smaller communities, where it raises a distinctive set of environmental problems.

The water resource program funded under the *Small Reclamation Projects Act* and administered by the Bureau of Reclamation in the Department of the Interior[19] provides federal funding to local governments for the construction and rehabilitation of small reclamation projects, such as irrigation. The program differs from funding for large-scale reclamation projects, which is provided by the Congress on a case-by-case basis.

Finally, this chapter considers hydroelectric power projects permitted by the Federal Energy Regulatory Commission (FERC) under the *Federal Power Act*[20] and the additional environmental protection requirements for power projects contained in the *Northwest Power Act*.[21] Power generation projects have been environmentally controversial, primarily because of their effects on fish and wildlife. Environmental protection requirements in these statutes attempt to accommodate conflicting interests in power generation and fish and wildlife protection.

How State and Local Projects Become Subject to Federal Environmental Review Requirements

Federal environmental reviews are required for state and local public works projects whenever a federal trigger or "nexus" brings these projects within the provisions of federal legislation. Environmental review requirements are contained in federal assistance and permit legislation and in legislation that requires supplemental environmental reviews, such as NEPA. To understand the environmental reviews required, one must also understand how these statutes are administered and how they affect the state programs that receive federal aid.

Federal environmental review-and-permit legislation often is administered by more than one agency. The following table lists the environmental review-and-permit legislation that is discussed in this chapter and indicates the agencies responsible for its administration.

Federal Assistance

One type of federal assistance available for state and local public works projects is categorical grants and loans. These voluntary programs require an application and federal agency approval for specific projects authorized for funding. The legislation authorizing these grants may contain environmental review requirements. The federal government also makes assistance available to state and local governments through block grants that can be used for a variety of public projects. Block grant legislation may also require environmental reviews.

Compliance with the provisions of a federal assistance statute, such as environmental requirements, is a condition attached to federal aid. Some assistance statutes also contain sanctions that authorize the federal agency to with-

Table 1-1
Federal Environmental Review and Permit Legislation

	Responsible Federal Agencies								
	Corps of Engineers	CEQ	EPA	FERC	FHWA	Historic Preservation Council	Interior Fish and Wildlife Service	NOAA Marine Fisheries	Northwest Power Planning Council
Clean Air Act									
Emissions Standards			X						
Ambient Air Standards			X						
State Implementation Plans			X		X				
Clean Water Act									
Effluent Standards			X						
Dredge & Fill Permit	X		X						
Endangered Species Act							X	X	
National Environmental Policy Act		X							
Fish & Wildlife Coordination Act							X		
Historic Preservation Act						X			
Federal Power Act				X					
Northwest Power Act									X

hold assistance if a governmental unit does not comply with conditions on the receipt of federal aid.[22] An example is the provision in the federal highway law authorizing the federal agency to withhold a percentage of highway aid from states that allow the sale of alcoholic beverages to persons under 21 years of age.

The legal remedy when the provisions of a federal assistance act are violated is the sanction provided by the act, not invalidation of state or local legislation through preemption. For example, if a state adopted a statute that allowed the sale of alcoholic beverages to persons under 21, the law would not be invalid but federal aid could be withheld.

Federal Permits for State and local Public Works Projects

The only federal permit requirement for state and local public works included in this study is that from the Federal Energy Regulatory Commission (FERC) for public hydroelectric power projects. The legislation authorizing a federal permit is regulatory, directly affecting the regulated governmental entity, and can preempt state and local legislation. This has the effect of displacing state and local legislation and making it invalid. This issue has arisen under the *Federal Power Act.*

Supplemental Federal Environmental Permits

State and local public works projects are also subject to federal environmental review if they must obtain supplemental federal permits. A supplemental federal environmental permit is required only if the state and local public works project falls within the jurisdiction of the environmental permit statute.

This chapter reviews the supplemental environmental permits required by the *Clean Air* and *Clean Water* acts State and local public works may require a permit under these laws even if they are not federally funded if they discharge or emit pollutants that are covered by these acts. Municipal waste incinerators are an example of a locally funded project that requires a permit under the *Clean Air Act*.[23] Publicly owned wastewater treatment works require pollutant discharge permits under the *Clean Water Act*.[24]

Supplemental Federal Environmental Reviews

The *National Environmental Policy Act* and other federal statutes require environmental reviews without requiring a federal permit. Either federal funding under a categorical assistance statute or a permit under the *Federal Power* Act may make a project subject to the environmental review requirements.

The application of supplemental environmental reviews is a matter of some complexity when a state and local public works project requires only a supplemental permit under the *Clean Air Act* or *Clean Water Act.* NEPA illustrates the problem. Actions taken by EPA under the *Clean Air Act* are exempt by another statute from the impact statement requirements of NEPA." The *Clean Water* Act exempts from NEPA discharge permits for existing sources of pollution but not for pollution from new sources.[26] A pollution discharge permit for a new, publicly owned treatment works is a new-source permit.

In addition, any source of pollution requiring a dredge-and-fill permit under the *Clean Water Act* is subject to NEPA because the dredge-and-fill permit is also a permit for a new source of pollution.[27] A source of pollution that requires a dredge-and-fill permit could be any state or local public works project, whether or not it is federally funded, if it comes within the jurisdiction of that program.

The complex and overlapping environmental reviews that may be required for a state or local public works project is illustrated by a state highway project funded by the federal highway act. Such a project is subject to the

environmental review requirements in the federal highway legislation; it also is subject to **NEPA** if it is a major federal action significantly affecting the human environment. It requires a dredge-and-fill permit as well if it is located in a wetlands. The highway also is subject to **(1)** statutory prohibitions on location in a park or other protected site, (2) the ***Endangered Species Act*** if a habitat of an endangered species is affected, and **(3)** review under the *National Historic Preservation Act* if an historic site is affected.

VETO POINTS

Having illustrated a number of environmental "veto points" that apply to state and local public works, we now discuss these points and the review requirements they impose on state and local public works projects.[28]

Environmental Requirements in Federal Assistance Legislation

Tables **1-2** and **1-3** indicate the types of environmental requirements found in federal assistance legislation and the natural resources they protect. The tables outline the environmental requirements in federal assistance legislation that are discussed below.

Section 4(f) of the *Department of Transportation Act*

All federally funded transportation projects, such as highways and mass transit, must satisfy the environmental protection requirement in Section 4(f) of the ***Department of Transportation Act.*** This act requires the protection of parks, historic sites, and similar areas from transportation projects. It provides:

> The Secretary of Transportation may approve a transportation program or project requiring the use . . . of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance . . . only if
>
> > **(1)** there is no prudent and feasible alternative to using that land; and
> >
> > (2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from that use.[29]

This provision was one of the first environmental protection statutes. It was enacted in 1968 to protect a park in San Antonio, Texas, from a federally funded highway, although the highway was finally approved by the Congress. ***An*** initial problem with the statute was uncertainty about whether the Secretary of Transportation was required only to balance the benefits of a transportation project against the environmental costs of going through a protected area or to satisfy a substantive environmental standard.

In an important case, ***Citizens to Preserve Overton Park*** v. *Volpe*,[30] the Supreme Court considered the "feasible and prudent" alternative part of the statute's two-part test. **A** highway was proposed to go through Overton Park in Memphis, Tennessee. The Transportation Secretary claimed the statute required only a "balancing" of project benefits against environmental costs, and that he could exercise his nonreviewable discretion to decide whether a project should be approved in a park. This interpretation arguably was consistent with the statute's legislative history.

The Court disagreed and held there was "law to apply" to the secretary's decision. It adopted a presumption against the use of parks for highways. It held that the secretary could reject an alternative to a park location only if "truly unusual factors . . . or the cost of community disruption resulting from alternative routes reached extraordinary magnitudes." This is a substantive test. It means the secretary and the courts, in applying the statute, must apply a presumption that parks and other protected areas are not suitable locations for transportation projects.

The Supreme Court has not considered the second requirement in the statute, that a program contain "all possible planning to minimize harm" to a park **or** other protected site. This is a mitigation of environmental harm requirement. **A** leading lower federal court case held that this requirement contains an implicit limitation, similar to the one expressly included in the section on alternatives, that mitigation measures are required only if they are reasonable and prudent.[31]

Section 4(f) illustrates a number of characteristics typical of environmental review legislation. It is limited in scope because it applies only to a single category of state and local public works. It requires the selection of alternatives and the adoption of mitigation measures. It imposes these environmental protection requirements in ambiguous and open-ended statutory language. In addition, the statute does not contain a mechanism for balancing the environmental protection objectives it enacts with other environmental protection requirements or with the need for the transportation projects that are covered by the statute. Finally, it leads to litigation, with all of its costs in terms of time, money, and animosity.

Additional Environmental Requirements for Transportation Projects

Federal aid legislation for transportation projects contains additional environmental review requirements. **A** provision in the federal highway act requires the secretary to publish guidelines to "assure that possible adverse economic, social, and environmental effects" relating to any highway project are "fully considered."[32] This provision also requires the federal highway agency to take "into consideration . . . the costs of eliminating or minimizing such adverse effects" as well as air, noise, and water pollution and the "destruction or disruption of manmade and natural resources."

Because automobile traffic on highways contributes substantially to air pollution, another provision in the federal highway act links federal aid to implementation of the *Clean Air Act.* This provision requires the adoption of guidelines to assure that highways constructed with federal

Table 1-2
Federal Assistance Legislation

	Types of Provisions									
	Environmental Standards	Financial Sanctions	Vetoes' Procedural	Vetoes' Substantive	Reviews/ Analysis	Refer[2]	Defer[3]	Accommodation/ Mediation/ Mitigation	Public Participation[4]	Exemptions
Department of 'Ransportation Act	X			X	X			X	X	
Federal Highway Act	X	X		X	X		X		X	
Federal Transit Act	X			X	X			X	X	
Airport & Airway Improvement Act	X			X	X			X	X	
Clean Water Act (wastewater)	X		X	X	X			X	X	
Rural Development Act (wastewater)	X			X		X	X			
Small Reclamation Projects Act	X			X		X	X			
Coastal Zone Management Act	X			X		X	X	X	X	X

[1] Authority of federal agencies to carry out procedural reviews or exercise substantive vetoes of state and local public works projects.

[2] Projects must be referred to a state or another federal agency for comments that the approving federal agency must consider.

[3] The federal agency that has the authority to approve a project must defer to decisions by a state or another federal agency under criteria in their legislation.

[4] Through the comment process, hearings, notice-andcomment rulemaking, or adjudicatory proceedings.

Table 1-3
Federal Assistance Legislation

	Environmental Resource Protected					
	Natural Habitat	Air	Water	Historic	Wetlands	Land Use
Department of Transportation Act	X			X		X
Federal Highway Act	X	X	X	X	X	X
Federal Transit Act	X	X	X	X	X	X
Airport and Airway Improvement Act	X	X	X	X	X	X
Clean Water Act (wastewater)	X		X		X	X
Rural Development Act (wastewater)			X			X
Small Reclamation Projects Act	X					
Coastal Zone Management Act	X		X	X	X	X

aid are consistent with the implementation plans that states must adopt to provide a strategy for attaining national ambient air quality standards. A related provision in the ***Clean Air Act*** prohibits any federal assistance, including assistance for highways, that does not conform to a state implementation plan.[33] Another provision states that the Secretary of Transportation may not approve any grants for highway projects if there is no approved state implementation plan in operation in an area that has not attained the national air quality standards, if a state has not submitted the required plan, or if EPA has disapproved a plan.[34]

Environmental review requirements are also contained in the ***Airport and Airway Improvement Act.*** Some of these requirements are related to acceptability of an airport project. The Secretary of Transportation, for example, may require provision for high- intensity runway and other lighting if this is deemed necessary "for the safe and efficient use of the airport by aircraft."[35]

Other provisions in the act add additional environmental reviews. The secretary must be satisfied that "fair consideration has been given" to the interests of nearby communities.[36] A more explicit environmental requirement sets forth a "national policy that airport development projects . . . shall provide for the protection and enhancement of the natural resources and quality of environment of the nation."[37] The act implements this policy through a consultation process. The Secretary of Transportation must consult with the Secretary of the Interior and the Administrator of EPA on any project having a "significant impact on natural resources."

The Secretary of Transportation may not authorize an airport project that has a "significant adverse effect" unless "no feasible and prudent alternative exists and . . . all reasonable steps have been taken to minimize such adverse effect." This is a substantive environmental requirement similar to the alternatives requirement in Section 4(f) of the ***Department of Transportation Act*** and is also found in other transportation project assistance legislation.[38] The ***Airport Act*** also requires compliance with "applicable air and water quality standards" adopted under the ***Clean Air*** and ***Clean Water Acts***.[39]

The ***Federal Transit Act*** contains numerous environmental review provisions. One provision states that the Secretary of Transportation, when approving a mass transit project, is to take "into consideration" the effect of the project on a number of environmental resource problems, including air pollution.[40] This is not a substantive requirement, like the requirements in the ***Clean Air Act*** and the other transportation acts. This provision requires the secretary only to consider air pollution problems, not to reject or modify a grant if problems exist. Urban mass transit is exempt from the ***Clean Air Act*** compliance provision because it is assumed that mass transit, by reducing dependence on the automobile, will help improve air quality.

As shown by the highway project example given earlier, federal assistance for transportation projects can also trigger environmental reviews under other environmental legislation. This overlapping matrix of review requirements creates multiple environmental veto points. There is no attempt in the statutes to integrate or coordinate these requirements or to establish priorities.

Environmental Review for Wastewater Treatment and Water Resource Projects

Legislation authorizing these federal assistance programs does not have environmental review requirements as extensive as those in transportation assistance legislation. There are two reasons for this difference. One is that some of these programs are presumed to be environmentally positive. Another reason is that some of these programs antedate the environmental movement.

The statute that authorizes the Rural Development Administration to make grants for waste disposal facilities requires compliance with state and federal water pollution control standards.[41] This is a crosscutting environmental compliance requirement similar to the requirement that makes state implementation plans adopted under the ***Clean Air Act*** binding on federally funded highway projects.

A less binding requirement is contained in the statute providing financial assistance for small reclamation projects. Planning and construction of these projects are subject to the consultation provisions of the *Ash and Wildlife Coordination Act*.[42] This act requires federal agencies proposing or issuing permits for projects affecting streams, lakes, or other watercourses to consult with the Fish and Wildlife Service of the Department of the Interior and with state fish and wildlife agencies before approving a project. The courts have held that a failure by the fish and

wildlife agencies to consider comments adequately can make an agency action arbitrary.[43]

Another statute in this group, the ***Clean Water Act,*** provides federal assistance to local governments for wastewater treatment works. This act initially authorized federal grants for treatment works, and the environmental review requirements of the ***National Environmental Policy Act*** applied.[44] In 1987, the Congress terminated the federal assistance program, effective 1994, and substituted a new program under which the federal government provides "capitalization grants" to capitalize state revolving funds. The states contribute 20 percent of these funds and make loans to local governments for the construction of publicly owned treatment works. The ***Clean Water Act*** amendments of 1987 modified the application of the ***National Environmental Policy Act*** to treatment works constructed with loans from state revolving funds. NEPA applies to treatment works constructed with funds "directly made available by [federal] capitalization grants" prior to 1995.[45] EPA regulations require a less detailed environmental review for treatment works projects that are not funded from federal capitalization grants.[46]

The text next discusses environmental requirements in federal permit and review legislation. Tables 1-4 and 1-5 indicate the types of environmental requirements and the natural resources they protect.

Environmental Requirements in Federal Permit Legislation

The only statute in this group is the ***Federal Power Act.*** This statute requires a license or exemption from FERC for all nonfederal hydroelectric projects meeting the jurisdictional requirements of the act, including state and local hydroelectric power projects. Environmental review requirements in this legislation address the conflict between the need to meet energy demands and the need to protect fish and wildlife. One provision requires that FERC, when issuing a permit, give conservation interests "equal consideration" with development interests in determining the overall public interest in the project to be licensed.[47] Conservation interests include energy conservation, fish and wildlife protection, the protection of recreational opportunities, and preservation of other aspects of environmental quality.

Another important provision requires FERC to ensure that licensed projects will be "best adapted to a comprehensive plan" that includes provision for "the adequate protection, mitigation, and enhancement of fish and wildlife."[48] This provision, along with a ***Clean Water Act*** provision requiring state certification of compliance with state water quality standards, gives state and local governments an opportunity to inject environmental concerns into the FERC permitting process. Finally, the ***Federal Power Act*** requires FERC to impose license conditions to adequately protect, mitigate damages to, and enhance fish and wildlife.[49] These conditions are to be based on recommendations from federal and state fish and wildlife agencies. This provision complements consultation provisions in the ***Fish and Wildlife Coordination Act***.[50]

These provisions in the ***Federal Power Act*** are augmented for the Pacific Northwest by the ***Northwest Power Act,*** which creates a Northwest Power Planning Council with the responsibility to prepare a regional conservation and electric power plan.[51] The plan is to give priority to resources that are "cost effective," a term defined to include consideration of environmental costs and benefits.[52] The plan must include measures for environmental quality and for the "protection, mitigation, and enhancement of fish and wildlife."[53] The act also requires the council to adopt a program "to protect, mitigate, and enhance fish and wildlife."[54] The program must balance these protective measures with the need to assure an adequate supply of power for the Pacific Northwest.[55] Consultation with federal and state fish and wildlife agencies is again required.[56] Federal agencies, such as FERC, that regulate hydroelectric power facilities must consider any fish and wildlife programs adopted by the council and the purposes of the ***Northwest Power Act,*** which include provisions to protect fish and wildlife.[57] These requirements supplement the broader environmental responsibilities imposed on FERC by the ***Federal Power Act.***

Like most federal environmental review statutes, the federal power acts are a mixture of procedure and substance and do not assign objective weights for competing resource values. In the federal power acts, the unanswered question is how much "balancing" is required between the goals of assuring an adequate power supply and assuring protection of fish and wildlife and other natural resources.[58] These environmental requirements do change the prior balance in the commission's decisionmaking. They make environmental concerns of equal dignity in the decisionmaking process, thus making it harder for the commission to ignore them.

All applications for a FERC license or exemption are also subject to the broad and comprehensive environmental analysis required by NEPA. The federal license or exemption provides the necessary federal link to make the project a federal action under **NEPA.** The question is whether the project also is a major federal action significantly affecting the environment. Most major power projects would fall into this category, and a number of court cases have considered the application of NEPA to federally licensed hydroelectric power projects.[59]

Recall also that permit legislation like the ***Federal Power Act*** can preempt state statutes and regulatory requirements, which may provide more or less protection of environmental resources than that provided by the federal agency under its statutes. The Supreme Court held, for example, that the ***Federal Power Act*** preempts the authority of states to set minimum stream flows for fish and wildlife protection, except for exempted projects.[60] Federal preemption as an environmental veto point is the converse of legislation, such as the ***National Coastal Zone Management Act,*** which requires federal agencies to defer to state regulation.

Federal Environmental Permits

Environmental veto points also are contained in legislation requiring permits for state and local public works not having a federal link, such as federal assistance. The environmental review requirements of this legislation are

Table *1-4*
Federal Environmental Review and Permit Legislation

	Types of Provisions									
	Environmental Standards	Financial Sanctions	Vetoes' Procedural	Vetoes' Substantive	Reviews/ Analysis	Refer;!	Defer[3]	Accommodation/ Mediation/ Mitigation	Public Participation[4]	Exemptions
Clean Air Act										
Emissions Standards	X			X					X	
Ambient Air Standards	X			X					X	
State Implementation Plans	X	X		X		X			X	
Clean Water Act										
Effluent Standards	X			X					X	
Dredge and Fill Permit	X		X	X				X	X	X
Federal Permit/ State Certification	X			X			X	X		
Endangered Species Act	X		X	X	X			X		X
National Environmental Policy Act			X		X	X		X	X	X
Fish and Wildlife Coordination Act			X		X			X		
Historic Preservation Act			X		X			X		
Federal Power Act	X			X	X	X	X	X	X	
Northwest Power Act	X				X	X		X	X	

[1] Authority of federal agencies to carry out procedural reviews or exercise substantive vetoes of state and local public works projects.

*Projects must be referred to a state or another federal agency for comments that the approving federal agency must consider.

[3] The federal agency that has the authority to approve a project must defer to decisions by a state or another federal agency under criteria in their legislation.

[4] Through the comment process, hearings, notice-andcomment mlemaking, or adjudicatory proceedings.

Table 1-5
Federal Environmental Review and Permit Legislation

	Environmental Resource Protected					
	Natural Habitat	Air	Water	Historic	Wetlands	Land Use
Clean Air Act						
Emissions Standards		X				
Ambient Air Standards		X				
State Implementation Plans		X				X
Clean Water Act						
Effluent Standards			X			
Dredge and Fill Permit	X		X		X	X
Federal Permit/State Certification	X		X		X	X
Endangered Species Act	X		X		X	X
National Environmental Policy Act	X	X	X	X	X	X
Fish and Wildlife Coordination Act	X		X		X	X
Historic Preservation Act				X		X
Federal Power Act	X		X		X	
Northwest Power Act	X		X		X	

triggered whenever a state and local public works project falls within the jurisdiction of the environmental permit program. The result is that each of these permit programs imposes an environmental review requirement that is independent of and not coordinated with those in other federal legislation.

Clean Water Act Dredge-and-Fill Permits for Wetlands

The *Clean Water Act* authorizes the Secretary of the Army, acting through the U.S. Army *Corps* of Engineers, to issue a permit "for the discharge of dredged or fill material into the navigable waters of the United States."[61] This permit requirement applies to any state and local public works project located in wetlands because jurisdiction over "navigable waters" includes jurisdiction over wetlands. Dredging and filling are necessary for state and local public works located in wetlands.

The *Clean Water Act* gives the *Corps* of Engineers and the Environmental Protection Agency joint regulatory authority in the program. The act authorizes the *Corps* to issue dredge-and-fill permits but does not contain standards for making the decisions. EPA's authority is provided by a section in the act authorizing the agency to specify disposal sites for dredge-and-fill material through the application of guidelines based on statutory ocean discharge criteria. EPA guidelines also must consider the economic impact of the site on navigation and anchorage in any case in which the guidelines alone would result in disapproval of a permit.[62] Another section of the act authorizes EPA to veto a site for the discharge of dredge-and-fill material whenever the discharge "will have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas . . . , wildlife, or recreational areas."[63]

Both EPA and the *Corps* have extensive regulations that provide criteria for administering the dredge-and-fill permit program. The *Corps* has adopted regulations that call for a "public interest" review similar to the review of environmental impacts carried out under NEPA. The regulations are lengthy and specify a number of factors the *Corps* is to consider. As applied to wetlands, the regulations state in part:

> No permit will be granted which involves the alteration of . . . [important wetlands or dredge-and-fill activities with cumulative effects] unless the *[Corps]* district engineer concludes. . . [on the basis of a public interest review] that the benefits of the proposed alteration outweigh the damage to the wetlands resource.[64]

The regulations also require the consideration of alternatives to the proposed development.

EPA has wetlands regulations that elaborate on its responsibility to specify disposal sites and to veto dredge-and-fill projects. These regulations contain an important "water dependency" test that enacts a preference for water-dependent dredge-and-fill projects. As applied to wetlands, the water dependency test means a project must be dependent on a wetlands area if it is to be allowed there. For example, a marina or port would have to be located in a wetlands area at the edge of a navigable water body. If the project is not water dependent, then "practicable alternatives that do not include specific aquatic sites are presumed to be available."[65]

These regulations contain substantive standards for permit decisions. These standards make it very difficult for most state and local public works projects to locate in wetlands because these projects are not usually water dependent. A football stadium is an example. Court cases have applied these standards and have disapproved permits the *Corps* has granted for dredge-and-fill projects that violated the standards.[66]

NEPA applies to dredge-and-fill permits, and an impact statement must be prepared under NEPA if the permit is for a major action significantly affecting the environment. The interrelationship between NEPA and the dredge-and-fill permit program can be quite complex. *Sierra Club* v. *Sigler*[67] held inadequate an environmental

impact statement for a deepwater port facility that also received a dredge-and-fill permit. The court also held that the inadequate environmental impact statement "tainted" the decisionmaking process for the dredge-and-fill permit program and prevented the careful weighing of all factors required by the Corps' public interest review.

Like the legislation that protects parks and historic sites from transportation projects, the dredge-and-fill permit program contains a preference for natural resource protection over other environmental goals, and thereby places limits on the construction of state and local public works projects. This preference is important. The dredge-and-fill program defines wetlands broadly, so that there will often be situations where state and local public works projects are proposed in wetlands and require a dredge-and-fill permit. The effect of this requirement may be to force the project to an another location or require its modification or rejection.[68] The Two Forks Dam and Reservoir in Colorado, which was vetoed by EPA, is an example.

Air Quality Permits

The *Clean Air Act* includes an extensive permit program that implements the air quality and emission standards that must be attained to achieve compliance with the act. The 1990 amendments to the act considerably strengthened the program.[69]

One of the purposes of the permit program is to implement the act's air quality emission limitations for stationary sources of air pollution. A factory or similar facility that emits air pollutants is an example of a stationary source. Emission limitations are adopted for pollutants designated by EPA as "criteria" pollutants. There are two types of emission limitations. One type is adopted nationally by EPA for new stationary sources of air pollution. The other type is adopted by the states for existing stationary sources of air pollution. EPA can delegate to the states the authority to administer the program of national emission limitations for new sources of air pollution.[70]

Air quality emission limitations do not directly affect the location of a project. A project can be constructed at any location where it meets emission limitations. Cases may still arise where the application of emission limitations will require the relocation of a project. The act provides, for example, that a new stationary source of air pollution cannot locate in an area that has not attained the national air quality standards unless there is a reduction in pollution from existing stationary sources.[71] Compliance with this requirement is usually achieved through the purchase of air pollution rights by a new source of pollution from existing sources. If a new source of pollution cannot comply with this requirement, it cannot locate in a nonattainment area.

Air quality permits are required primarily for privately owned stationary sources that emit air pollution, but some state and local public works projects come under the permit program. Municipal waste incinerators are an important example because many local governments rely on incineration for waste disposal.[72] The Congress amended the *Clean Air Act* in 1990 to provide for the adoption of performance standards and other requirements for waste incineration plants.[73] These standards are to cover toxic pollutants not covered by emission limitations for the criteria pollutants.

Other environmental problems are raised by waste incineration. Some of the waste burned in incinerators can be recycled, and it is argued that recycling should be preferred so as to avoid environmentally hazardous by-products from incineration. Although EPA at first proposed regulations to require the recycling of trash as the basis for an air quality permit,[74] it dropped this requirement when the proposal was opposed by the Vice President's Council on Competitiveness.[75] A second related problem of incineration is the creation of fly ash as a residue from incineration. During the 1990 debate on the *Clean Air Act,* the Congress deferred action on this controversial issue for at least two years.[76]

Federal Environmental Review without Permits

A number of federal statutes require environmental review of state and local public works projects but do not require a permit. Several of these review requirements are discussed in this section. They include compliance with pollution control standards and environmental reviews required by NEPA, the *Endangered Species Act,* and the *National Historic Preservation Act.*

Compliance with Pollution Control Legislation

As noted in the last section, a number of federal assistance statutes require compliance with pollution control standards in the *Clean Air* and *Clean Water* acts but do not require pollution control permits. Examples are grants for rural wastewater treatment facilities administered by the Rural Development Administration[77] and grants for highways administered by the Federal Highway Administration.[78]

These requirements are reinforced by provisions in the *Clean Air Act* that require all activities funded, permitted, or approved by the federal government to conform to state implementation plans (SIPs) adopted under the act.[79] The application of this requirement to highway projects demands special attention because it illustrates the tensions that can arise when one federal program must comply with the environmental review requirements of another. The interpretation of this requirement produced serious disagreement between the Department of Transportation, which administers the highway program, and EPA, which administers the *Clean Air Act.*

The *Clean Air Act* requires the states to prepare transportation control plans that are part of the state implementation plan for attaining the national air quality standards. Preparation of transportation control plans is coordinated with regional transportation plans by regional transportation agencies under the federal highway act. The 1990 amendments to the *Clean Air Act* strengthened the transportation control measures required for areas that have not attained the national air quality standards.[80]

According to testimony before the Congress,[81] the Department of Transportation claimed a highway project was in conformity with a state implementation plan if the highway did not interfere with the timely administration of transportation control measures contained in a state implementation plan.[82] EPA claimed conformity existed only if a highway project contributed to the attainment and

maintenance of a national air quality standard and did not cause a violation of an air quality standard or aggravate an existing one. EPA's interpretation would require more of a showing about the impact on air quality than the Department of Transportation interpretation.

The 1990 amendments to the ***Clean Air Act*** specify in greater detail the requirements that must be met for all federally funded projects, including highway projects, if they are to be found in compliance with state implementation plans.[83] These amendments appear to adopt the position taken by EPA in the congressional hearings. As noted earlier, the 1990 amendments to the ***Cleun Air Act*** also revised and strengthened the sanctions for failure to attain the national air quality standards.[84]

A similar provision requiring compliance with pollution control standards appears in the ***National Coastal Zone Management Act.*** All state coastal management programs funded by the act must comply with all ***Clean Air Act*** and ***Clean Water Act*** requirements.[85] This condition is like the compliance requirement for highway projects because it imposes a federal standard on state programs. The effect of the requirement is that state air and water quality standards are carried directly into state coastal management programs that receive assistance under the federal act. The difference is that the *National Coastal Zone Management Act* requirement applies to state regulatory programs, not programs for the construction of state and local public works. State coastal regulatory programs *can* apply to state and local public works projects that are in the coastal zone.

The *National Environmental Policy Act*

The ***National Environmental Policy Act*** establishes the most comprehensive and far-reaching environmental review requirements in federal legislation. The reason is that the environmental review required by NEPA is not limited to a single resource, such as endangered species or historic sites. Instead, NEPA requires the preparation of a "detailed statement" on all "major federal actions significantly affecting the quality of the human environment."[86] The "detailed statement" is now called an environmental impact statement (EIS). The congressional declaration of a national environmental policy in the act is broad enough to include all elements of the urban as well as the natural environment.[87]

As in other federal environmental review statutes, a federal link or nexus is required to make state and local public works projects subject to NEPA. This nexus is provided by the requirement that NEPA applies to any "federal" action.[88] The courts have held that this term includes federal permits or assistance,[89] including those for state and local public works projects.

NEPA's importance cannot be overstated. The federal link established by the law is broad enough to include almost every conceivable federal assistance and permit program.[90] As one federal court held in an early case, NEPA makes environmental review the mandate of all federal agencies?'

Assume a federal statute authorizes a federal agency to make grants to state governments for flood control. The statute authorizing this assistance contains a number of grant requirements, covering the type of projects that will be funded, the state share of the project, and *so* on. NEPA applies to grants made under this statute because they are actions of the federal government. If the grant is major and if it significantly affects the human environment, the agency will have to comply with the environmental review requirements of NEPA as well as the statutory requirements in its own legislation. There are marginal cases where the federal government is *so* minimally involved that a federal link is not established,[92] but the state and local public works projects covered by this study are usually *so* extensive that there will almost always be a federal link.

The "small handle" problem illustrates a type of case in which NEPA might not apply to a state and local public works project because the federal link is minimal. Assume a publicly owned electric utility decides to construct a high-voltage power line 60 miles long. Assume also that the only federal permit required for the power line is from the Army Corps of Engineers for a one-mile crossing over a river. Some courts have held that this "small" federal permit "handle" is not enough to bring the entire power line under NEPA.[93] Only the power line segment that requires a permit is covered.

By requiring environmental reviews in decisionmaking by federal agencies, NEPA expanded the range of issues that must be taken into account. The courts and the Council on Environmental Quality have construed the environmental obligations imposed by the statute to include more than just the immediate consequences of an agency action. Secondary and cumulative environmental impacts of proposals also must be considered.[94] In an important early highway case, for example, a federal court held that the federal highway agency had to consider not only the direct impacts of the highway but also the impact of any new urban development that would be stimulated by the highway.[95] Finally, NEPA requires an agency to consider preferable alternatives and measures that will mitigate the environmental consequences of its action.[96]

These requirements are similar, in many ways, to environmental review requirements in other federal legislation. The difference is that NEPA's broad coverage of all federal agencies and almost every conceivable environmental impact make the review it requires especially important. Indeed, programs that fund or permit state and local public works make up a significant portion of the environmental reviews carried out under NEPA.

This does not mean that NEPA imposes a substantive obligation on federal agencies to make decisions that are environmentally sound. NEPA imposes a "procedural" duty on an agency to consider and disclose the environmental impacts of its actions. A federal agency may consider and disclose adverse environmental impacts and still decide to carry out the project. As the Supreme Court pointed out, if an agency adequately identifies and evaluates the adverse environmental effects of its proposed action, it may still decide that other values outweigh the environmental costs.[97]

NEPA still has bite even though it does not have a substantive effect. A court may order a remedy if an agency prepares an inadequate EIS. It may require the

agency to prepare a new and adequate impact statement. In some cases, the deficiencies may be so extreme that preparation of an adequate impact statement is not possible. This can effectively stop a project.[98] The procedural duty imposed by the EIS requirement also has an important effect on decisionmaking, compelling an agency to consider the environmental consequences of its actions. Furthermore, the public comment and referrals to other agencies required by NEPA open the agency's decisionmaking process to outside review.[99]

The *National Historic Preservation Act*

The ***National Historic Preservation Act*** also may require a federal environmental review of state and local public works projects. This act created a National Register of Historic Places and provides a process for protecting sites and buildings, including consultation to minimize the impact of federal undertakings on properties listed in or eligible for the national register. The act is administered by an Advisory Council on Historic Preservation and by the Secretary of the Interior through the National Park Service. The act concisely states the duties it imposes:

> The head of any federal agency having direct or indirect jurisdiction over a Federal or federally assisted undertaking . . . [or] authority to license any undertaking shall, prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license. . . take into account the effect of undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. The head of any such Federal agency shall afford the Advisory Council on Historic Preservation . . . a reasonable opportunity to comment with regard to such undertaking.[100]

The requirement that there be a federal "undertaking" requires a federal link with a project to trigger the act. A state and local public works project could be subject to the act if it is planned for an historic site, or even if it is nearby and has an effect on the site. The federal link requirement will not be met if federal participation in a project is marginal.[101]

Regulations adopted by the advisory council require federal agencies to apply "Criteria of Adverse Effect" to undertakings found to have an effect on historic properties.[102] A consultation process may be initiated if an adverse effect is found and a memorandum of agreement is executed that resolves the dispute. If a memorandum of agreement is not executed, the advisory council may file comments on the undertaking, which the responsible federal agency need only take into account.

Note that the statute authorizes consultation. It does not require a substantive decision from a federal agency that modifies or rejects a project because of an adverse effect on an historic site or building. In this respect, the act resembles NEPA. Although the act states that it is not to be interpreted to require the preparation of an environmental impact statement under NEPA,[103] projects which are undertakings under the act may also be major federal actions that do require an impact statement.

The ***National Historic Preservation Act*** does not command any particular result to protect historic sites and buildings. The process it creates is intended to help assure the preservation of historic properties, but it does not give preservation a substantive priority superior to the "primary missions" of federal agencies.

The *Endangered Species Act*

The ***Endangered Species Act*** is another federal environmental statute that may impose review requirements on state and local public works. Unlike other environmental review statutes, such as NEPA, the ***Endangered Species Act*** imposes substantive environmental review requirements on projects.

The act applies to "any action authorized, funded, or carried out by such [federal] agency."[104] The environmentally protective features of this act are triggered by a "listing" of an endangered species, which may be based on any one of a number of statutory factors.[105] The Secretary of the Interior also is to designate the "critical habitat" for a listed endangered species,[106] defined to include areas "essential for the conservation of the species."[107] The effect of a listing is to protect not only the endangered species but also its habitat.'" This statutory protection may restrict the areas where state and local public works projects can be located.

The act provides a number of protections. One key provision requires federal agencies to:

> insure that any action authorized, funded, or carried out by such agency. . . is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species. . . [which the Secretary of Interior determines to be critical.][109]

If it is concluded that a species or its habitat will be jeopardized, the secretary is to suggest "reasonable and prudent alternatives" to be implemented by the federal agency or the applicant for a federal license or funding. A leading Supreme Court case held that the prohibitions and restrictions in this provision are absolute.[110] The Court found an "explicit congressional decision" to afford "first priority" to saving endangered species, and a "conscious decision" by the Congress to give endangered species priority over the "primary missions" of federal agencies.'" After this decision, the Congress authorized an exemption from the statutory prohibition if the agency or applicant for a federal license or funding can show that the value of the project outweighs the protection of the species.[112]

The consequences of a jeopardy finding under the ***Endangered Species Act*** are enormous because the act prohibits completion of a project in such a case. For this reason, the ***jeopardy*** standard in the ***Endangered Species Act*** is interpreted to require a higher threshold of environmental harm than the ***significance*** standard in other review legislation, such as NEPA.

Other provisions of the ***Endangered Species Act*** provide additional protection for endangered species and their habitats. The act prohibits any "taking" of an endan-

gered species.[113] Cases have held that this provision includes indirect takings as well as direct physical takings, even though a project is found not to jeopardize an endangered species or its habitat. An indirect taking occurs, for example, if the construction of a public works project, such as a treatment plant, disturbs the habitat of an endangered species, even though the project does not jeopardize the species.[114] The impact of the taking prohibition is lessened somewhat by a provision in the act that authorizes the Secretary of the Interior to grant an exemption if the taking is found to be incidental and mitigated.[115]

Finally, another provision of the ***Endangered Species Act*** requires federal agencies other than the Interior Department to execute their programs in a manner consistent with the conservation of endangered and threatened species.[116] A federal court has held that this provision is not absolute and leaves some discretion with an agency.[117] The court held that an agency does not have to adopt an alternative to a proposed action, even though the alternative is equally effective in serving the government's interest and would enhance the conservation of a protected species to an equal or greater extent.

Unlike some environmental review legislation, the ***Endangered Species Act*** establishes a substantive obligation that applies to federal agencies and that gives the protection of endangered species priority over the primary missions of these agencies. This priority makes it difficult to accommodate the environmental protection provisions of this act with other environmental review legislation, or with the purposes or missions of federal agencies charged with funding or licensing state and local public works projects.

Federally Authorized Environmental Review by the States

A number of federal statutes transfer the environmental review of state and local public works to the states. This creates a "reverse federalism" by which the acceptability of a federal agency decision under federal law is dependent on state approval. The federal agency cannot act without state permission. Two important examples of this concept are the ***Clean Water Act*** and the ***National Coastal Zone Management Act.***

State Certification under Section 401 of the *Clean Water Act*

Section 401 of the ***Clean Water Act*** requires certification from the affected state for all applicants for federal licenses and permits on projects that may result in a discharge of pollution into the waters of the United States. The state must certify that the license or permit is in compliance with state water quality standards and with "appropriate requirements" of state law.[118] The appropriate requirements language means that the license or permit must comply with more than just the effluent limitations and other regulatory standards contained in the federal law.

The meaning of the appropriate requirements provision and how it affects interlocking state and federal environmental review requirements is illustrated by ***Arnold Irrigation Co.*** v. ***Department*** of ***Environmental Quality,*** an Oregon case.[119] The court held that an applicant for a license from the Federal Energy Regulatory Commission[120] was not required by Section 401 to comply with a county land use plan unless the plan affected water quality. The court also held that states have inherent and independent authority when making certifications under Section 401 to protect and plan the use of their waters, and that this section allows the states to enforce all water quality-related statutes and rules. The court remanded the case so that the Department of Environmental Quality could determine which provisions of the land use plan were sufficiently related to water quality to be enforced against the licensee under Section 401.[121]

Federal Consistency Requirements in the *Coastal Zone Management Act*

The ***Coastal Zone Management Act*** contains another example of reverse federalism: the federal consistency provision. This provision is stated differently, depending on the federal program, but it generally requires federal activities and federally funded and permitted activities to be consistent with state coastal programs.[122] The Congress strengthened this provision in 1990 by extending it to offshore lease sales authorized by the federal government, an amendment that overruled a Supreme Court decision.[123] Coastal states make the initial consistency determination for federal permits and licenses, subject to an appeal to the Secretary of Commerce, where the agency that administers the federal coastal zone program is located.

State and local public works projects permitted or funded by federal agencies are subject to the federal consistency requirement if they affect land or water uses in a state's coastal zone. This means that state and local public works projects must obtain permission from the state-authorized coastal agency, which may be a local government. State requirements in coastal zone legislation and coastal programs may be more stringent than requirements imposed under federal legislation and may provide an additional environmental veto point.

A number of coastal states have adopted coastal zone legislation that requires permits for development. Some of this legislation applies to state and local public works projects in coastal zones when they receive federal assistance or a federal permit. New Jersey's Coastal Area Facility Review Act is one of the most effective coastal permit laws,[124] which applies to a 1,375-square-mile coastal area designated by the legislature but not to areas protected under the state's wetlands law. Permits from the state environmental agency are required for a large number of state and local public works, such as power generation facilities, waste incinerators, and road, airport, and highway construction.[125]

Permit applications may be approved only if they meet statutory criteria that are similar to the environmentally protective criteria applied to federal agency actions in federal environmental review legislation. The New Jersey law generally authorizes the issuance of a permit only if the facility will minimize adverse environmental effects in the area in which it is located.[126] A facility may be disap-

proved if it "would materially contribute to an already serious and unacceptable level of environmental degradation and resource exhaustion."[127]

Other state coastal legislation requires the adoption of plans and programs for coastal areas. The California Coastal Act is the most elaborate of the state statutes,[128] with a detailed set of policies based partly on a 447-page state coastal plan. Local governments in the coastal zone must adopt local coastal programs that are consistent with the statutory policies. These programs are approved by regional coastal commissions, subject to an appeal to the state coastal commission. Local programs include a coastal plan, zoning ordinances, and other implementing actions. Once the programs have state approval, any development in the coastal zone must receive a development permit from the local government that has jurisdiction. Coastal development permits must be consistent with the local coastal program and may be appealed to the state commission in a limited number of cases. An environmental impact statement must be prepared on coastal development permits under the state's equivalent of NEPA. These brief examples only begin to illustrate the wide variety of regulatory controls in state coastal programs that are applied through the federal consistency requirement to state and local public works projects.

ACCOMMODATING ENVIRONMENTAL REVIEWS

The Limited Scope of Accommodation

The preceding discussion of veto points in federal environmental review legislation has documented extensive diversity. Environmental review is divided among a variety of federal agencies in different departments. Accommodation of the diverse federal environmental reviews required for state and local public works projects would help ease the barriers that environmental veto points create for these projects. The difficulty is that opportunities for accommodating multiple environmental reviews to one another are limited. This section describes several examples of accommodation that have occurred through legislative, agency, and judicial action.

Legislative Accommodation

Federal environmental statutes contain a number of provisions that accommodate multiple reviews. Several of these legislative provisions, and the way in which they accommodate environmental reviews, are discussed in the sections that follow. These legislative provisions also may complicate and present barriers to environmental accommodation. These problems are discussed later in this chapter.

Crosscutting Requirements

A crosscutting requirement is one of the most effective ways to accommodate multiple environmental reviews. A crosscutting requirement is a provision that applies to all federal agencies. The advantage of crosscutting legislation is that it imposes conditions that all federal agencies must follow and places implementation authority in a single federal agency. An example is the obligation that all federal agencies base their NEPA regulations on guidelines adopted by the Council on Environmental Quality. NEPA is unique because it is the only federal environmental statute that requires implementation by every federal agency. Other environmental review statutes, such as the *National Historic Preservation Act,* apply to all federal agencies, but there is only one implementing agency.

Exemptions from Review Legislation

Some statutes accommodate conflicts in environmental reviews by exempting certain federal agency actions. These statutes accommodate environmental reviews with the program needs of federal agencies, but they do not apply comprehensively throughout all federal programs.

The *National Environmental Policy Act* is the best example of a statute that provides exemptions from its environmental review requirements. The broad reach of this statute has led the Congress, both in NEPA and other environmental legislation, to provide exemptions from NEPA's review requirements.

One important exemption in NEPA is contained in the "nonderogation" clause, which is common in federal legislation. It makes clear that NEPA does not affect the duties of other federal agencies. The nonderogation clause provides:

> Nothing in . . . [the environmental review requirements of NEPA] shall in any way affect the specific statutory obligations of any Federal agency (1) to comply with criteria or standards of environmental quality, (2) to coordinate or consult with any other Federal or State agency, or (3) to act, or refrain from acting contingent upon the recommendations or certification of any other Federal or State agency.[129]

This section was added as part of a compromise between Senators Henry M. Jackson and Edmund S. Muskie when NEPA was enacted to ensure that the act would not affect pollution control standards adopted under pollution control laws.

There has been surprisingly little judicial interpretation of the nonderogation clause. The leading case is an early and influential decision from the Court of Appeals of the District of Columbia, *Culvert Cliffs' Coordinating Committee* v. *Atomic Energy Commission*.[130] Commission regulations required it to accept water quality and other environmental standards adopted by other federal and state agencies in licensing proceedings. The court held that this abdication of responsibility was not a proper interpretation of the nonderogation clause. NEPA required a complete environmental review by the agency responsible for the project so that a full balancing of costs and benefits could be conducted. The court read the nonderogation clause to reaffirm specific obligations in other federal statutes. NEPA's environmental review mandate applies unless other statutory obligations are plainly mutually exclusive with the NEPA obligations.

The *Clean Air* and *Clean Water Acts* also contain exemptions from NEPA. An express exemption for actions taken under the *Clean Air Act* is provided by the *Energy*

Supply and Environmental Coordination Act of 1974.[131] More complicated provisions exempt actions taken under the *Clean Water Act*. One provision states that NEPA does not authorize any agency to "impose" as a condition to a license or permit any effluent limitation on the discharge of pollutants other than a limitation adopted under the *Clean Water Act*.[132]

A court decision indicates how complex the application of this provision can be in the interlocking matrix of federal environmental reviews.[133] EPA adopted an effluent limitation for an ocean discharge by an electric power plant. The plant also required a dredge-and-fill permit from the Corps of Engineers. The court held that the Corps had to prepare an impact statement on its permit even though the environmental impacts disclosed in the statement might lead the Corps to deny or modify the dredge-and-fill permit. A denial or modification for this reason would not "impose" an effluent limitation on the power plant.

Other statutes also contain specific exemptions from NEPA. The *Disaster Relief Act of 1974*, for example, exempts from NEPA the restoration of facilities substantially as they existed prior to a disaster.[134] This exemption could apply to state and local public works projects. The Congress also has, from time to time, exempted specific state and local public works projects from NEPA in cases where they were blocked by NEPA litigation. The San Antonio freeway is an example.[135]

Other exemptions from NEPA arise from the judicial interpretation of possible conflicts between NEPA and other federal legislation. In a leading Supreme Court case, the Court held that NEPA did not apply to a decision by the Department of Housing and Urban Development to approve a subdivision of land under the *Interstate Land Sales Disclosure Act*. The Court held that the short time limitation contained in the act prevented compliance with NEPA, which required a much longer time period.[136] This case is not likely to apply to federal assistance and permit programs for state and local public works, but it establishes the principle that the Congress contemplated exemptions from NEPA.

Federal agencies have successfully claimed exemption from NEPA for other reasons. In *Pacific Legal Foundation* v. *Andrus*,[137] the circuit court held the Fish and Wildlife Service was not required to file an environmental impact statement on the listing of an endangered species under the *Endangered Species Act*. The court held that the listing of a species under the act was a nondiscretionary decision based on nonenvironmental criteria included in the act, and that an agency does not have to prepare an impact statement where it does not have the authority to consider environmental factors. This case is not entirely consistent with other cases that require compliance with NEPA because NEPA provides an agency with supplementary authority to consider environmental factors in its decisions.[138] The implication in these cases is that an agency cannot escape NEPA by arguing that it does not have the authority to consider environmental impacts because NEPA supplements agency statutes by conferring this authority.

Multiple Agency Referral, Comments, and Recommendations

One of the important innovations in environmental review legislation is the recognition that environmental problems often are complex and require analysis and participation by more than one federal agency. As the discussion of environmental veto points showed, federal legislation often requires federal environmental agencies to comment on and make recommendations for projects permitted or funded by other federal agencies that do not have environmental expertise. The *Fish and Wildlife Coordination Act* is one important example.

NEPA requires that an agency responsible for an environmental impact statement obtain the comments of any other federal agency "which has jurisdiction by law or special expertise with respect to any environmental impact involved."[139] This provision also states that the impact statement and the "comments and views" of appropriate federal, state, and local agencies "authorized to develop and enforce environmental standards" must be made available to the President, the Council on Environmental Quality, and the public through the *Freedom of Information Act*.[140] The courts have held that the federal agency responsible for the impact statement must make a reasoned response to comments, but that commenting agencies do not hold a veto power over the responsible agency's decision.[141]

Section 309 of the *Clean Air Act* is another example of a statutory referral-and-comment provision.[142] This section applies to EPA, which is one of the federal agencies authorized by NEPA to comment on impact statements. Section 309 extends EPA's commenting authority to federal construction projects and any other major federal agency action that requires an impact statement, even though EPA does not have authority over the environmental problem covered by the statement.

The courts have held that EPA's authority under Section 309 is comparable to the review authority conferred by similar environmental legislation. In *State of Alaska* v. *Andrus*,[143] EPA determined under Section 309 that an offshore oil lease was unsatisfactory, and the Council on Environmental Quality concurred. The court indicated in a footnote that Section 309 was intended to do more than the comment-and-review provisions of NEPA. An unsatisfactory Section 309 determination did not bar an agency from proceeding with its decision, but did give rise to a "heightened obligation" to explain more clearly the agency's reasons for proceeding.

Deferring to Other Federal Agencies

Some of the environmental review legislation discussed in this chapter requires one federal agency to defer to and apply the environmental standards of another. Important examples are the provisions in the *Highway* and *Clean Air* acts that make the requirements of state implementation plans adopted under the *Clean Air Act* binding on federally funded highways. Provisions for deferring accommodate environmental review because they give the environmental objectives of one program a priority over another. Attaining air quality standards, for example, is given priority over the construction of federally funded highways.

Reverse Federalism

Reverse federalism provisions are another example of legislative environmental accommodation. These provisions require a federal agency either to consider the recommendations of a state environmental agency or to defer to state environmental requirements. An important example of deferring is the provision in the ***Clean Water Act*** allowing a state to apply water quality and other "appropriate" requirements to federal permits and licenses. Reverse federalism *can* accommodate environmental review by giving priority to the environmental policy of a state agency.

Agency Accommodation through Joint Processing and Mediation

There are many examples of agency regulations that provide for environmental accommodation through joint processing and mediation. A common example is the joint processing of environmental reviews required by other legislation with the environmental review required by NEPA. CEQ's NEPA regulations, for example, encourage the preparation of draft environmental impact statements "concurrently and integrated with environmental impact analyses and related surveys and studies" required by the Fish ***and Wildlife Coordination Act,*** the ***National Historic Preservation Act,*** the ***Endangered Species Act,*** and "other environmental review laws and executive orders."[144] When more than one federal agency participates in the preparation of an environmental impact statement, CEQ's regulations require the selection of a "lead agency" to prepare the impact statement.[145]

CEQ also has a role in resolving environmental disputes among federal agencies. NEPA provides for the referral of environmental impact statements and comments on these statements to the council. EPA is also authorized by Section 309 of the ***Clean Air Act*** to refer any matters it finds environmentally unsatisfactory to the council. CEQ's regulations provide procedures under which the council resolves these "environmental referrals."[146] The regulations apply to "interagency disagreements concerning proposed major Federal actions that might cause unsatisfactory environmental effects."[147] Criteria for making referrals emphasize the national importance of the matter referred. Referral procedures include a statement from the referring agency indicating why it believes the proposal is environmentally unsatisfactory and a response from the agency whose action was referred.

CEQ may take a number of actions on environmental referrals, including publication of its findings and recommendations, mediation, and a request for negotiation.[148] Although CEQ's referral process has considerable potential as a method of resolving environmental conflicts, a CEQ study found that only 22 referrals had been made in 17 years. The stringent "national importance" standard adopted by CEQ had discouraged referrals, and the availability of the process encouraged the informal resolution of environmental disputes between agencies. The study found that the referral process was generally effective, except that CEQ's role as a mediator was uncertain. Mediation was a problem because agency positions were firmly entrenched at the time of the referral, and CEQ was viewed as having a substantive concern with the implementation of NEPA.[149]

Another example of regulatory accommodation appears in the joint interpretive regulations adopted for the ***Endangered Species Act*** by the Fish and Wildlife Service and the Marine Fisheries Service, two agencies in different departments charged to administer the act.[150] These regulations provide that the consultation, conference, and biological assessment procedures required by the ***Endangered Species Act*** may be consolidated with interagency cooperation procedures required by other acts, such as NEPA and the Fish ***and Wildlife Coordination Act***.[151] The regulations make it clear that satisfying the procedures of these other acts does not relieve a federal agency from compliance with the substantive requirements of the ***Endangered Species Act.*** Regulations for accommodating environmental reviews appear in federal assistance programs for state and local public works projects. Regulations of the Federal Highway Administration, for instance, combine the environmental review required under the parks and historic sites protection provision with the environmental review required under NEPA.[152] Regulations adopted by the Rural Development Administration for the environmental review of its programs, including the rural wastewater facilities program, integrate environmental reviews under 19 statutes, executive orders, and departmental regulations.[153] The statutes include those reviewed in this report as well as other federal environmental legislation, such as the ***Wild*** and ***Scenic*** Rivers ***Act***.[154]

A number of federal agencies have cooperated in developing joint processing procedures for the application of both NEPA and the dredge-and-fill permit program of the ***Clean Water Act*** to highway projects.[155] Accommodation is needed because a highway project located in a wetlands may require both a dredge-and-fill permit and an environmental review under NEPA. Coordination of these environmental review requirements with highway construction presents problems because of differences in statutory requirements and differences in the timing of necessary environmental permits and approvals.

Agencies have developed a variety of techniques to facilitate joint reviews of highway projects under these environmental review programs. These techniques include the "scoping" process required by NEPA regulations, which is intended to determine the environmental problems that NEPA requires for review.[156] The dredge-and-fill permit process requires a similar early evaluation of environmental impacts. Joint scoping can improve coordination of projects that require both a NEPA review and a dredge-and-fill permit.[157]

Federal Energy Regulatory Commission regulations for hydroelectric power permits provide for an extensive two-part pre-filing consultation process.[158] The regulations *call* for an analysis of environmental impacts on significant resources and provide guidance on referrals to the states for the certification required by the ***Clean Water Act.***

Judicial Interpretation

Opportunities for accommodation occur in the judicial interpretation of environmental review provisions in federal statutes. Many of these statutes contain similar

environmental review requirements, and courts can simplify that process if they provide comparable interpretations of similar statutory language. The courts also have developed a "functional equivalence" doctrine in the implementation of NEPA that provides another method through which courts can accommodate multiple requirements within the environmental review process under diverse federal laws.

Comparable Interpretation of Environmental Review Provisions

Federal environmental review statutes use a common terminology. Examples are the requirement in the ***National Environmental Policy Act*** for the preparation of an impact statement on federal actions that "significantly" affect the environment and the provision in the ***Endangered Species Act*** prohibiting federal undertakings that "jeopardize" an endangered species. Federal assistance statutes contain similar language requiring federal agencies to consider the environmental impacts of state and local public works projects they review for funding.

Many federal statutes also contain provisions requiring, or are interpreted to require, agencies to consider alternatives to proposed federal actions that affect the environment and to consider measures to mitigate adverse environmental impacts. NEPA and Section 4(f) of the ***Department of Transportation Act*** are examples. This common terminology should give the federal courts an opportunity to adopt comparable interpretations of the terms used in environmental review legislation.

Despite these examples of similar legislative requirements and terminology, a number of limitations prevent the courts from adopting comparable interpretations of many environmental statutes. One problem is that the statutes impose different types of environmental restrictions. Some statutes, like NEPA, require federal agencies to engage in a process in which they consider environmental values but do not require a decision based on substantive environmental standards. Other statutes, like the ***Endangered Species Act,*** prohibit agency actions if the environmental standard is violated. These differences prevent the courts from providing comparable interpretations of key statutory language.

Other environmental statutes do not use terms such as significance or jeopardy in defining the environmental obligations of federal agencies. The air and water quality acts, for example, authorize the adoption of pollution control standards that contemplate the use of a particular control technology. These statutes also may require an environmental review, but it is part of a process in which a pollution standard is adopted, not part of a process for considering the environmental impact of an agency action. This makes a difference.

Other federal statutes that govern state and local public works, such as the ***Federal Power Act*** and the ***Northwest Power Act,*** contain specific restrictions intended to protect a particular natural resource, namely, the fish and wildlife endangered by hydroelectric power projects. This difference in the type of environmental protection required also makes comparable judicial interpretations difficult.

In addition to variations in their restrictions and requirements, federal environmental review legislation serves different purposes. The ***Endangered Species Act*** is intended to protect endangered species. The parks and historic sites provision in the ***Department of Transportation Act*** is intended to protect parks, historic sites, and similar areas. Differences in purpose also prevent the courts from adopting comparable judicial interpretations of key environmental requirements.

Legislative history also inhibits comparable interpretation of similar environmental statutes. Even if the language used in a statute is similar to language used elsewhere, legislative history may indicate that another interpretation was intended, possibly because the statute serves a different environmental purpose.

For all these reasons, federal cases interpreting federal environmental review requirements often do not cross-cite cases that interpret similar legislation. This tendency is illustrated by ***Pyramid Lake Paiute Tribe of Indians*** v. ***United States Department of the Navy,***[159] a case interpreting the ***Endangered Species Act.*** The tribe argued that the act required an agency proposing a project to adopt an alternative suggested by another agency or objector that would be a "less burdensome" alternative on an endangered species. The court rejected this argument, but did not cite NEPA cases that considered the extent to which NEPA requires the consideration of alternatives to agency actions.

National Wildlife Federation v. ***Federal Energy Regulatory Commission***[160] provides another example of different interpretations by a court of a similar problem that arose under two environmental statutes, in this case the ***Federal Power Act*** and NEPA. The issue was whether FERC must consider the cumulative impact of the second phase of a hydroelectric power project when it approves the project's first phase, but the two statutes handle the problem differently. The argument under the ***Federal Power Act*** was that cumulative impact analysis was required by the statutory obligation to determine whether a power project is "best adapted to a comprehensive plan." This requirement is potentially a more affirmative and extensive environmental requirement than the environmental review process required by NEPA. The argument under NEPA was that regulations adopted by the Council on Environmental Quality required a cumulative impact analysis, although the act does not contain a provision dealing with this problem. The court rejected both arguments but interpreted the two statutes differently.

Another limit on the ability of courts to provide comparable judicial interpretations of environmental statutes is the standard of judicial review that courts apply to agency decisions and to an agency's interpretation of its legislation. Judicial review of federal agency actions has always been deferential, an approach reinforced in environmental law by recent Supreme Court cases under the ***Clean Air Act***[161] and NEPA.[162] These cases adopted an "arbitrary and capricious" standard for judicial review of agency decisionmaking. This standard means that an agency's interpretation of its statute will be upheld unless it is clearly wrong. As a result, the federal courts may not be able to adopt comparable interpretations of similar statutes

because they defer to agency interpretations, which may differ. Agencies are free to interpret their own statutes with only a limited possibility they will be overruled.

An example of the arbitrary and capricious standard of judicial review is the treatment of agency responses to comments by other federal agencies on the environmental impact of a proposed action. This requirement is contained in a number of statutes, and the courts often hold that an agency's decision on whether to rely on another's environmental comments is not arbitrary and capricious. In one case, for example, the court held that the Federal Highway Administration did not act arbitrarily when it relied on a Fish and Wildlife Service comment that a highway project was not likely to jeopardize the existence of an endangered species.[163]

Federal courts apply a similar standard of judicial review to formal adjudications by agencies, such as that by the Federal Energy Regulatory Commission on an application for a hydroelectric power permit. The courts uphold adjudicative agency decisions if they are based on substantial evidence. In a hydroelectric power permit case,'" for example, the court considered a provision of the ***Federal Power Act*** that requires FERC to consider recommendations of federal and state environmental agencies for the protection of fish and wildlife. The court held that FERC's refusal to follow recommendations from these agencies was supported by substantial evidence on the record.

It is true that judges often state in environmental cases that courts should take a "hard look" at the environmental problems raised by federal agency decisions.[165] This doctrine competes directly with the arbitrary and capricious standard, although in recent years that standard has prevailed despite judicial acknowledgement that the "hard look" standard also exists. The distinction may be that courts tend to take a harder look at federal agency decisions when the problem involves a conflict between the "primary mission" of an agency and compliance with environmental review requirements.

Despite these limits on the ability of courts to provide comparable interpretations of environmental review statutes, there are cases in which the courts have construed similar environmental statutes in similar ways. In one case, for example, the court held that the standard for determining environmental significance was the same under the ***Airport and Airway Improvement Act*** as under the ***National Environmental Policy Act***.[166] In another case, the court held that the Secretary of Transportation could integrate consideration of the impact of a highway on parks and other protected land with consideration of the highway's impacts on agricultural land.[167] Consideration of the impacts of federal projects on agricultural land is required by another federal statute.[168] In a fair number of cases, the courts have applied a common analysis to the environmental review provisions of NEPA and Section 4(f) of the ***Department of Transportation Act***.[169]

The Functional Equivalence Doctrine under NEPA

Another doctrine that allows the federal courts to accommodate environmental reviews is the functional equivalence doctrine adopted by the courts under NEPA.[170] This doctrine exempts agencies from NEPA if they provide an environmental review process that is functionally equivalent to NEPA's. Federal legislation that requires environmental reviews for state and local public works projects may be able to qualify under the functional equivalence doctrine.

The courts first adopted the functional equivalence doctrine in a case reviewing an emission limitation adopted by EPA for a new source of air pollution.[171] The court held that the ***Clean Air Act*** required EPA to take environmental considerations into account when it set emission limitations for new sources. This statutory requirement excused EPA from complying with NEPA, even though it did not provide all of the advantages of a "structured" NEPA determination. EPA actions taken under the ***Clean Air Act*** were later exempted from NEPA by another statute.

The courts have considered the application of the functional equivalence doctrine to a number of federal environmental statutes. Although the boundaries of the doctrine are unclear, the courts have regularly applied it only to actions taken by EPA under its various environmental review statutes. They have not applied the doctrine to actions taken by other agencies under other environmental statutes. The courts may believe that only when EPA takes action under an environmental statute can a court be certain that the action is sufficiently benign to be protected from review under NEPA by the functional equivalence doctrine. As one court stated in refusing to apply the functional equivalence doctrine to actions taken under the ***Marine Mammal Protection Act,*** the mere fact that an agency has the authority to implement an environmental statute is not enough to apply the functional equivalence doctrine. NEPA would be considerably weakened, the court held, if the functional equivalence doctrine were extended to all cases in which an agency administers a statute designed to protect the environment.[172]

BARRIERS TO ACCOMMODATION

legislative Problems

Conflicts and Ambiguity in Federal Legislation

Conflicts and ambiguities in federal legislation aggravate the accommodation problem. Federal assistance legislation is an example. The Congress enacts federal assistance legislation to fund state and local public works for which there is a demonstrated need, such as highways and airports. The Congress also may add environmental review requirements, but may fail to strike a balance between competing needs for public facilities and the need to protect the environment. The Congress usually addresses this problem by directing the federal agency to "consider" the environmental impact of its funding decisions, but this direction does not provide clear statutory guidance and leaves difficult policy choices to the agency. This type of statute creates opportunities for conflicts in decisionmaking.

The problem of balancing the primary funding mission of federal agencies with demands for environmental protection is aggravated by the tendency to fund some of these programs through "trust" funds. These funds are

financed by special taxes, such as the tax on gasoline that feeds the highway fund, and can be used only for specified purposes limited to the program they support. The airport development program has a similar fund. These trust funds may encourage the Congress to authorize expenditures to meet program needs and the agencies to ignore environmental problems raised by projects that have a guaranteed funding source.

The problem of balance is even more serious in federal permit legislation, such as the ***Federal Power Act.*** This statute requires the Federal Energy Regulatory Commission to take a number of factors into account when it makes a permit decision on a hydroelectric power plant. Environmental impact is only one of these factors, and FERC is comparatively free to balance environmental protection against the need for hydroelectric power.

National Wildlife Federation v. *Federal Energy Regulatory Commission*[173] is an example of the ambiguities created by the commission's exercise of its balancing responsibility. In this case, the court considered a provision of the ***Federal Power Act*** that requires FERC, when deciding whether to issue a license, to give equal consideration to (inter alia) "the protection of. . . environmental quality" along with "the power and development purposes for which licenses are issued."[174] The National Wildlife Federation argued that FERC could not consider the water supply benefits in deciding whether to issue a license. Rather, it contended, the statute required the commission to weigh only the power and development purposes of a project against its environmental costs.

Because the project had no navigation benefits and minimal power benefits, the National Wildlife Federation argued that the costs of the project outweighed its power and development purposes. The commission adopted a different interpretation. The project had water supply benefits, and the commission argued that it could consider these benefits as part of the "development" purposes it was authorized to weigh against environmental costs. FERC concluded that the water supply benefits justified the project despite its costs.

The court upheld the commission. It found the commission's construction of the statute to be entitled to judicial deference because the Congress did not directly address the precise question on which the parties disagreed. The commission, the court stated, was correct in concluding that water supply benefits could be considered as part of the development purposes of a project. The court emphasized the explicit role of the Congress in defining FERC's jurisdiction:

> The Commission has traditionally exercised jurisdiction to license even those dams which are not exclusively or even primarily built for the purpose of power generation. Congress would not likely confer upon the Commission jurisdiction to approve or reject such projects and then bar it from considering other than the power and navigation benefits of the proposed projects in making its decisions.[175]

Conflicts also arise in environmental review legislation, whether or not it requires a permit, because some of this legislation contains substantive standards and some only requires that the federal agency engage in an environmental review process. The result is that the legal effect of the legislation on a state and local public works project will differ depending on which alternative the law has adopted.

The ***Endangered Species Act,*** for example, imposes a substantive requirement that prohibits the funding of state and local public works that jeopardize an endangered species and its habitat. NEPA requires an environmental review but does not require a federal agency to make a decision to reject or modify a project because of the environmental impacts disclosed by the review.

Another reason why accommodation is difficult is the vague and ambiguous nature of environmental legislation. This problem occurs in all legislation, but the problem is aggravated in environmental legislation for a number of reasons. One reason is that the Congress has used broadly phrased language in environmental legislation that delegates major interpretive responsibilities to the agencies. Why the Congress has legislated in this way is not entirely clear. The Congress may be reluctant to resolve the many policy conflicts that environmental legislation creates and may decide to hand this problem on to the agencies.[176]

Another explanation may lie in the polycentric nature of decisionmaking on environmental issues.[177] Federal environmental legislation usually includes environmental factors as only one of the elements an agency is to take into account in its decisions. All factors must be considered, but the legislation usually does not weight these elements or provide decision criteria indicating how the agency is to balance the statutory factors in its decision. The agency must balance and assign weights to the statutory criteria that guide its decisionmaking process. Any decision is possible.

There are exceptions to this rule, as in the legislation protecting parks and other sites from transportation projects. The **U.S.** Supreme Court interpreted this legislation to include a presumption against using these sites as locations for these projects. The Congress also legislated specific standards in other environmental legislation, as in the acid rain provisions of the 1990 amendments to the ***Clean Air Act.***[178] This type of specific substantive standard is the exception and may be extreme. The Congress should strive to strike a better balance between vague aspirational commands and detailed legislative direction.

Another explanation for broad or ambiguous environmental legislation may be the influence on environmental legislation of the ***National Environmental Policy Act.*** This act appeared to recognize the polycentric nature of decisionmaking that includes environmental factors, although the legislative history is incomplete and what the Congress intended is only speculative. The list of environmental impacts to be considered in impact statements is open ended. NEPA gives agencies an opportunity to balance the environmental values of a project against the benefits it confers without a statutory direction that indicates how agencies are to factor environmental values into their decisions. Much environmental legislation that followed NEPA also contemplates this kind of open-ended, polycentric balancing.

Ambiguity also appears in the terminology used in environmental review legislation. One example is the statutory terminology that determines the threshold at which an environmental review is required. NEPA's requirement is that an impact statement must be prepared only when environmental impacts are "significant." Other environmental legislation for state and local public works either incorporates the significance requirement or uses similar terminology. This language makes accommodation difficult because ambiguous legislation gives agencies considerable discretion in interpreting congressional mandates. Agency interpretations may differ, so that the basis for conducting an environmental review will differ from one program to the other. Conversely, however, this ambiguity *can* be viewed as the flexibility necessary to negotiate reasonable and prudent accommodations in diverse situations.

Conflicts in Congressional Committee Jurisdiction and Interest Group Representation

The fragmented jurisdiction of congressional committees is another reason why the accommodation of environmental reviews is difficult.[179] Environmental legislation spans a wide variety of public programs and interests and is split among a large number of congressional committees and subcommittees. Often, the committee structure for a particularly important piece of legislation, such as the ***Clean Air Act,*** is not the same in the House and Senate. This division in jurisdiction makes accommodation difficult because congressional committees have different missions and may take contradictory views of the same environmental problem or program. This split in jurisdiction is aggravated by differences in the leadership roles played by key committee chairs and subcommittees in the development and enactment of environmental legislation.

The problem of divided congressional jurisdiction is aggravated by the conflicting representation of interest groups that is typical of the environmental legislative agenda. Interest group representation in environmental legislative conflicts is different from many other areas of public concern in which there are only two major protagonists. Conflict between industry and organized labor, for example, marks the consideration and enactment of labor legislation.

This is not true in the environmental field. Like environmental legislation, interest group involvement in environmental politics is polycentric. A number of groups compete for influence, their positions change depending on the legislation at issue, and coalitions shift. ***An*** example is the shift in position among some industry representatives to favor rather than oppose a strengthening of federal pesticide legislation. The reason is industry's concern about more stringent state legislation, which many states have adopted to remedy the gap left by federal legislation in the control of pesticides.

Difficulties in Defer and Refer Requirements and Reverse Federalism

Legislation requiring a federal agency to consider the comments of, or to defer to a decision by, another federal or state agency is an example of environmental accommodation. These requirements may help facilitate accommodation, but they have inherent difficulties because they divide authority between at least two federal agencies and sometimes a state agency as well. Conflict and controversy may result, as in the application of the ***Clean Air Act's*** requirements for federally funded highways. The courts have not compelled one federal agency to accept recommendations by another federal agency, except when there is a very clear justification.

Reverse federalism creates similar problems. Sometimes, the scope of state agency authority is unclear, as it is in the ***Clean Water Act*** provision giving states the authority to refuse certification of federal permits. In other instances, the state veto depends on state policymaking that is governed by ambiguous and open-ended federal statutory direction, as in the state coastal programs funded by the ***Coastal Zone Management Act.***

The Congress can modify the power it has given the states in reverse federalism, but this is not likely in an age in which the delegation of program responsibilities to the states has become politically popular.

Federal Agency Problems

Problems in federal agency administration of environmental review and assistance legislation also limit accommodation. These problems mirror the difficulties that are created for the Congress by conflicts in committee jurisdiction and interest group representation. Federal agencies are client caretakers of federal programs shaped by the interest groups whose specialized interests are reflected in congressional committees. Agencies often reflect these narrow interests in their administration of statutory programs. Accommodation suffers as a result.

Failure to Comply with Environmental Mandates: The Mission Agency Problem

The phrase "mission agency" describes an agency whose primary program responsibility is to carry out a mission assigned by the Congress. This mission can be funding additional airports to meet the needs of airline travel or permitting additional hydroelectric power plants to meet energy needs.

Until the Congress adopted environmental review legislation, the primary missions of federal agencies often overrode any environmental problems. The construction of highways on straight lines through environmentally sensitive areas, no matter what the cost, was one example. Federal legislation actually imposed this requirement at one time.

Congressional balancing of mission agency responsibilities with the need to consider environmental problems modifies the primary missions of federal agencies. Federal agency reluctance to accept this modification, however, can be a barrier to accommodation. Some commentators, for example, are critical of the Federal Energy Regulatory Commission's record in recognizing its environmental responsibilities.[180] Legislation was also introduced in the Congress making NEPA expressly applicable to independent regulatory agencies."'

Supporters of state and local public works projects may believe that federal agency hesitancy to implement

environmental mandates is exemplary because it facilitates the construction of public works projects by removing environmental review obstacles. However, this perception may be erroneous. Federal agency resistance to environmental review mandates often leads to frustration and delay in the funding and approval of public works projects. Congressional committees hold oversight hearings, corrective legislation is introduced, and environmental and other interest groups bring litigation to challenge the agency's interpretation of environmental responsibilities they consider incorrect.

Divided Agency Jurisdiction and Dispersed Environmental Responsibility

A second barrier to accommodation in federal agencies is the division that has occurred in agency jurisdiction and the dispersal of environmental responsibilities among several agencies. Multiple jurisdiction also occurs when a federal agency must refer its action to another federal agency for comment, or defer to decisions by another federal or state agency.

In many cases, division of jurisdiction has prevented the development of a consistent national policy on a number of issues affecting state and local public works. There is, for example, no clear federal policy on supplying electrical power. Jurisdiction over the electrical power industry is dispersed among a number of federal agencies having different missions.[182] Neither is there a coherent federal transportation policy that balances the need for competing forms of transportation with the need to protect the environment. The federal transportation agencies recently have tried to remedy this problem.[183]

Divisions may even be so deep within a single agency that different programs remain uncoordinated. This is true of EPA, which has had difficulty developing a program to deal adequately with cross-media pollution. This problem arises when pollution problems created by one pollution control program spill over on another. Sludge disposal is an example.

The dispersion of environmental responsibilities among several federal agencies aggravates the problem of accommodating environmental reviews. No comprehensive environmental policy is binding on all federal agencies, and there is no easy way to produce one.

Elevating EPA to Cabinet status might have only a limited effect. Although EPA has responsibilities for removing, limiting, or preventing air, water, and other types of pollution, it does not administer federal assistance programs for state and local public works, except for the wastewater treatment construction program now structured as a state revolving loan fund. CEQ's broad environmental policy role is dampened by its small size and its limited statutory and regulatory mandate. Other environmental review responsibilities are dispersed among agencies, such as the Fish and Wildlife Service, whose primary missions are to protect narrow environmental concerns. Some of the potentially most effective environmental protection provisions are administered at least semi-independently by federal agencies with missions to provide grants and loans to state and local public works agencies.

In summary, although there are many barriers to developing a more effective and efficient coordination of federal environmental review requirements, opportunities for better coordination can be found in existing legislation and court decisions, and more coordination could be achieved by presidential and congressional action.

Notes

[1] In this chapter, an "environmental review requirement" is a statutory requirement that either requires a process in which the environmental impacts of state and local public works are considered or a statutory requirement that applies environmental standards to state and local public works. The National Environmental Policy Act is an example of a statute that requires a process for reviewing the environmental impacts of state and local public works. The Clean Water Act is an example of a statute that applies environmental standards to state and local public works.

[2] We wish to thank Peggy McDermott, Research Librarian, and Dorie Bertram, Government Documents Librarian, at Washington University School of Law, and Professor A. Dan Tarlock, Chicago Kent College of Law, for their invaluable assistance in the preparation of this chapter.

[3] A. Dan Tarlock, "Balancing Environmental Considerations and Energy Demands: A Comment on Calvert Cliffs' Coordinating Committee, Inc. v. AEC," *Indiana Law* Journal 47 (Summer 1972): 645-659.

[4] 42 U.S.C. Sec. 4321 et. seq. All statutory citations are current as of June 30, 1992.

[5] Buttrey v. United States, 690 F.2d 1170 (5th Cir. 1982), cert. denied, 461 U.S. 927 (1983).

[6] Executive Order 11991, 3 C.F.R. Sec. 123 (May 24, 1977).

[7] 49 U.S.C. Sec. 303(b).

[8] For a discussion of the environmental problems due to fragmented jurisdiction that are likely to arise in the construction of the proposed National Highway System, see Nicholas J. Masucci, "Slow Construction Ahead," *Environmental Forum* (July/August 1991): 18.

[9] Art. I, Sec. 8, cl. 1.

[10] 483 U.S. 203 (1987).

[11] Art. I, Sec. 8, cl. 3.

[12] 317 U.S. 111 (1942).

[13] 33 U.S.C. Sec. 1362(7).

[14] 474 U.S. 121 (1987).

[15] 23 U.S.C. Sec. 101 et. seq. (highways); 16 U.S.C. Sec. 1601 et. seq. (urban mass transportation); 49 U.S.C. Sec. 2201 et. seq. (airports).

[16] Library of Congress, Congressional Research Service, Environmental and Natural Resources Policy Division, "Federal Assistance for Water and Sewer Systems" (1989).

[17] 33 U.S.C. Sec. 1293.

[18] 7 U.S.C. Sec. 1925 et. seq.

[19] 43 U.S.C. Sec. 422a et. seq.

[20] 16 U.S.C. Sec. 801 et. seq.

[21] 16 U.S.C. Sec. 839 et. seq.

[22] Federal Highway Act, 23 U.S.C. Sec. 101 et. seq.

[23] Comment, "Municipal Waste Combustion: A Wasted Investment," *University of Hawaii* Law *Review* 12 (Summer 1990): 153.

[24] 33 U.S.C. Sec. 1342.

[25] Energy Supply and Environmental Coordination Act of 1974, 15 U.S.C. Sec. 793(c)(1).

[26] 33 U.S.C. Sec. 1371(c)(1).

[27] A dredge-and-fill permit is required for a "discharge," 33 U.S.C. Sec. 1344(1), which is defined as a "discharge of a pollutant" (Sec. 1362(16).

[28] For another view of this problem, see Michael S. Hamilton, "Regulatory Federalism: A Useful Concept for Natural Resources and Environmental Management?" in Michael S. Hamilton, ed., ***Regulatory Federalism, Natural*** *Resources,* ***and Environmental Management*** (Washington, DC: American Society for Public Administration, 1991).

[29] 49 U.S.C. Sec. 303(c).

[30] 401 U.S. 402 (1971).

[31] Louisiana Environmental Society, Inc. v. Coleman (II), 527 F.2d 79 (5th Cir. 1983).

[32] 23 U.S.C. Sec. 109(h).

[33] 42 U.S.C. Sec. 7506.

[34] 42 U.S.C. Sec. 7509.

[35] 16 U.S.C. Sec. 2208(b)(3).

[36] 16 U.S.C. Sec. 2208(b)(4).

[37] 16 U.S.C. Sec. 2208(b)(5).

[38] 49 U.S.C. Sec. 1610 (airport projects).

[39] 49 U.S.C. Sec. 2208(a)(7)(A).

[40] 49 U.S.C. Sec. 1604(h)(2)(A).

[41] 7 U.S.C. Sec. 1926(c)(10)(11).

[42] 43 U.C.C. Sec. 422h.

[43] Sierra Club v. United States Army Corps of Engineers, 697 F.2d 297 (2d Cir. 1982) (dredge-and-fill permit under Clean Water Act).

[44] 33 U.S.C. Sec. 1371(c).

[45] 33 U.S.C. Sec. 1382(b)(6).

[46] 55 ***Federal Register*** 10176 (May 24, 1990) (interim regulation).

[47] 16 U.S.C. Sec. 797(e).

[48] 16 U.S.C. Sec. 803(a)(1). For discussion of this provision, see Note, The "Comprehensive Plan" Requirement of the Federal Power Act: A Senator's Dream, A Congressional Mandate, and a Parameter for Agency Discretion, ***Boston College Law Review*** 28 (1987): 523. See also 16 U.S.C. Sec. 803(g)(1).

[49] 16 U.S.C. Sec. 803(j).

[50] 16 U.S.C. Secs. 661, 662.

[51] 16 U.S.C. Sec. 839b(d).

[52] 16 U.S.C. Sec. 839(a)(4)(B).

[53] 16 U.S.C. Sec. 839b.

[54] 16 U.S.C. Sec. 839b(h)(1)(A).

[55] 16 U.S.C. Sec. 839b(h)(5).

[56] 16 U.S.C. Sec. 839b(h)(2).

[57] 16 U.S.C. Sec. 839b(h)(11). Another important statute, not included in this study, that affects hydroelectric power development is the Wild and Scenic Rivers Act. See Note, Piloting the Preservation/Development Balance on the Wild and Scenic Rivers, ***Duke Law Journal*** (November 1988): 1044.

[58] Michael O. Early and Egio Krogh, "Balancing Power Costs and Fisheries Values under the Northwest Power Act," ***University*** of ***Puget Sound Law Review*** 13 (Winter 1990): 281.

[59] 'Annotation, Necessity and Sufficiency of Environmental Impact Statements under Sec. 102(2)(C) of National Environmental Policy Act of 1969" (42 U.S.C. Sec. 4332(2)(C)), in Cases Involving Power Projects, 66 A.L.R. Fed. 395 (1984).

[60] California v. Federal Energy Regulatory Commission, 110 S. Ct. 2024 (1990). This issue is important because stream flow volume can affect the survival of fish species. See Michael C. Blumm, "Federalism, Hydroelectric Licensing and the Future of Minimum Stream Flows after California v. Federal Regulatory Energy Commission," ***Environmental Law*** 21 (1991): 113.

[61] 33 U.S.C. Sec. 1344(a).

[62] 33 U.S.C. Sec. 1344(b).

[63] 33 U.S.C. Sec. 1344(c).

[64] 33 C.F.R. Sec. 320.4(b)(4).

[65] 40 C.F.R. Sec. 230.10(a).

[66] E.g., Van Abbema v. Fornell, 807 F.2d 633 (7th Cir. 1987) (coal loading facility in historic area of river town).

[67] 695 F.2d 957 (5th Cir. 1983).

[68] See generally, ***The Administration*** of ***Section 404 of the Clean Water Act***, Hearing before the U.S. Congress, House Committee on Public Works and Transportation, Subcommittee on Investigations and Oversight, 100th Congress, 2d Session, September 14, 1988.

[69] Clean Air Act Amendments of 1990, Title V.

[70] EPA can also issue emission limitations to control emissions of pollutants not listed as criteria pollutants. 42 U.S.C. Secs. 7401-7228.

[71] 42 U.S.C. Sec. 7503.

[72] "Municipal Waste Combustion: A Wasted Investment?," ***University*** of ***Hawaii Law Review*** 12 (Summer 1990): 153.

[73] Clean Air Act Sec. 129, to be codified as 42 U.S.C. Sec. 7429. See also ***Federal Register*** 56 (1991): 5488 (EPA final rules on emissions from incinerators pending revisions in accordance with Sec. 129).

[74] ***Environment Reporter*** 20 (January 1990): 1508.

[75] ***Federal Register*** 56 (1991): 5488. See "Defeat of EPA Trash Recycling Plan Harshly Criticized by Environmentalists," ***Inside EPA*** (January 4, 1991): 3.

[76] Clean Air Act Amendments of 1990, Sec. 306, Pub. L. No. 101 549 (1990). ***Environment Reporter*** 21 (October 1990): 1171.

[77] 7 U.S.C. Sec. 1926(c)(10)(11).

[78] 23 U.S.C. Sec. 109(j) (must comply with State Implementation Plans adopted under Clean Air Act).

[79] 42 U.S.C. Sec. 7506.

[80] 42 U.S.C. Sec. 7504.

[81] ***The Impact of Air Qualify Regulation on Federal Highway and Transit Programs and on Fuel Tax Collections,*** Hearing before the U.S. Congress, House of Representatives, Committee on Public Works and Transportation, Subcommittee on Investigations and Oversight, 101st Congress, 1st Session, November 9, 1989. Also U.S. General Accounting Office, ***Air Pollution: EPA Needs*** *More* ***Data From FHWA on Changes to Highway Projects*** (Washington, DC, 1990).

[82] 23 C.F.R. Pt. 770.

[83] 42 U.S.C. Sec. 7506.

[84] 42 U.S.C. Sec. 7509.

[85] 16 U.S.C. Sec. 1456(f).

[86] 42 U.S.C. Sec. 4332(2)(C).

[87] 42 U.S.C. Sec. 4331.

[88] 42 U.S.C. Sec. 4332(2)(C).

[89] Daniel R. Mandelker, ***NEPA Law and Litigation*** (Chicago, Callaghan & Company, 1984 and 1991 Supplements), Sea. 8:16, 8:17.

[90] Ibid., Secs. 8:15-820.

[91] Calvert Cliffs' Coordinating Committee v. Atomic Energy Commission, 449 F.2d 1109 (D.C. Cir. 1971).

[92] E.g., Winnebago Tribe of Nebraska v. Ray, 621 F.2d 269 (8th Cir.) (permit for small portion of power transmission line not enough of a federal link), cert. denied, 449 U.S. 836 (1980).

[93] Mandelker, ***NEPA Law and Litigation,*** Sec. 8:16.

[94] Ibid., Secs. 10:36, 10:37.

[95] City of Davis v. Coleman, 521 F.2d 661 (9th Cir. 1975).

[96] Mandelker, ***NEPA Law and Litigation,*** Secs. 10:22-10:27, 10:38, 10:38-10:50.

[97] Robertson v. Methow Valley Citizens Council, 109 S. Ct. 1835 (1989).

[98] Sierra Club v. United States Army Corps of Engineers, 772 F.2d 1043 (2d Cir. 1985) (Westway highway project in New York City).

[99] For discussion of the extent to which federal agencies have internalized the environmental review process demanded by NEPA, see Serge Taylor, "Making Bureaucracies Work: The Environmental Impact Statement Strategy of Administrative Reform" (Stanford: Stanford University Press, 1984).

[100] 16 U.S.C. Sec. 470f.

[101] Vieux Carre Property Owners, Residents and Associates., Inc. v. Brown, 875 F.2d 452 (5th Cir. 1989) (act not triggered by instructions from federal agency to developers to submit final plans or by continued federal agency monitoring of project).

[102] 36 C.F.R. Sec. 800.3(b).

[103] 16 U.S.C. Sec. 470h 2(i).

[104] 16 U.S.C. Sec. 1636(a)(2).

[105] 16 U.S.C. Sec. 1533(a)(1). The discussion of this act is based on A. Dan Tarlock, *Law of Water Rights and Resources* (New York, Clark Boardman Co., 1988), Sec. 9.06[4].

[106] 16 U.S.C. Sec. 1533.

[107] 16 U.S.C. Sec. 1532(5)(A).

[108] See Katherine S. Yagerman, "Protecting Critical Habitat under the Federal Endangered Species Act," ***Environment Law*** 20 (1990): 811.

[109] 16 U.S.C. Sec. 1536.

"'Tennessee Valley Authority v. Hill, 437 U.S. 153 (1978).

[111] Ibid., 185.

[112] 16 U.S.C. Sec. 1636(h).

[113] 16 U.S.C. Sec. 1538(a)(1)(B).

[114] Palila v. Hawaii Department of Land and Natural Resources, 471 F. Supp. 985 (D. Hawaii 1979) (state's maintenance of goat and sheep herd in area that endangered a listed species held to be a taking), aff'd, 639 F.2d 495 (9th Cir. 1981).

[115] 16 U.S.C. Sec. 1539.

[116] 16 U.S.C. Sec. 1536(a)(1).

[117] Pyramid Lake Paiute Tribe of Indians v. Department of the Navy, 898 F.2d 1410 (9th Cir. 1990).

[118] 33 U.S.C. Sec. 1341(a)(1), (d).

[119] 717 P.2d 1274 (Ore. App. 1986). Also, Fourth Branch Associates v. New York State Department of Environmental Quality, 550 N.Y.S.2d 769 (Sup. Ct. 1990) (Section 401 does not authorize state to require environmental review of FERC permit under state law comparable to NEPA).

[120] For FERC regulations see 18 C.F.R. Sec. 4.38.

[121] Commonwealth Department of Environmental Resources v. City of Harrisburg, 578 A.2d 563 (Pennsylvania Commonwealth 1990) (state environmental review under Sec. 401 limited by Clean Water Act).

[122] 16 U.S.C. Sec. 1456.

[123] Congressional ***Record*** 136 (October 26, 1990): H12695.

[124] N.J. Stat. Ann. Secs. 13:19-1 to 13:19-24. See also Barry G. Rabe, "Environmental Regulation in New Jersey: Innovations and Limitations," ***Publius: The Journal of Federalism*** 21 (winter 1991): 83-103.

[125] N.J. Stat. Ann. Sec. 13:19-3.

[126] N.J. Stat. Ann. Sec. 13:19-10.

[127] N.J. Stat. Ann. Sec. 13:19-11.

[128] Cal. Pub. Res. Code Sea. 30000-30900.

[129] 42 U.S.C. Sec. 4334.

[130] 449 F.2d 1109 (D.C. Cir. 1971).

[131] 15 U.S.C. Sec. 793(c)(1).

[132] 33 U.S.C. Sec. 1371(c)(2)(B).

[133] Mahelona v. Hawaiian Electric Company, Inc., 418 F. Supp. 1328 (D. Hawaii 1976).

[134] 42 U.S.C. Sec. 575.

[135] Pub. L. No. 93-87, Sec. 154, 87 Stat. 250 (1983).

[136] Flint Ridge Development Company v. Scenic Rivers Association, 426 U.S. 776 (1976).

[137] 657 F.2d 829 (6th Cir. 1981).

[138] E.g, Environmental Defense Fund, Inc. v. Mathews, 410 F. Supp. 336 (D.D.C. 1976).

[139] 42 U.S.C. Sec. 4332(2)(C).

[140] 5 U.S.C. Sec. 552.

[141] See State of California v. Block, 690 F.2d 753 (9th Cir. 1982) (program impact statement on allocation of land in roadless wilderness areas to land management categories).

[142] 42 U.S.C. Sec. 7609.

[143] 580 F.2d 465 D.C. Cir. (1978).

[144] 40 C.F.R. Sec. 1502.25(a).

[145] 40 C.F.R. Sec. 1501.5.

[146] 40 C.F.R. Secs. 1504.1-1504.3.

[147] 40 C.F.R. Sec. 1504.1(a).

[148] 40 C.F.R. Sec. 1504.3(f).

[149] U.S. Council on Environmental Quality, "Environmental Referrals and the Council on Environmental Quality," Special Report (17th Annual Report.) (Washington, DC, 1988)

[150] 50 C.F.R. Sec. 402.01 et. seq.

[151] 50 C.F.R. Sec. 402.06.

[152] 23 C.F.R. Sec. 771.135.

[153] 7 C.F.R. Sec. 1940.301.

[154] 16 U.S.C. Sec. 1271.

[155] U.S. Department of Transportation, Federal Highway Administration, ***Applying the Section 404 Permit Process to Federal-Aid Highway Projects*** (Washington, DC, 1988).

[156] 40 C.F.R. Secs. 1501.7, 1508.25.

[157] Federal Highway Administration, *Applying* ***the Section 404 Permit Process to Federal-Aid Highway Projects***, ch. 5.

[158] 18 C.F.R. Sec. 4.38.

[159] 893 F.2d 1410 (9th Cir. 1990).

[160] 912 F.2d 1471 (D.C. Cir. 1990).

[161] Chevron, U.S.A., Inc. v. Natural Resources Defense Council, Inc., 467 U.S. 837 (1984).

[162] Marsh v. Oregon Natural Resources Council, 109 S. Ct. 1851 (1989).

[163] Stop H-3 Association v. Dole, 740 F.2d 1442 (9th Cir. 1984), cert. denied, 471 U.S. 1108 (1985).

[164] National Wildlife Federation v. Federal Energy Regulatory Commission, 912 F.2d 1479 (D.C. Cir. 1990).

[165] For examination of the "hard look" doctrine see Frederick R. Anderson, Daniel R. Mandelker and A. Dan Tarlock, ***Environmental Protection: Law and Policy***, 2d ed. (Boston: Little Brown and Company, 1990), pp. 123-144.

[166] CARE Now, Inc. v. Federal Aviation Administration, 844 F.2d 1569 (11th 1990).

[167] Eagle Foundation, Inc. v. Dole, 813 F.2d 798 (7th Cir. 1990).

[168] Farmland Protection Policy Act, 7 U.S.C. Sec. 4201(b).

[169] Mandelker, ***NEPA Law*** and ***Litigation***, Sec. 219.

[170] Ibid., Sec. 5:15.

[171] Portland Cement Association v. Ruckelshaus, 486 F.2d 375 (D.C. Cir. 1973).

[172] People of Village of Gambell v. Hodel, 774 F.2d 1414 (9th Cir. 1985), reviewed on other grounds, 480 U.S. 531 (1987).

[173] 912 F.2d 1471 (D.C. Cir. 1990).

[174] 16 U.S.C. Sec. 797(e).

[175] Ibid., 1482-1483.

[176] For an explanation of this theory, see N. William Hines, "A Decade of Nondegradation Policy in Congress and the Courts: The Erratic Pursuit of Clean Air and Water," ***Iowa Law Review*** 62 (February 1977): 647.

[177] See Daniel R. Mandelker, ***Environment and Equity: A Regulatory Challenge*** (New York: McGraw Hill, 1981), pp. 64-66.

[178] Clean Air Act, Tit. IV, added by Pub. L. No. 101-549 (1990).

[179] Richard J. Lazarus, "The Neglected Question of Congressional Oversight of EPA ***Quis Custodiet Ipsos Custodes*** (Who Shall Watch the Watchers Themselves)," ***Law and Contemporary Problem*** 54 (1991): ***205*** (author concludes that poorly drafted and designed laws result from fragmentation in congressional committee jurisdictions).

[180] Judith A. Bearzi and William R. Wilkerson, "Accommodating Fish and Wildlife Interests under the FPA, *Natural Resources & **Environment*** 4 (Spring 1990): 20; Murray D. Feldman," National Wildlife Federation v. FERC and Washington State Department of Fisheries v. FERC: Federal Energy Regulatory Commission Ignores Ninth Circuit Rebuke on Hydropower Permitting," Ecology ***Law Quarterly*** 15 (1988): 19.

[181] H.R. 1113, Sec. 3, 101st Congress, 1st Session (1989) (expressly making NEPA applicable to independent regulatory agencies); H.R. Rep. No. 101-219, 101st Congress, 1st Session (1989) (making express reference to Federal Energy Regulatory Commission as included within Sec. 3).

[182] Peter Huber, "Electricity and the Environment: In Search of Regulatory Authority," ***Harvard Law Review*** 100 (March 1987): 1002.

[183] National Transportation Policy statement in U.S. Department of Transportation, "Moving America" (1990). Also, Federal Highway Administration, Environmental Policy Statement (1990).

> In the nineties, we will be forced to make increasingly difficult decisions about resource use. The quality of those decisions, as well as the ability to make them in a reasonably democratic society, requires the ability to compare consequences. Resource evaluation methods can provide this standard—but the methods and their application must meet the demands of the problems at hand.'

This chapter first outlines the types of information, assessment, and methods used in federal environmental decisionmaking, and, second, reviews other economic and analytical decisionmaking techniques that might be used.

Difficult choices—trade-offs—often must be made to minimize environmental impacts when providing for public works. Decisionmaking by engineers, scientists, designers, planners, and elected officials, and the environmental review of public works projects, requires two types of analysis:

1. ***An assessment of project alternatives*** that analyzes and presents economic, engineering, social, environmental, and other information about the alternatives; and

2. ***Decisionmaking: a selection of the preferred or "best" alternative*** based on an evaluation and ranking of project alternatives following decision rules, statutory or regulatory direction, legal case precedent, or best professional judgment.

The assessment organizes, analyzes, and discovers linkages between scientific, physical, ecological, economic, and social data. Evaluation uses the analysis to select the best project alternative based on a variety of decision criteria. In deciding which project alternative should be chosen, a financial/economic analysis is almost always required because projects are constrained by limited capital and operating budgets. Today, in addition, analysts and decisionmakers are expected not only to devise novel technological solutions and financing packages but to consider environmental, resource conservation, and social objectives in selecting project alternatives.

Project planners use different methods to analyze the effects of public works projects on economic, social, and environmental systems and to select a project alternative. Although each analytical method has advantages and limitations, the methods are, in general, well developed. The question for this study is how these techniques are used in federal environmental decisionmaking.

Analytical Techniques Used to Inform the Decision Process

Economic, risk, engineering, systems, environmental, and other analyses can help with these decisions by providing information on the pros and cons of particular courses of action, eliminating inefficient alternatives and alternatives with unacceptable social impacts, costs, and risks. The tools and methods include architectural-engineering principles; a variety of financial and economic analyses; systems, input-output, optimization, and matrix analyses; and water hydrology, pollution transport, habitat, wetland, ecosystem, and population models.

The methods used to rank project alternatives and to guide the selection of the "best" alternative include the following:

- ***Environmental regulations that constrain the alternatives.*** Governments, through legislation and regulations, may specify actions that may or may not be taken (air and wastewater emissions standards and protection of wetlands, endangered species, or historic buildings). The public works project alternatives are then evaluated within the guidelines set by the environmental regulations, and project options are eliminated or redesigned to conform with the regulations.

- ***Benefit-cost,*** net benefit, or economic optimization analyses that put the costs and benefits of each alternative in monetary terms, including monetary estimates of the nonpecuniary environmental values, thereby reducing all criteria or objectives to one measurable criterion (efficiency) expressed in monetary terms.

- ***Multiple objective analysis,*** by which economic effects are compared to or weighed along with other decision criteria (presented in quantitative and qualitative terms), such as environmental quality, income distribution, social/cultural effects, and regional development.

- ***Best professional or government agency judgment*** based on a variety of data and information inputs, which may include regulations; policy; economic, engineering, scientific, and environmental analyses; and legal case precedents.

The applicability and appropriateness of using these methods to evaluate the environmental effects of public works projects is discussed below.

Some federal environmental laws and agency practices involve a balancing process (e.g., the ***National Environmental Policy Act*** and the ***Toxic Substances Control Act);*** others evaluate a project against a biological imperative or environmental constraint (e.g., air and water emissions, Section **404** of the ***Clean Water Act*** for wetlands, and endangered species). A public works project applicant may face different federal environmental decisionmaking criteria for different permits and reviews. Are federal environmental decisionmaking criteria inconsistent? Or do different types of environmental issues require different types of criteria? **Is** a more consistent approach possible, feasible, and desirable from the perspective of the public works applicant? Some of this report's recommendations address these questions.

Environmental protection also presents special decisionmaking and valuation issues. First, although *economic* analysis is typically based on valuing alternatives in terms of goods and services that have market prices, many environmental goods and services are not expressed in terms of market prices. It's an "apples and oranges" problem. Second, economic criteria are not the only ones used in environmental decisionmaking. Environmental and ***social*** criteria may be difficult to compare to economic criteria. Third, describing ecosystem functions and measuring environmental impacts pose difficulties due to imprecise data and the nature of ecosystems (dynamics, irreversibility thresholds, cumulative impacts, feedbacks). The challenge is to devise workable and acceptable decision methods to account for environmental values and for potential trade-offs between the benefits of public works projects and the costs of the environmental impacts.

TYPES OF ASSESSMENT AND DECISION METHODS USED

Different types of economic and analytical assessment and evaluation methods are required by federal law, regulations, and court decisions to be used in the federal review of the environmental effects of public works projects. The methods can be divided into assessment and evaluation or decisionmaking categories.

Assessment includes information and analysis to inform the decisionmaking process, such as that presented in an environmental impact statement (EIS). For a federal environmental review or permit, information and data are gathered and analyzed to determine if a project meets or is subject to permit criteria or guidelines mandated by federal regulations (e.g., physical, biological, engineering, or other environmental standards or wetlands definitions/impacts).

Decision methods include those that rank project alternatives, determine acceptance or rejection of the project based on environmental criteria, and/or balance competing policies or criteria (e.g., by use of multiple objective methods or best professional judgment).

The assessment and decision methods and criteria used in several major federal environmental programs are summarized in the following subsections by statute and in Table 2-1 (the types of public works likely to be affected by each method are listed in the right column). Most federal environmental permit and review decisions are based on some combination of comparing project effects against environmental standards, best professional judgment, agency policies, case precedents, and some sort of economic impact or cost-effectiveness analysis. Few if any federal environmental decisions concerning state and local public works projects are based on information marshalled into a format that ranks project alternatives by a single decision criteria, such as net economic benefits.

The *National Environmental Policy Act* and the Environmental Impact Statement

All major public works projects are likely to require the completion of an environmental impact statement (EIS), as outlined in NEPA and subsequent regulations issued by the Council on Environmental Quality (CEQ), to bring together, coordinate, and review the environmental effects of alternative ways of meeting human needs targeted by a proposed project that may have significant environmental effects. "The NEPA process is intended to help public officials make decisions that are based on understanding **of** environmental consequences, and take actions that protect, restore, and enhance the environment."[2] The EIS is an informational document intended to "provide full and fair discussion of significant environmental impacts and . . . inform decision makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts."[3] Therefore, EIS findings are not binding: project approval or rejection decisions are made **by** federal agencies in the permit and program funding reviews.

In many respects, an **EIS** goes beyond informing to shape the nature of the decision process by:

- ***Raising issues,*** exploring alternatives including those that minimize environmental impacts and the "no project" alternative, and outlining mitigation measures;

Table 2-1

Federal Environmental Decision Criteria

Legislation and Program	Decisionmaking Agency	Type of Action	Decision Criteria	Public Works Affected
National Environmental Policy Act	All	EIS	EIS is an informational document. EIS influences decisions by identifying environmental impacts of alternatives, recommending mitigation measures, and including public comments.	All
Clean Water Act Section 404 Wetlands Protections	Corps of Engineers and a few states	Permit	(1) Screening exercise to determine least damaging alternative (based on biological, environmental, social, economic, and other criteria) and effect of federal, state, and local laws on alternatives; (2) public interest review to balance benefits of the project against damage to wetlands based on public response, Corps of Engineers best professional judgment, and case precedents.	All
Clean Water Act Section 404 Wetlands Protections	EPA	Veto	Unacceptable project is defined by EPA on a case-bycase basis and includes a screening exercise similar to 404 permit process.	All
Clean Water Act NPDES Pollution Abatement	EPA or state agency	Permit	Permit based on federal engineering and effluent standards (BPT, BAT, or stormwater guidelines) and on state water quality-based effluent standards. Economic and other analyses used to determine standards but not individual permits.	Sewage treatment, stormwater
Clean Air Act (point source discharges)	EPA, state or local agency	Permit	Permits based on BPT/BAT engineering and effluent standards. Similar to *Clean Water* Act.	Highways, sewage treatment
Electric Consumers Protection Act/ Federal Power Act	FERC	License	License decision should give equal consideration to power and non-power values including energy conservation, fish and wildlife, and recreation. Decisions based on FERC staff best professional judgment and case precedents.	Dams, energy, water resources
Endangered Species Act	FWS/NMFS	Review of permits and funding	Biological determination as to whether project jeopardizes species or habitat. Data collected by various agencies as part of EIS, 404 permit, FERC license, DOT funding review, or other federal review. Reviewed by FWS or NMFS. FWS or NMFS decision can be appealed to interagency federal review board, which can weigh biological and economic impacts.	All
Department of Transportation Act (Section 4(f))	DOT (e.g., FHWA, FAA)	Review of funding	Section 4(f) includes specific provisions to protect parks, recreation areas, wildlife refuges, and historic sites. Project may not "significantly affect" these areas.	Transportation
National Historic Preservation Act	Federal agencies	Review of permits and funding	Federal agencies must consider project impacts on historical, cultural, architectural, and archaeological resources and take measures to protect them.	All

Significant Environmental Impact

As interpreted by CEQ regulations and case law, major federal actions include a wide range of actions, more than the construction projects most commonly associated with NEPA compliance. The question of what is "significant," thus making EIS preparation necessary, has been the most frequent reason for NEPA litigation. CEQ regulations do not define what is significant; rather they provide a discussion of facts that should be considered by each agency, including the societal and environmental "context" and the "intensity" or degree to which proposed action affects health and safety and environmental resources.

Source: Dinah Bear, "NEPA at 19: Primer on an 'Old' law with Solutions to New Problems," *Environmntal Law Reporter* **19 (February 1989): 10063.**

- ***Involving citizens*** in the formulation and review of the EIS; and
- ***Increasing the time and cost*** required to initiate a public works project (some cost millions of dollars and on average take a year to complete).

Therefore, the factors that trigger the EIS requirement or allow for the simpler environmental assessment (EA), which does not require public participation or extensive analysis, become important. ***An*** EIS is applied to "major federal action significantly affecting the quality of the human environment" (NEPA Section **102).** The definition of "significant" becomes important. A dam or new airport almost always has "significant environmental impacts." In other cases, the definition is not clear-cut. For example, the purchase **of 25** Boston railroad cars by a new Northern Virginia commuter rail line may require the completion of an EIS because the Boston cars are partially owned by the Federal Transit Administration.[4] The commuter railway officials argue that their operation would have a minimal impact on the environment because the line would run on tracks used by Amtrak and freight railroads, but proving their contention could take **18** months to three years of study.

An environmental impact statement (EIS) must include the following:

(1) The environmental impact of the proposed action;

(2) Any adverse environmental effects that cannot be avoided should the proposal be implemented;

(3) Alternatives to the proposed action;

(4) The relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity; and

(5) Any irreversible and irretrievable commitments of resources that would be involved in the proposed action should it be implemented.

Source: *National Environmental Policy Act,* **Sec. 102(C).**

An EIS typically includes a description of the affected environment (e.g., land uses, socioeconomic characteristics, air and water quality, floodplains, biotic communities, farmland, and historic sites) and the environmental consequences of various alternatives. ***An*** **EIS** may also outline mitigation measures for noise, wetland, and construction impacts. For example, a recent EIS for expansion of the Dallas/Fort Worth airport compared runway expansion alternatives in terms of effects on noise; land use; social; economic; air and water quality; historic, architectural, archaeological, and cultural resources; biotic communities; endangered and threatened fauna; wetlands; floodplains; farmlands; energy supply and natural resources; solid waste; and construction impacts.'

According to CEQ regulations, an EIS may include a formal benefit-cost analysis in an appendix, but few are reported to do so.[6] In general, economic analyses in an EIS are in the form of impact analysis with elements similar to "regulatory impact analysis" practiced by EPA and "urban and community impact analysis" practiced by federal agencies in the **1970s** and **1980s.**

NEPA requires that a preliminary analysis called an "environmental assessment" (EA) be conducted for all major federal projects to determine if the proposed action may involve a significant impact on the environment. In that case, a full EIS **is** required. The EA briefly considers the environmental factors included in an EIS. An EA is followed either by a "Finding of No Significant Impact" (FONSI) or a decision to prepare an EIS. The **U.S.** Army **Corps** of Engineers, for example, prepares approximately **13,000 EAs** per year, most of which do not lead to a full EIS; in **1990,** the Corps started **13** statements, had **44** pending, and filed **9.**[7]

Another NEPA requirement is that at the time **of** decision about a project, each agency must prepare a public "record of decision." This record states the decision, identifies the alternatives considered, specifies which alternatives were considered to be environmentally preferable, and discusses factors that were balanced by the

EIS Benefits at EPA

In **1980,** an EPA report entitled "Evaluation of EPA's EIS Program for Wastewater Treatment Facilities'' presented the results of a study of the effects of NEPA on EPA's programs. The report also examined **58** statements prepared in the ten EPA regional offices, most of which were related to the grants that EPA provides for construction of wastewater treatment facilities. The study found that EIS preparation was effective in **(1)** causing major changes in projects, (2) providing more protection for the environment, **(3)** improving opportunities for public participation in the decisionmaking process, and **(4)** producing cost savings as a result of project changes prompted by the **EIS.** More recent **EPA** studies of the benefits derived from the NEPA process confirm the results of the **1980** study. Findings of the EPA studies are presented in CEQ's Twentieth Annual Report **(1990),** pp. **31-37.**

decisionmaker. The decision record also should state whether all practical methods to avoid or minimize environmental harm are being adopted.*

Although it is a question often asked of CEQ, very little work has been done on comparing the costs and benefits of undertaking an EIS.[9] A general answer is that "an ounce of prevention is worth a pound of cure." The preparation of an EIS has become relatively "routine." However, an EIS can be expensive to prepare. If EIS and other federal environmental decision processes are integrated, the duplication of data gathering and analysis is avoided and the costs of the EIS and the decision process are minimized. In its annual reports, CEQ has documented the environmental, cost-saving, and public participation benefits engendered by an EIS.

Permit and License Review and Decisions

Many state and local public works projects must obtain one or more federal environmental permits concerning wetlands impacts, air and water discharges, or dam construction. While an EIS may delay a project and add to the costs, the permit decision either allows a project to proceed or stops it. The following subsections review the criteria used in permit decisions.

Section 404 of the *Clean Water Act:* Wetlands

Almost every major road project, dam, airport, power plant, and sewage treatment plant is likely to affect wetlands. The U.S. Army Corps of Engineers (or the state government in a handful of states that have received permission to administer the program) writes 11,000 Section **404** dredge-and-fill permits per year. Some of these permits are for public works projects. The **404** permit generally is the most time-consuming and costly permit that must be obtained for a highway project, in part because it is combined with endangered species and other federal requirements.[10] The importance of Section **404** permits to highway projects is underscored by the Federal Highway Administration's (FHWA) efforts to coordinate project reviews with the Corps of Engineers. FHWA's report ***Applying the Section 404 Permit Process to Federal-Aid Highway Projects*** outlines techniques to coordinate and process permit and review requirements of FHWA, the Corps, EPA, the Fish and Wildlife Service (FWS), National Marine Fisheries Service (NMFS), and state and local governments.[11]

Evaluation of a Section **404** permit is a two-part test:

1. To determine whether the project complies with the Section 404(b)(1) guidelines defined by EPA (33 CFR 320.4(b)(4)) and
2. To provide a public interest review conducted by the Corps of Engineers.

The guidelines center around requirements that a proposed action not have an unacceptable adverse impact on the aquatic ecosystem, especially wetlands. No permit can be granted if there is a practicable alternative with less adverse impact on the environment or if the action would violate other applicable laws, such as state water quality standards and the ***Endangered Species Act.*** The Corps of Engineers' public interest review is a balancing test in which the public and private benefits of a project are weighed against its adverse impacts to the environment.

Section 404(b)(1) Guidelines

"No permit shall be granted which involves the alteration of wetlands identified as important . . . unless the district engineer concludes on the basis of the analysis required in paragraph (a) of this section, that the benefits of the proposed alteration outweigh the damage to the wetlands resource. In evaluating whether a particular discharge activity should be permitted, the district engineer shall apply the section 404(b)(1) guidelines (40 CFR Part 230, 10(a)(1), (2), (3)."

Paragraph (a) simply lists relevant factors, such as conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain Values, land use, navigation, erosion, recreation, water supply and quality, energy needs, safety, food production, and the needs and welfare of the people.

In practice, there is no single method or criteria used by Corps for determining whether to grant a **404** permit. The decisions are based on a screening exercise, a process of elimination—finding the least damaging alternative; finding the alternative that does not violate federal, state, and local laws; successively examining the rules of each applicable regulation or law; and submitting project alternatives to the public interest review. The public interest review includes the public response to a proposed project, best professional judgment by the Corps, and precedent.[12] The balancing of benefits and environmental impacts is not undertaken with a formal method like benefit-cost or the so-called ***Principles and Guidelines*** used in deciding the fate of other federal water projects.

The Corps of Engineers and other federal agencies use a variety of tools, application procedures, manuals, and guidelines in their Section **404** evaluations. Environmental and biological criteria and wetlands models help define whether a proposed project affects wetlands and potential wetlands.

Under the authority of Section 404(c), EPA may prohibit, withdraw, or restrict ("veto") the discharge of dredged or fill material into the waters of the United States if the discharge would have unacceptable adverse effects on water supplies, shellfish, fisheries, wildlife, and

Wetlands Models and Evaluation Methods

- Federal Manual for Identifying and Delineating Jurisdictional Wetlands
- HECII
- Wetland Evaluation Technique (WET) 2.0
- USFWS Habitat Evaluation Procedure

recreational areas. "Unacceptable" is defined by EPA and includes a screening exercise similar to that used by the *Corps* of Engineers in 404 decisions.

Wastewater and Stormwater Discharge Permits: NPDES

Federal National Pollution Discharge Elimination System (NPDES) wastewater permits are required under the *Clean Water Act* for several types of public works, including municipal sewage treatment plants, power plants, and urban stormwater discharges. The permits are based on federal engineering and technology-based effluent standards for "point-source" discharges and on engineering standards for stormwater structures. The point-source standards were formulated by EPA after it examined the technological measures available to control, reduce, or treat the effluents: best practicable technology (BPT) and, for toxic substances, best available technology economically achievable (BAT).[13] Permit applications require information about the type and composition of the effluent and the production process. In addition, point-source discharges are subject to state water quality-based standards that reflect the uses of the waterway receiving the effluent (standards that must follow federal guidelines and are subject to federal review).[14]

Permit requirements for stormwater discharges include engineering and environmental standards for construction site controls, revegetation requirements, domestic waste recycling programs for toxic products and oil, regulation of domestic application of fertilizers, pesticides, and herbicides, controls for highway runoff, retention, detention, and infiltration systems.[15] Final EPA stormwater regulations promulgated in 1990 will affect 173 cities and 47 counties (cities and counties with populations greater than 100,000).

Economic or social analyses are not conducted before issuing NPDES permits. However, EPA undertook economic or regulatory impact analyses of each BPT and BAT regulation by major industrial and municipal discharge category to assess alternative standards.[16] In addition, EPA is working on potential applications of economic analysis methods that states might use to formulate state water quality-based guidelines." Section 401 of the *Clean Water Act* also requires a certification that the discharge associated with the activities of applicants for federal licenses or permits meets relevant provisions of the law. This includes an anti-degradation policy[18] requiring that water quality be maintained unless the state finds that lowering quality is necessary to allow "important" social or economic development. Decision rules to judge what is "important" to social or economic development are not defined. However, if degradation occurs, water quality must be maintained to protect existing uses.

Air Quality Permits

Federal air quality permits, many of which are administered by state governments, are required for fossil fuel power plants, sewage treatment plants, and some highway construction projects. The *Clean Air Act* requires state and local governments to control air pollution discharges within their jurisdictions so that the maximum concentration of common air pollutants in their jurisdiction meets federal national air quality standards. New highway projects, for example, must be consistent with a state's air quality implementation plan (designed to meet the national standards or nonattainment standards). If the highway project does not conform because too much air pollution will be emitted by the increased traffic, then the project must be redesigned or halted.

Permits for stationary point sources of air pollution are based on best-technology standards similar to wastewater discharge standards. Cost impact and benefit-cost analyses were used by EPA in drafting several air quality standards.[19]

Federal Energy Regulatory Commission licensing

The *Electric Consumers Protection Act of 1986* amended the *Federal Power Act* by specifying that the Federal Energy Regulatory Commission (FERC) should give equal consideration to nonpower values (e.g., energy consemation, fish, wildlife, and recreation) as well as to power values when making license decisions for dams (including state and local power and water development projects). The law and FERC regulations do not define how to provide equal consideration because each case is unique, complex, and fact-specific.[20] FERC's licensing decisions are based on the best professional judgment of its staff after gathering all evidence of engineering, economic, environmental, and mitigation factors (including an EA or an EIS) and reviewing case precedents.[21] Recent FERC cases detail the considerations included in licensing decisions.[22] Although benefit-cost analysis has not been applied by FERC when relicensing nonfederal hydro project~the commission is considering combining benefit-cost analysis with "decision analysis" (adding probability distribution ranges to monetary estimates of nonpecuniary environmental values) developed by the Electric Power Research Institute.[24]

Environmental Reviews

In addition to obtaining federal permits, many public works projects must be reviewed and approved by one or more federal agencies if the project receives federal funds, jeopardizes endangered species, or affects historic, cultural, or archaeological sites.

Endangered Species

The *Endangered Species Act* requires every federal agency to ensure that any action that it authorizes, funds, or carries out is not likely to jeopardize the continued existence of listed endangered species or the destruction or adverse modification of critical habitat.[25] This requirement applies to all state and local public works projects that must obtain one or more federal permits or approvals. Endangered species can affect a number of major public works projects in an area. For example, protection of habitat for the California least tern, an endangered species,

California least Tern

Construction was well under way on an $18 million ocean outfall booster pump station for the County Sanitation Districts of Orange County, California, when a representative from the California Department of Fish and Game noticed that groundwater from a tidewater operation was leaking into an estuary adjacent to the construction site. The estuary is a nesting area for the California least tern, an endangered species. Favorite nesting areas of the least tern are the wetlands and estuaries near the mouth of the Santa Ana River, a flood control channel. To ensure that the tern's habitat is not adversely affected, a $4.2 million Talbert Channel Outlet Mitigation Plan was designed with the participation of local citizens' groups and federal agencies. Mitigation includes lowering parking lot lighting at a nearby beach near nesting sites and installation of tern predator control devices around the construction site. This area is the focus of several large-scale projects that must consider the California least tern: the Army Corps of Engineers is widening the Santa Ana River; CALTRANS is widening the Pacific Coast Highway where it crosses the river's outlet; the County Sanitation District of Orange County is installing a 120-inch pipeline adjacent to the river; and the Orange County Environmental Management Agency is relocating the Talbert Flood Control Channel outlet from its Santa Ana River outlet to a position north of the river.

must be considered by coastal public works projects in Orange County, California.

The federal agencies enter into early consultation with the **U.S.** Fish and Wildlife Service or the National Marine Fisheries Service to determine whether the action is likely to jeopardize endangered species. Biological assessments are required if listed species or critical habitat may be present in the area affected by any major construction activity. If a federal agency disagrees with the biological opinion of FWS or NMFS, the agency may appeal to a committee of senior federal officials for an exemption. This appeal committee, dubbed the "God Squad" by some pundits, can make an exemption when overriding economic interests are present.[26]

DOT Environmental Review Guidelines

Public works projects, such as highways and airports, that seek federal funding from the Department of Transportation (DOT) and its agencies, such as the Federal Highway Administration (FHWA) and the Federal Aviation Administration (FAA), are subject to DOT environmental review guidelines. Section 4(f) of the ***Department of Transportation Act of 1966*** as amended, includes specific provisions providing protection to public parks, recreational areas, wildlife, and waterfowl refuges, and all historic sites. Land from one of these special areas may not be used unless there is no feasible and prudent alternative, and the action includes all possible planning to minimize harm to the property resulting from the use. The courts "construing the term 'use' under section 4(f) have focused on whether the proposed project actually takes or significantly adversely affects the site in question."[27] The EIS/EA process has been integrated by DOT agencies into their project funding review process as a way of considering a range of objectives and criteria.[28]

Historic Preservation

As part of a federal environmental permit or funding approval, public works projects must meet the requirements of Section 106 of the ***National Historic Preservation Act.*** Regulations promulgated by the Advisory Council on Historic Preservation require that the effects of federal decisions on sites, structure, or objects of national importance be taken into account.

Economic and Analytical Techniques that Might Be used in Decisionmaking

This section reviews analytical and decision methods that could be included in federal environmental decisionmaking to balance public works and environmental objectives. These methods have been recommended by think tanks (such as Resources for the Future), academics, and EPA's Science Advisory Board, and in reports commissioned by federal agencies and international organizations. Some of these methods, such as economic and risk analysis, are used by some federal, state, and local agencies to address development and environmental protection; the methods could be adapted for public works reviews. Other techniques, such as multiple objective analysis or value engineering, are not in wide use but could improve public works environmental decisionmaking if used in conjunction with other methods. The methods reviewed in this section include economic analysis, multiple objective analysis, sustainable development evaluation, risk analysis, social impact analysis, and value engineering.

Several practical considerations that apply to all of these decisionmaking methods are important in designing and selecting an evaluation method: the nature and complexity of the evaluation problem; the identity of the decisionmakers and the budget, time, and staff resources available to them; and the data requirements of the method. An increase in the complexity of the evaluation methods used will increase the data needs, and, up to a point, the understanding of the problem. Models that are overly complex, however, may confuse the decisionmakers and public, stray from the analytical questions, and become too costly to execute.[29]

The acceptance of analysis by affected citizens also must be considered. Legislators and public officials struggle to find a balance between laws and regulations that dictate decision methods with little flexibility and more flexible decision methods allowing administrative discretion but generating decisions that may appear arbitrary. Public opinion polls show a steady erosion of faith in experts.[30] This means that economic and other analyses are met by skepticism in some quarters because they depend on expert opinion or findings that may be poorly understood or are simply not accepted by those who deal

in absolutes. In addition, some will focus on monetary figures in an analysis and miss the qualitative information presented—numbers can be taken out of context to support preferred policies.

Economic Analysis

In deciding which public works project alternative should be chosen, an economic analysis is almost always required because projects are constrained by limited budgets. The economic analysis may be used to compare alternatives, eliminate those that are not cost effective, and estimate the benefits or effects on the economy. One of the virtues of economics is its focus on what are called opportunity costs, on scarcity, i.e., what society must give up in the form of other desirable things in order to pursue a desired goal such as reduced environmental risk/impact. An economic perspective on costs provides valuable insights about the nature and magnitude of these forgone opportunities. Like other methods, economic analysis has limitations. For example, it leaves out or has difficulty including some aspects of public works projects, such as distributional impacts and environmental values, that might be better covered by other types of analysis. Also, because there are many techniques for valuing benefits and costs, especially nonpecuniary ones, all of which invariably produce different outcomes, none is able to resolve conflicts between interest groups over the "best" project alternative. However, economic techniques at least make people ask perceptive questions and think more coherently—even if the questions do not always receive firm answers. Economic analysis was never intended to be the exclusive basis for decisionmaking; rather, it is one way to guide, inform, and support decisionmaking. Practitioners argue that it should be used in conjunction with other decision tools, such as environmental, social, and risk criteria; engineering; and input-output, systems, optimization, econometric, risk, cost-effectiveness, regional development, fiscal, and multiple objective analysis.

In applying economic analysis to public works projects, economists distinguish between three general types of analysis:

- ***Cost or economic impact analysis*** estimates the cost or monetary loss of those affected by a project (e.g., loss of employment, plant closings, profitability, lost revenues) and/or the increased economic activity generated by a project.
- ***Cost-effectiveness analysis*** identifies the least costly way to accomplish a particular project objective.
- ***Benefit-cost analysis*** derives the net economic benefits or ratio of benefits to costs of a project or project alternatives.[31]

Using economics to inform decisionmakers about the cost impacts or cost-effectiveness of different options is relatively straightforward. The analytical assumptions become more complicated when benefit-cost analysis is used to answer nonnative questions about what we ought to do, such as deciding which public works option is the "best." If we pursue a particular project alternative, what good will come of it and what will we have to sacrifice to get it? It is a simple extension to ask whether the former is worth the latter.

Economic Impacts and Net Benefits

The difference between cost impact and benefit-cost analysis also can be explained as the difference between economic impact and economic value (net economic benefits). For example, the economic impact of opening the striped bass fishery to recreational fishermen can be measured by the economic activity generated by the fishing: anglers' expenditures for bait, tackle, food, fuel, charter boat, and the multiplier effects of these expenditures. The economic value is the net economic benefit of recreational fishing: the gross amount that fishermen are willing to pay to catch striped bass (measured by some combination of market prices and survey techniques) minus the costs of catching the fish. A similar analysis can be conducted for commercial fishermen. It would be incorrect to make policy decisions based solely on either approach. Economic or cost impact does not indicate whether the impact is good or bad, while a net benefits analysis reduces the decision to the criteria of economic efficiency and may leave out important social and environmental criteria.

Use of Economic Analysis in Federal Environmental Decisionmaking

Although net benefit analysis can clarify the pros and cons of taking particular actions, it has not been applied generally as a key decision criteria in the federal environmental regulatory process for permits, licenses, and environmental review (veto decisions) for state and local public works projects. As described earlier, wetlands permits, FERC licensing, DOT environmental reviews, and endangered species decisions can include economic considerations, but not in any formal, normative, or consistent format. Advocates of economic analysis argue that economic methods, especially net benefit analysis, could be used more widely and consistently in federal environmental decisionmaking. Economic analysis is used in a variety of federal environmental programs, and these techniques could be adapted for environmental decisionmaking concerning public works projects. Many of the uses of economic analysis in federal environmental programs are listed in Table 2-2. In addition, several applications of economic analysis to public works projects are outlined below: benefit-cost and risk-benefit analysis of the health effects of toxics in the ***Toxic Substances Control Act of 1976*** and the ***Federal Insecticide, Fungicide, and Rodenticide Act of 1972***, regulatory impact analyses of EPA programs, and natural resource damage assessments.

The ***Principles and Guidelines*** project evaluation methodology, used by all federal agencies that administer federal water projects, is described in greater detail in the

Table 2-2
Use of Economic Analysis in Federal Environmental Programs

Legislation and Program	Agency	Type of Action	Notes
National Environmental Policy Act	Federal Agencies	EIS	Economic and regional economic impacts of project alternatives listed in an EIS; benefit-cost analysis may be included as an appendix.
Clean Water Act Section 404 Wetlands Protections	corps of Engineers	Permit	Economic impacts considered in screening process. Economic benefits weighed against wetlands impacts in public interest review (no formal method).
Clean Water Act NPDES Pollution Abatement	EPA	Regulations	Economic and regulatory impact and cost effectivenessused to evaluate regulatory options in formulating regulations.
Clean Air Act	EPA	Regulations	Economic and regulatory impact, cost effectiveness, and benefitcost analysis used to evaluate various regulatory options.
Electric Consumers Protection Act	FERC	License	Economic analysis enters licensing decision, but no formal or consistent method.
Endangered Species Act	FWS/NMFS	Review of permit and funding	Interagency federal appeal committee may weigh economic and biological considerations, but no formal methods.
Water Resources Principles and Guidelines	All federal water agencies	Review of federal water projects	Multiple objective analysis, including a benefit-cost analysis and determination of project alternative that maximized net national economic benefits.
Toxic Substances Control Act and Federal Insecticide, Fungicide, and Rodenticide Act	EPA	Licensing	Benefit-cost and risk-benefit analyses.
Safe Drinking Water Act	EPA	Drinking water regulations	The maximum contaminant level is based on health effects, taking into account technology, treatment, and cost considerations.
Resource Conservation and Recovery Act	EPA	Solid waste regulations	Rulemaking based on protecting human health and environment, but EPA considers cost effectiveness in choosing among alternatives.
Comprehensive Environmental Response, Compensation, and Liability Act	EPA	Remedial action measures for hazardous substances	Like RCRA, EPA considers cost-effectiveness.
Comprehensive Environmental Response, Compensation, and Liability Act	Interior, Commerce	Damage assessment	Cost impacts, including lost net economic benefits and array of estimated (non-monetary) environmental values.
Fish and Wildlife Service Habitat Management Plans	FWS	Habitat management plans	May include benefitcost and cost effectiveness.
National Marine Fisheries Service Economic Valuation Guidelines	NMFS	Economic valuation guidelines for recreational fishing	Estimating techniques for environmental values.

Flood Control Act of 1933

All of these applications of economic and benefit-cost analysis in federal programs start with the ***Flood Control Act of 1933*** (amended in 1936), which states that the government would undertake public works on rivers and harbors "if the benefits to whomsoever they may accrue are in excess of the estimated costs, and if the lives and social security of people are otherwise adversely affected (Section 1), the legislation compelled government agencies to make "explicit estimates of the gains and losses to be expected from their proposals."

section on multiple objective analysis below. Other applications of economic analysis in federal environmental programs include the Fish and Wildlife Service's Habitat Management Plans, which require benefit-cost, cost effectiveness, and other economic analyses, and the National Marine Fisheries Service guidelines on economic valuation of marine recreational fishing.

TSCA and FIFRA. EPA considers many aspects of benefit-cost analysis in establishing rules under the ***Toxic Substances Control Act*** (TSCA) and the ***Federal Insecticide, Fungicide, and Rodenticide Act*** (FIFRA). The language in TSCA calls for consideration of health and environmental effects as well as economic consequences:

> (a) the effects. . . on health and the magnitude of exposure to human beings. . . , (b) the effects. . . on the environment and the magnitude of the exposure of the environment. . . , (c) the benefits of such substance or mixture for various uses and the availability of substitutes for such uses, and (d) the reasonably ascertainable economic consequences of the rule, after consideration of the effects on the national economy, small business, technological innovation, the environment, and public health.[32]

Regulatory Impact Analyses. Executive Order 12291 requires that EPA conduct a regulatory impact analysis (RIA) or economic impact analyses (EIA) for any major new federal regulations with impacts in excess of $100 million annually. For example, EPA has conducted RIAs or EIAs for discharge regulations issued under the ***Clean Water Act*** and ***Clean Air Act.*** EPA's practitioners of economic analysis argue that such analysis often results in regulatory improvements worth many times its costs.[33] In addition, they contend that the analyses have at times led to more efficient regulations by showing how more stringent alternatives would bring about a greater reduction in pollution without a commensurate increase in costs. In two instances (lead in fuels and small-quantity generators), this led to the adoption of regulations that were more stringent than originally contemplated. At other times, the analysis showed that the costs of more stringent regulations would be disproportional to the expected benefits (e.g., used oil, TSCA premanufacture review, and FIFRA data requirements).

Damage Assessments under CERCLA. Damage assessments under the ***Comprehensive Environmental Response, Compensation and Liability Act*** (CERCLA) are relatively new applications of net benefit-cost analysis and economic methods for valuing environmental resources.[34] The stakes are high: monetary estimates of damage based on studies conducted by physical scientists, biologists, and economists will be used in determining court-mandated payments or out-of-court settlements for injuries from oil spills and other natural resources damage events. Assessing such values may have been strengthened by a federal court ruling in July 1989 in a case filed against the Department of the Interior by environmental groups.[35] The court found that polluters who dump oil or toxic chemicals must restore the environment to its original condition. If that is not possible, they have to pay compensation for the total value of the damages—including the loss of nonmarket benefits. The natural resources damage assessment methodologies will also help define which net benefit methodologies will stand up to the rules of evidence in a court of law. Environmental values will figure in court cases and in settlement of cases, and their worth is becoming increasingly important. For example, Exxon Corporation and the state of Alaska have been assessing the damage to wildlife and recreational users in Prince William Sound as they manage the settlement of their case and move forward to restore the damaged environment.

Estimating Nonmonetary Costs and Benefits

Because environmental or public goods and services, such as clean water and air, are unpriced in traditional economic markets, they can easily be undervalued in or left out of economic analyses. During the past 20 years, economists and ecologists have grappled with the question of how to value environmental resources that have no market price and how to bring environmental values into a net benefits analysis by estimating their monetary value. Decisionmakers must somehow assess and compare economic, environmental, social, and other criteria. Inclusion of environmental values in a decisionmaking process can be accomplished in a variety of ways. Analysts have attempted to account for nonpecuniary values, impacts, and goals within an economic analysis and by combining, comparing, and weighing economic, ecological, social, physical, and other criteria. Benefit-cost analysis is an example of the first approach; different types of multiple objective, systems, and matrix analysis are examples of the second. Probability, risk, and uncertainty components, as well as best professional judgment, can be added to most approaches: However, even if extensive environmental impact data can be obtained to assist in the evaluation of alternative project proposals, valuation difficulties confront decisionmakers. *An* example demonstrates the unit-of-measure problem inherent in valuation for decisionmaking:

> If a wetlands dredging project produces environmental disturbances . . . can these biological effects be described on an economic (quantitative) basis? If such quantification is not feasible, one is left with a summary similar to, "Dredging of the proposed shipping channel will result in

some loss of benthic organisms, local fish populations, and 100 acres of wetlands." In an EIS, such a conclusion could be weighed against such possible facts as, "The new shipping channel will generate $25 million of new business for the local port city and adjacent counties. Commercial fishing boats will have easier access to the Ocean and save $1.1 million per year in fuel costs. Also the deeper channel will decrease grounding and shoaling by 80%, which last year, resulted in $1.9 million in lost revenues and damages to shippers and recreational boaters." ... The fact remains that where biological effects are compared to economic impacts on an unequal basis, the outcome favors economics. Most people, especially government and industry leaders who will be making the environmental decisions, can more readily grasp the meaning of a $10 million increase in business than a 25% reduction in primary productivity.[36]

Economists have developed techniques for estimating the values of unpriced resource services.[37] Some of the methods devised to estimate the market value of environmental goods and services are straightforward. Others may be costly, inaccurate, unsuitable, or even farfetched. Some values simply cannot be quantified. Some of these methods are used regularly in federal water project analysis following the Principles and Guidelines method, in TSCA and FIFRA benefit-cost and risk-benefit analyses, and in natural resource damage assessments. Inevitably, value judgments may be involved in the choice as well as in the use of decision criteria. Social beliefs, values, ethics, politics, customs, and cultural values help shape our laws and regulations and the decisionmaking methods employed by public officials.

Including environmental values in decisionmaking by one or more of the methods listed above frequently will affect the ranking of project alternatives. A water resources example indicates the policy implications:

Methods for Estimating Environmental Values

A hierarchy of approaches for estimating environmental values in rough decreasing order of reliance on market process includes:

> The use of market prices of goods and supported by environmental factors; valuation of the economic costs imposed by environmental degradation; use of marketable goods and services as substitutes for environmental (including property values); restoration costs; survey techniques (e.g., travel cost and contingent valuation methods using techniques from marketing and psychological research); and techniques for weighing the estimated values relative to other values. Another approach is energy analysis that quantifies the values of an ecosystem using the energy captured by the ecosystem (not human utility) as a basis of value.

Use and Nonuse Values

To analyze these questions, economists distinguish between two types of values that people hold for nonmarket or environmental resources, termed "use" and "nonuse" values. Use values are the direct effects of an environmental resource—the value derived from the consumption of the good (e.g., the value of a day of fishing). Nonuse value refers to the value derived from the knowledge of the existence of the good (option, value, existence, and bequest value). Measuring use values can be difficult, but real data can be measured: people pay to visit national parks; comparing the prices of similar houses in quiet and noisy streets gives some guide to the value of calm. A polluted river will discourage fishing and swimming, and the value of the lost recreational opportunities can be estimated. The loss to fisheries following an oil spill can be quantified once scientific studies establish the relationship between the spilled oil and the harvest rates of commercial species of fish. Nonuse values include those people might put on the "option" of using an environmental resource or the pleasure they might derive from the mere "existence" of the Grand Canyon or clean air in Los Angeles. The only way to value these is to ask people how much they would be willing to pay, for an improvement in air quality or the protection of an endangered species.

> A review of studies that estimate the value of water in alternative uses indicates that a wide variety of valuation approaches are being applied. As the studies cited demonstrate, the economic value of instream flows *can* be measured so as to be comparable to the value of water in offstream agricultural, municipal, and industrial uses. Comparisons of the value of water in alternative uses will help to identify economically beneficial alterations in water allocation between competing offstream and instream uses. Without information comparing benefits generated by different water uses, federal and state water policy decisions will continue to emphasize diversions for offstream uses such as irrigation, mining, and urban development.[38]

Limitations of Economic Analysis

For the uses of economic analysis to increase, some of its limitations and problems, and objections, must be addressed. The litany of these well documented limitations includes the following:

- Provides *only* one perspective—a single measure of "economic efficiency," such as net benefits, can never present a complete picture for such complex issues as risks to health and environmental degradation and the panoply of functions and values of natural systems.
- Estimating *methods*—economists are hobbled by the limitations of available tools when

they try to value environmental resources. Reliance on "willingness to pay" techniques works best when people have experience buying similar goods. But willingness to pay can undervalue aspects of ecosystems with which people are unfamiliar. The value of things people never think about is a "wobbly concept" and has distorted our understanding of the value of natural resources, according to some critics.[39] For example, while some people may not care about wetlands and assign no value to their existence, such areas still provide valuable ecosystem services to this and future generations. Others object to survey techniques for different reasons: "The oil industry is not ready to write a check for someone's sense of moral outrage watching otters die on TV, says an oil industry source."[40]

- Distributional *issues*—benefit-cost analysis is distributionally neutral: a dollar of benefit or cost is worth the same no matter where or to whom it accrues. Yet, distributional issues, such as who bears the costs and receives the benefits of acid rain, are almost always important. Benefit-cost analysis is silent on the question of whether the losers from a public works project should be compensated. Even projects that result in aggregate positive net benefits leave some people worse off, and it is natural for the losers to oppose the project.

- Discount rate—another limitation is the practice of using the "present value" of projects as the basis for adding up the costs and benefits of a project over time. A discount rate converts future dollars into current equivalents to calculate net "present" project value.[41] Discounting works well for measuring the value of a resource today versus what it would be worth delivered a year from now: when economies are working efficiently, the discount rate is equal to the interest rate. But the choice of discount rates becomes increasingly problematic in the long time frame of environmental impacts. Decisions affecting future generations are even more difficult. Valuing future benefits and costs is particularly important in cases of great uncertainty about irreversible use of nonrenewable resources. EPA's Science Advisory Board concluded that:

> methodology that presumes the future value of an ecological resource necessarily must be less than its present value will not be a useful analytical tool for sustaining economic development over the long term. The standard practice of discounting future resource values is inappropriate, and it results in policies that lead to the depletion of irreplaceable natural resources.[42]

- Imprecise *information*—economic analysis relies on the data from physical, biological, and engineering systems as well as on economic factors (e.g., air dispersion, groundwater chemical plume dispersion, exposure models, wetland/habitat, and fish and wildlife population models). The scientific questions, such as the magnitude of environmental impacts, are often difficult to answer.

- Other objections to economic analyses—some shy away from economic arguments and from assigning economic value to environmental resources because these resources have so many intangibles and nonpecuniary values that are not fully considered by economics. Some wildlife managers, for example, have resisted the "commercialization" implied by the application of economic values.[43]

Future Directions of Economic Analysis

In its 1990 report Reducing Risk: Setting Priorities and Strategies for *Environmental* Protection, EPA's Science Advisory Board called for development of improved methods to value natural resources, to account for long-term environmental effects in economic analysis, and to incorporate ecological investments into a concept of sustainable growth. One tack is to "continue to explore the wondrous world of alternative surplus measures,"[44] in other words, to polish existing techniques. Argues one economist: "The more analysts can narrow the sources of error in the use of methods over which, admittedly, reasonable people can disagree, the greater the precision of our measuring rod. . . opportunities for manipulation are reduced by improvements in methods and consensus over best practice."[45] The quality of the contingent valuation, travel cost, and survey methods has improved over the past few years, the questions are becoming more realistic, and the techniques have evolved to the point where people are willing to get up in court and defend their numbers.[46] EPA continues to refine its use of benefit-cost, cost-impact, and cost-effectiveness analyses. For example, EPA's guidelines for regulatory impact analyses are being revised.[47] Other tacks include greater use of multiple objective analysis and of merging ecological and economic analysis (see sections below on multiple objective and sustainable development methods).

Another fruitful direction might be educational efforts to convey the value, uses, and limitations of economic studies. These efforts would be important not just for analytical exercises but also for resource management. For example, some observers argue that economic principles need to be increasingly brought to bear in wildlife programs and that wildlife agencies need to overcome their reluctance to use economic justifications and the information gleaned from socioeconomic surveys.[48] Otherwise, wildlife will be considered a marginal spe-

cial-interest luxury product. Economic arguments help show that wildlife has significant economic benefits to local and national economies and that wildlife is an indicator of environmental and public health, or of sustainable development. However, this socioeconomic information must make its way into the decisionmaking and political process for economic arguments to be useful. At a time when there is intense political debate over how much to spend on the environment, including these nonmarket economic values may strengthen the case for sustainable development approaches.

Multiple Objective Analysis

Multiple objective analysis connotes a variety of procedures to evaluate alternative project proposals against several policy objectives.[49] In other words, multiple objective analysis is a way to address the "apples and oranges," monetary/nonmonetary, and environment/development valuation issues confronted in environmental decisionmaking concerning public works. Objectives may include national economic benefits, environmental quality, regional development, employment creation, income redistribution, and environmental and cultural goals. Several types of systems analysis and matrix analysis are forms of multiple objective analysis. One multiple objective approach examines how proposed project alternatives measure up to a set of different objectives. Another approach is to design several project alternatives (or combinations of alternatives), each intended to maximize or satisfy a different objective. In either case, the decision problem is how to compare the alternatives.

The **U.S.** Water Resources Council proposed a multiple objective evaluation framework entitled ***Principles and Standards*** for use by federal agencies in evaluating alternative water resources projects. ***Principles and Standards*** and its successor ***Principles and Guidelines*** have been applied to many federal water projects during the past two decades. The techniques could be adapted for state and local public works projects. ***Principles and Standards*** proposed that an explicit trade-off be made between the nationl economic development (NED) and environmental quality (EQ) accounts in the decisionmaking process.

Principles and Standards was changed into the ***Principles and Guidelines*** method, which **is** now in use by all federal agencies that administer federal water projects, such as the Army Corps of Engineers, the Bureau **of** Reclamation, the Forest Service, and the Soil Conserva tion Service. ***Principles*** *and* ***Guidelines*** is similar to the earlier version. However, the trade-off between NED and EQ **was** replaced with a constrained maximization of NED. The preferred plan is the one that maximizes net economic development benefits consistent with protecting the nation's environment (the "NED plan"). Other plans that reduce NED benefits in order to address other federal, state, and local concerns are also formulated. However, the **NED** Plan is selected unless an exception is justified and granted by the agency **director.** ***Principles and Guidelines*** is subject to the same criticism as benefit-cost analysis: economic analysis undervalues environmental resources. The Corps of Engineers is studying the **possibility** of using a ***Principles and Standards*** approach to include sustainable development concepts and **objectives.**[50] The South Florida Water Management District is considering the use of a multiple objective evaluation method **similar** to ***Principles*** *and* ***Standards*** for water use management **planning.**[51]

Several methods have been advanced to evaluate trade-offs among alternatives in order to select an optimal or preferred alternative. If the decisionmaker's values, and thereby the relative importance of the objectives, can be defined by quantitative weights, an "optimal" project alternative can be determined. This is an attempt to derive a single-value answer like benefit-cost analysis. In order to do ***so,*** it is necessary to establish weighing functions (or "shadow prices") for all nonmonetary objectives. If such weights can be found and agreed on by the various contesting groups, the nonmonetary costs and benefits can be translated into their monetary equivalents. This approach has been developed extensively in the context of the economic development literature. Use of weights turns the exercise into a benefit-cost or optimization analysis. Focus groups of experts may be used to determine the weights. There are several methods for varying the weights systematically to eliminate inferior alternatives.

Multiple Use or Joint Production

The multiple objective evaluation problem is similar to that posed by multiple use or joint production possibilities where different products are measured by noncomparable yardsticks. Multiple use is often associated with goods and services produced by a forest. Varying amounts of different types of forest outputs are feasible: timber (value measured in dollars), water (acre-feet), recreation (visitor **days),** and wildlife (deer harvested, bird count). The decision problem is how to compare the value of different products.

Principles and Standards

The evaluation method called for comparing project alternatives by measuring and appraising their differences and the "without project" alternative. Four accounts were used to facilitate evaluation and to display the effects of each plan:

- The national economic development (NED) account displays changes in the economic value of the national output of goods and services (a benefit-cost analysis from a national accounting perspective).
- The environmental quality (EQ) account displays nonmonetary effects on ecological, cultural, and aesthetic resources.
- The regional economic development (RED) account registers changes in regional economic activity.
- The other social effects (OSE) account registers plan effects from perspectives that are relevant to the planning process but are not reflected in the three other accounts.

South Florida Water Management District: Multiple Objective Analysis

The method would have four accounts: economic efficiency, social and cultural, regional development and fiscal, and ecological and related aesthetic, including water quality contributions to ecological properties. The account also could have subaccounts to distinguish, for example in the economic and *social* accounts, effects on water use and supply, flood and storm control, and recreation. The ecological account might be subdivided into estuarine, wetlands, free-flowing stream, and lake subaccounts, and include the output of hydrology, pollutant transport, and ecosystem models. Once the attribute values for each project are known, the alternatives would be "screened" to select plans that perform well under different hydrological conditions and for a variety of attribute values, weights, and risk preferences. Scaling and weighing schemes, determined by focus groups, are attached to the four accounts to compare alternatives.

In the more likely case that weights (or even objectives) are not defined by the decisionmakers, the other approach is to develop a multiple objective accounting framework that traces the consequences of various project alternatives, and relates them not only to monetary effects, but also to environmental, social, regional development, and other objectives. Where possible, these consequences are defined in monetary terms. Where not, accounts are shown in the physical, quantitative, and qualitative terms that best reflect their values. Results can be presented in a format to describe the potential economic and other trade-offs among multiple goals. Ian McHarg's overlay method, the Leopold type matrix, elements of *Principles and Standards* designed by the U.S. Water Resources Council, and planning tools such as the Multi-Attribute Trade-off System (MATS), are among the techniques used in multiple objective analysis.[52] Such a framework will not provide a simple, singular answer, telling what is better or what is worse. However, the analysis will help officials to make value and political judgments and project decisions.

Sustainable Development as a Project Analysis Method

Sustainable development is identified here as a concept that gets to the heart of the challenge of combining public works development and environmental quality. Can "sustainable development" concepts be used in project analysis? To do so, the various definitions of sustainability need to be distinguished. John Pezzy distinguishes between:

- ***Sustainable growth:*** nondeclining or positive and nondeclining economic output or consumption;
- ***Sustainable development:*** nondeclining utility (human utility or well being);
- ***Sustainable resource use:*** nondeclining renewable and/or nonrenewable resources and/or nonincreasing pollution.[53]

Applying these definitions to project analysis is likely to be difficult. Several World Bank and other reports analyze sustainability in terms of conventional economic theory (this theory views capital stock, technology, and environmental quality/natural resources as factors that affect production, consumption, and utility). Also, the reports explain why free market forces may not achieve sustainability and how policy intervention may help or hinder sustainability.[54]

Sustainability at the Project Level

How could a sustainability criterion work at a project level, where a project is only a small part of the overall system that is to be sustained? Indeed, there is a conceptual problem, deriving from the definition of sustainability as a constraint (like an environmental standard or regulation) rather than a maximization rule like optimality or net economic benefits. Sustainability could be introduced into economic analysis by setting a constraint on the depletion of the stock of natural capital: projects maximizing net benefits should be undertaken subject to the requirement that environmental damage should be zero or negative. However, applied at the level of each project, such a requirement could be stultifying. Does every resource need to be conserved, or are trade-offs acceptable?

Sustainability at the Program Level

At the program level, however, sustainability criteria might be applied with greater flexibility: netted out across a set of projects (program), the sum of project damages should be zero or negative.[55] Compensatory projects or measures could help make a sustainable program operational. As a World Bank report noted: "Promoting growth, alleviating poverty, and protecting the environment are mutually supportive objectives in the long run. . . . In the short run, however, the objectives are not always compatible. . . ."[56] The Memorandum of Agreement between EPA and the *Corps* of Engineers concerning the determination of mitigation under the *Clean Water Act* Section 404 guidelines contains a similar distinction between each project decision or the short-run and the overall long-term "no net loss" goal of wetlands protection.[57]

EPA-Corps of Engineers Memorandum on Mitigation

"The level of mitigation determined to be appropriate and practicable . . . may lead to individual permit decisions which do not fully meet this goal because the mitigation measures necessary to meet this goal are not feasible. . . . Consequently, it is recognized that no net loss of wetlands functions and values may not be achieved in each and every permit action. However, it remains a goal of the Section 404 regulatory program to contribute to the national goal of no overall net loss of the nation's remaining wetlands base."

Limitation on Practical Applications of Sustainability

As an analytical tool, a sustainability criterion would have all of the measurement problems of valuing environmental goods and services and addressing intergenerational equity and irreversible losses of nonrenewable resources. Deriving sustainability conditions will require judgments on which natural and manmade resources are essential to production and to welfare, and on the extent to which these resources can be substituted for each other. The existence of natural thresholds, beyond which environmental damage is irreversible and possibly catastrophic, may represent a significant limit to the substitutability of capital and technological knowledge for natural resources.

Examples of Sustainability Measures in Practice

Despite the theoretical and practical difficulties of translating sustainability into an analysis tool, several efforts examining sustainability are under way.

Energy Analysis. One approach popular among some wetlands ecologists and ecological economists is energy analysis, that is, to calculate energy balances on the assumption that energy supplies (measured by units of solar energy) represent the ultimate constraint on human activity. By measuring the amount of energy absorbed by a wetland, for example, an economic value of the wetland can be calculated: the dollar value of the fossil fuel equivalent of the solar energy that the wetland converts to plant biomass.[58] This technique has also been applied to agriculture and aquaculture. The solar energy input-output analysis of a project (linked to sustainability criteria) may provide another analytical input into decisionmaking. But solar energy values do not necessarily reflect observable human economic activities.[59]

Natural Resources Accounting in National or Regional Income Accounts. Another effort is to incorporate environmental factors in basic accounts used to measure national output (GNP, GDP) or in regional models. National accounting schemes typically characterize revenues generated by activities that deplete or degrade environmental resources as "income" while failing to account for the reduction of society's environmental capital assets. Including the environment as a capital asset is a feature of studies conducted by international organizations and an EPA study of the Chesapeake Bay.[60] Resource accounting may help decisionmakers make judgments about trade-offs between public works projects and environmental protection within the context of sustainability of the ecosystem functions of the Chesapeake Bay.

Carrying Capacity and Sustained Yield. Sustained yield and carrying capacity are two concepts drawn from agriculture/fisheries and ecology, respectively, with applications and similarities to sustainable development.[61] Sustained yield is a yield that can be maintained over long periods without significant reduction in the rate of production. Maximum sustained yield is used to describe the maximum harvest possible in fish, wildlife, or forestry. Carrying capacity, an ecological attriiute of the environment, refers to the number of individuals of a species that can be stably sustained by that environment. Carrying capacity and sustained yield have been applied to many studies. As decisionmaking criteria for public works projects, carrying capacity and sustained yield would share the same limitations as sustainable development discussed above.

Risk Analysis

Uncertainty is an integral part of project decisions. Risk analysis recognizes that forecasting project impacts is an uncertain business and incorporates, in probabilistic statements of future conditions, analysts' best guesses and historical data about the extent of uncertainty. The process of quantifying risks attempts to generate objective information from empirical data or when data do not exist, through constructing models of physical and other processes. Professional judgment is used to fill in the knowledge gaps. Risk analysis has long been used as part of the engineering design of a public works project, for example, as part of structural, reliability, or safety analysis. For use in environmental decisions concerning public works, the human health, ecosystem, and environmental risks of the public works project must be assessed. Many risk analysis techniques are in use in other federal environmental programs and could be adapted for use in public works reviews. A summary of federal risk assessments of cancer-causing agents in the environment is given in Table 2-3.

Engineering Risk Analysis

Risk cost-effectiveness analyses are undertaken for public works projects at the engineering/design phase. Engineers seek to determine the most cost-effective project alternatives within the constraints of structural or project reliability or safety. Reliability and safety information in turn is based on known historical risks of particular designs and structures, hydrological data, and best professional judgment. In dam projects, for example, "buffering" or "redundance" are built into a project for a resilient design that will reliably provide water, power, and flood control with a high degree of safety.

Distinction between Risk Assessment and Risk Management. Risk-based decisionmaking or risk analysis encompasses both risk assessment and risk management as defined by the National Academy of Sciences:

> Risk assessment is the use of the factual base to define the health effects of exposure of individuals or populations to hazardous materials and situations. Risk management is the process of weighing policy alternatives and selecting the most appropriate regulatory action, integrating the results of risk assessment with engineering data and with social, economic, and political concerns to reach a decision.[62]

Undertaking risk analysis is resource and data intensive. For example, although EPA has neither the budget nor the time to extensively test thousands of chemicals for health risks, the agency is being asked, by its Science Advisory

Table 2-3
Public Laws Providing for the Regulation of Exposures to Carcinogens

Legislation (Agency)	Definition of Toxics or Hazards for Regulation of Carcinogens	Degree of Protection	Agents Regulated as Carcinogens (or Proposed Regulation)	Basis of Legislation	Remarks
Federal Food, Drug, and Cosmetic Act (FDA)					
Food	carcinogenicity for additive defined by Delaney Clause	no risk permitted, ban of additive	21 food additives and colors	risk	
	contaminants	"necessary for the protection of public health" Sec. 406 (346)	three substances: Aflatoxin, PCBs, nitrosamines	balancing	
Drugs	carcinogenicity defined as risk	risk and benefits of drug balanced	not determined	balancing	
Cosmetics	"substance injurious under conditions of use prescribed"	action taken on basis that cosmetic is adulterated	not determined	risk (no health claims allowed for "cosmetics"; cosmetic becomes a "drug" if claims made)	
Occupational Safety and Health Act (OSHA)	not defined in act (OSHA Generic Cancer Policy defines carcinogens on basis of animal test results or epidemiology)	"adequately assures to the extent feasible that no employee will suffer material impairment of health or financial capacity" Sec. 6(b)(5)	20 substances	technology (or balancing)	
Clean Air Act (EPA)					
Sec. 112 (stationary sources)	"an air pollutant. . . which. . . may *cause* or contribute to an increase in mortality or an increase in serious, irreversible, or incapacitating reversible illness" (Sec. 112(a)(1)	"an ample margin of safety to protect the public health" Sec. 112(b)(1)(B)	asbestos, beryllium, mercury, vinyl chloride, benzene, radionuclides, and arsenic (an additional 24 substances are being considered)	risk	basis of the Airborne Carcinogen Policy
Sec. 202 (vehicles)	"an air pollutant from any . . . new motor vehicles. . . or engine . . . which. . . cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare" Sec. 202A(a)(1)	"standards which reflect the greatest degree of emission reduction achievable through. . . technology. . . available" Sec. 202(b)(3)(a)(1)	diesel particulates standard	technology (Sec. 202(b)(4)(B) includes no-risk test for deciding between pollutant that might result from control attempts)	Sec. 202(b)(4)(A) specifies that no pollution control device, system, or element shall be allowed if it presents an unreasonable risk to health, welfare, or safety

Table 2-3 (cont.)
Public Laws Providing for the Regulation of Exposures to Carcinogens

Legislation (Agency)	Definition of Toxics or Hazards for Regulation of Carcinogens	Degree of Protection	Agents Regulated as Carcinogens (or Proposed Regulation)	Basis of Legislation	Remarks
Sec. 211 (fuel additives)	same as above Sec. 211(c)(1)	same as above Sec. 211(c)(2)(a)		balancing (technology based with consideration of costs, but health based in requirement that standards provide ample margin of safety	requires cost-benefit comparison of competing control technologies
Clean Water Act (EPA) Sec. 307	toxic pollutants listed in House Committee Report 95-30 (Committee on Public Works and Transportation); list from consent decree between EDF, NRDC, Citizens for Better Environment, and EPA	defined by applying BAT economically achievable Sec. 307(a)(2), but effluent levels are to "provide an ample margin of safety" (Sec. 307(a)(4))	49 substances listed as carcinogens by CAG	technology	
Federal Insecticide, Fungicide, and Rodenticide Act and the Federal Environmental Pesticide Control Act (EPA)	one that results in "unreasonable adverse effects on the environment or will involve unreasonable hazard to the survival of a species declared endangered"	not specified	14 rebuttable presumptions against registrations either initiated or completed; nine pesticides voluntarily withdrawn from market	balancing "unreasonable adverse effects" Sec. 2(bb)	"unreasonable adverse effects" means "unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits"
Resource Conservation and Recovery Act (EPA)	one that "may cause or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness; or pose a . . . hazard to human health or the environment" Sec. 1004(5)(A)(B)	"that necessary to protect human health and the environment" Sec. 3002-04	74 substances proposed for listing as hazardous wastes	risk (the administrator can order monitoring and set standards for sites)	
Safe Drinking Water Act (EPA)	"contaminant(s) which . . . may have an adverse effect on the health of persons" Sec. 1401(1)(B)	"to the extent feasible . . . (taking costs into consideration)" Sec. 1412(a)(2)	trihalomethanes, chemicals formed by reactions between chlonne used as disinfectant and organic chemicals; 2 pesticides and 2 metals classified as carcinogens by CAG but regulated because of other toxicities	balancing	

Table 2-3 *(cont.)*
Public Laws Providing for the Regulation of Exposures to Carcinogens

Legislation (Agency)	Definition of Toxics or Hazards for Regulation of Carcinogens	Degree of Protection	Agents Regulated as Carcinogens (or Proposed Regulation)	Basis of Legislation	Remarks
Toxic Substance Control Act (EPA)					
Sec. 4 (to require testing)	substances that "may present an unreasonable risk of injury to health or the environment" Sec. 4(a)(1)(A)(i)	not specified	site chemicals used to make plastics pliable	balancing "unreasonable risk"	
Sec. 6 (to regulate)	substances that "present or will present an unreasonable risk of injury to health or the environment Sec. 6(a)	"to protect adequately against such risk using the least burdensome requirement" Sec. 6(a)	PCBs regulated as directed by law	balancing "unreasonable risk"	
Sec. 7 (to commence civil action against imminent hazards)	"imminently hazardous chemical substance or mixture means a . . . substance or mixture which presents an imminent and unreasonable risk of serious or widespread injury to health or the environment	based on degree of protection in Sec. 6	PCBs regulated as directed by the law	balancing "unreasonable risk"	
Federal Hazardous Substances Act (CPSC)	"any substance (other than a radioactive substance) which has the capacity to produce a personal injury or illness" 15 USC 1261(g)	"establish such reasonable variations or additional label requirements . . . necessary for the protection of public health and safety" 15 USC 1262(b)		risk	"highly toxic defined as capacity to cause death, thus toxicity may be limited to acute toxicity
Consumer Product Safety Act (CPSC)	"products which present unreasonable risks of injury . . . in commerce" and "risk of injury" means a risk of death, personal injury, or serious or frequent injury" 15 USC 2051 "imminently hazardous consumer product" means consumer product that presents imminent and unreasonable risk of death, serious illness or severe personal injury" 15 USC 2061	"standard shall be reasonably necessary to prevent or reduce an unreasonable risk of injury" 15 USC 2056	5 substances: asbestos, benzene, benzidine (and benzidine-based dyes and pigments), vinyl chloride, "tris"	balancing "unreasonable risk"	standards to be expressed, whenever feasible, as performance requirements

Source: U.S. Congress, Office of Technology Assessment, Technologies *for Determining Cancer Risks from the Environment,* 1981.

Board, to devote more resources to quantifying ecosystem risks. Risk management, as a form of planning, can be used to determine which risk assessments to conduct by setting EPA's agenda and priorities. EPA has adopted the risk assessment strategy and terminology set out in the National Academy of Science's report on risk assessment activities in the federal government.[63]

Health Risk Analysis. The National Academy of Sciences characterized risk assessment as containing some or all of the following four steps:[64]

- *Hazard identification:* determine whether a particular chemical is or is not causally linked to particular health effects;
- *Dose-response assessment:* determine the relation between the magnitude of exposure and the probability of occurrence of the health effects in question;
- *Exposure assessment:* determine the extent of human exposure before or after application of regulatory controls; and
- *Risk characterization:* describe the nature and the magnitude of human risk, including attendant uncertainty.

In each step, decision points occur where risk to human health can only be inferred from the available evidence. Both scientific judgments and policy choices may be involved in selecting from among possible inferential bridges.

Ecosystem and Environmental Risks. Scientists have made some progress in developing quantitative measures for use in comparing different risks to human health. Although current ability to quantify ecological risks is not as well developed, an increased capacity for comparing different kinds of risks more systematically would help determine which problems are most serious and deserving of the most urgent attention, according to EPA's Science Advisory Board.[65] An improved ability to compare risks in common terms would help society choose more wisely among the range of policy options available for reducing risks.

Implications and Uses of Risk Assessment. A high degree of uncertainty about the effects of a public works project will influence the selection of project alternatives. For example, the implications of a high degree of risk in the case of a major dam include the following:

- Do not invest in irreversible, inflexible, large-scale, and high-cost measures.
- Design, modify, and rehabilitate structures and operating procedures that will provide robust and resilient water resource systems under different climate scenarios.
- Implement a wide variety of measures for reducing demand, as long as they do not reduce the robustness and resilience of the systems.

Risk analysis can be added to, or combined with, other analytical methods, such as benefit-cost analysis. The economic analysis is extended to capture the uncertainty by including probability, sensitivity, or other forms of risk analysis.

Implementation of Risk Assessment. The basic problem in risk assessment is the sparseness and uncertainty of the scientific knowledge of certain types of health and environmental hazards. This problem has no ready solution.[66] Risk assessment draws extensively on science and depends for reliability on the quality of data. A strong scientific basis has developed for linking exposure to chemicals and to chronic health effects. Water and highway projects have relatively well defined risks due to years of experience with typical designs and historical (e.g., hydrological) data. However, uncertainty is particularly great for noncancer health effects and ecosystem impacts (due to such factors as irreversibility thresholds, cumulative impacts, and feedback effects.). Few of these risks can be quantified accurately, resulting in risk management decisions based more on judgment than on specific data. The U.S. General Accounting Office (GAO) concluded in a 1988 study that large and extensive gaps exist in information needed to perform risk assessments at EPA. The nature of the information gaps include poor or nonexistent exposure and other data, a lack of methodologies for assessing ecological or noncancer risks, and a lack of understanding of basic global environmental processes.[67]

The lack of accurate data and resources to obtain such data is felt at all levels of government. State representatives at a National Governors' Association workshop on risk analysis in November 1990 agreed with the conclusions of the EPA Science Advisory Board study that risk analysis is a valuable policy tool. But the conference participants indicated that state agencies generally do not have enough data to use risk analysis at the project or program level and that risk analysis is not refined enough to use to set priorities.[68]

Over the last two decades, most federal agencies responsible for risk assessment have improved their techniques through research and demonstration projects, and they have sought to develop guidelines to provide a systematic way of meeting regulatory requirements. These guidelines vary widely as to the degree of comprehensiveness, flexibility, and legal authority vested in them. EPA's Science Advisory Board, in its September 1990 report on risk, recommended that EPA

- Develop a long-term strategy for improving the methodology for assessing and ranking environmental risks and for assessing the alternative strategies that can reduce risks;
- To the extent possible, merge the evaluations of (1) cancer and noncancer risks and (2) ecological and welfare risks;
- Improve the data and analytical methodologies that support the assessment, comparison, and reduction of different environmental risks; and
- Develop improved analytical methods to value natural resources and to account for long-term environmental effects in its economic analyses.[69]

Risk assessment analyses face a variety of external pressures, including public concern with health protection and different definitions of acceptable risk by interest groups. Much of the controversy is general; it reflects the conflict in values between different groups in society, particularly with regard to the relative importance of eco-

nomic factors and health and environmental protection in the formulation of regulatory decisions. Consensus on the value of mortality risks, for example, is difficult to obtain (e.g., labor's willingness to accept increased risks in exchange for additional wages is one method). The necessity of placing a monetary value on human life is a source of deep-seated conflicts of values and beliefs, and it indicates one of the problems of linking risk and economic analyses. The "right" to be risk free, a perception of some citizens, is another problem with communicating the results of a risk analysis. Nothing is risk free, and decisionmakers often must make trade-offs.

As long as there are large gaps in key data sets, efforts to evaluate risk on a consistent, rigorous basis, or to define optimum risk-reduction strategies, necessarily will be incomplete. Thus, the results will be uncertain enough to limit the decisionmaking uses of risk analysis. However, like benefit-cost analysis, risk analysis is not intended to be used as the sole basis for decisionmaking. Risk analysis is used as one means to inform decisionmaking.

> ... in any attempt to compare and rank environmental risks [it] is the inevitable value judgments that must be made. For example, are health risks posed to the aged more or less serious than health risks posed to infants? ... Comparing the risks posed to human populations with the risks posed to ecosystems may be even more difficult. It seems clear that subjective values always will—and should—influence the ranking of relative environmental risks, no matter how sophisticated the technical and analytical tools become.[70]

Other critics question whether current practices adequately safeguard the quality of the scientific interpretations needed for risk assessment. With a scientific base that is expanding, with large uncertainties to be addressed in each decision, and with the presence of great external pressures, the National Academy of Sciences warned that the scientific interpretations in risk assessment could be distorted by policy considerations and called for new institutional safeguards to ensure that risk assessments are protected from inappropriate policy influences and for uniform guidelines for carrying out risk assessment.[71]

Social Impact Analysis

Social and cultural impact analyses (SIA) include methods for describing the social, cultural, distributional, and community impacts of project alternatives.[72] Some analysts argue that there is a legal or regulatory requirement for a systematic interdisciplinary approach in NEPA and NEPA regulations ("economic, social, and physical impacts"). Yet "in over 80 EISs in the first decade after the enactment of NEPA, fewer than 10 percent mentioned primary or secondary social relationships" and "no social research method could be observed in 86 percent" of the EISs, according to a 1986 study.[73] However, social, cultural, and applied anthropology studies are now a regular feature of many federal environmental reviews, especially for major projects such as hazardous and nuclear waste disposal, impacts on Native Americans, and the supercollider-superconductor projects.

SIA is used by some as more than an analysis tool. SIA and the NEPA process can be used to highlight value choices, increase public involvement in decisionmaking, give more democratic or public direction to the decision process, and take into account the broader policymaking context of the decision process and choices.

Business and Corporate Efficiency and Management Techniques

A variety of interrelated techniques used in business to generate effective, cost-efficient, and marketable products could be applied to the federal environmental decisionmaking process. The techniques include performance management, fast-tracking, and value engineering.[74] Value engineering, for example, is the search for and selection of new means to reduce cost and improve value (in a business sense) during the design phase of a commercial product. The concepts grew from cost-prevention campaigns sponsored by the government in the 1940s. Value engineering is an organized effort to identify and eliminate unnecessary costs without sacrificing quality or reliability. The effort is sometimes undertaken by an independent team of experts. Process capabilities, product design, and inspection practices are considered in minimizing the total cost of quality assurance. Alternative methods are sought to reach the desired product and quality (a preferred level for the quality of goods and services balances the cost of attaining that quality against the value placed on the quality by consumers). Value engineering has been applied to a superfund cleanup site.[75]

Performance management generally has to do with using a labor force efficiently and effectively. GAO has recommended that EPA adopt several management, organizational, financial management, and efficiency measures that are similar to these corporate efficiency concepts.[76]

Application of Value Engineering to Superfund Cleanup

The Kansas City District of the Army Corps of Engineers, under the direction of EPA Region II, is the lead agency for the multimillion dollar remediation of the Marathon Battery Superfund Site in Putnam County, New York. Scientists and engineers from the Corps, EPA, the remediation engineering company, and members of the remedial investigation/feasibility (RI/FS) team convened for five days to evaluate the RI/FS plan using value engineering. The group's charge was to take a close, impartial look at the problem and identify economical alternatives that were at least as effective as the proposed measures. The brainstorming sessions encouraged exchange of ideas and helped to speed resolution of technical questions. The group's recommendations were included in the remedial design and saved the project $8 million in 1988 dollars, reducing the initial estimated cost by 40 percent.

Notes

[1] V. Keny Smith, "Resource Evaluation at the Crossroads," *Resources* 90 (Winter 1988): 6.

[2] 40 CFR 1500.1.

[3] 40 CFR 1502

[4] Brooke A. Masters, "Red Tape May Delay Virginia Commuter Rail," *Washington Post,* April 4, 1991.

[5] U.S. Department of Transportation, Federal Aviation Administration, *Draft Environmental Impact Statement: Dallas/Fort Worth International Airport, Volume 1: Documentation* (Washington, DC, July 1990).

[6] Dinah Bear, General Counsel, U.S. Council on Environmental Quality, personal communication, February 21, 1991.

[7] Jack Chowning, U.S. Army Corps of Engineers, Regulatory Branch, personal communication, February 22, 1991.

[8] 40 CFR 1505.2.

[9] Dinah Bear.

[10] Eugene W. Cleckley, Chief, Environmental Operations Division, Federal Highway Administration, Office of Environmental Policy, personal communication, April 17, 1991.

[11] U.S. Department of Transportation, Federal Highway Administration, *Applying the Section 404 Permit Process to Federal-Aid Highway Projects* (Washington, DC, September 1988).

[12] U.S. Congress, Office of Technology Assessment, *Wetlands: Their Use and Regulation* (Washington, DC, March 1984); David G. Burke et al., *Protecting Nontidal Wetlands* (Chicago: American Planning Association, December 1988); U.S. General Accounting Office (GAO), *Wetlandr: The Corps of Engineers' Administration of the Section 404 Program* (Washington, DC, July 1988).

[13] 40 CFR Parts 400 699.

[14] See U.S. Environmental Protection Agency (EPA), Office of Water, *Water Quality Standards Handbook* (Washington, DC, December 1983).

[15] *Federal Register* 55 (November 16, 1990): 47990.

[16] See EPA, Office of Policy Planning and Evaluation, *EPA's Use of Benefit-Cost Analysis: 1981-1986* (Washington, DC, 1986); and A. Myrick Freeman III, "Water Pollution Policy," in Paul R. Portney, ed., *Public Policies for Environmental Protection* (Washington, DC: Resources for the Future, 1990), p. 106.

[17] Deborah Nicole, EPA, Office of Water, and Brett Snyder, EPA, Office of Policy Analysis, personal communication, February 7, 1991.

[18] 40 CFR 131.12.

[19] See EPA, *EPA's Use of Benefit-Cost Analysis: 1981-1986;* Paul R. Portney, "Air Pollution Policy," in Portney, ed., *Public Policies for Environmental Protection,* pp. 27-96.

[20] John H. Clements, Deputy Director, U.S. Federal Energy Regulatory Commission, Office of Licensing, letter to Bruce McDowell, U.S. Advisory Commission on Intergovernmental Relations, May 15, 1991.

[21] Decision Focus Incorporated, *Evaluating Hydro Relicensing Alternatives: Impacts on Power and Nonpower Values of Water Resources* (Los Altos, CA: Electric Power Research Institute, August 1990); Ed Folkes, Federal Energy Regulatory Commission, personal communication, February 20, 1991.

[22] See Possum Kingdom, Project No. 1490, order issued September 14, 1989, 48 FERC 62190; Mahoning Creek, Project No. 10521, order issued May 7, 1990, 51 FERC 62098; Brandon Island, Project No. 3944, order issued August 16, 1990, 52 FERC 62161.

[23] Decision Focus Incorporated, *Evaluating Hydro Relicensing Alternatives,* p. S-1; Ed Folkes.

[24] Ed Folkes; and Jennie Rice, Decision Focus Incorporated, personal communication, February 22, 1991.

[25] 50 CFR Part 402.

[26] Ted Gup, "Down with the God Squad," *Time,* November 5, 1990, p. 102.

[27] *Fedeml Register* 52 (1987): *32657.*

[28] DOT Order 5610.1C.

[29] C.S. Holling, *Adaptive Environmental Assessment and Management* (Chichester: 1978), p. 65.

[30] A. Myrick Freeman III and Paul R. Portney, "Economics Clarifies Choices about Managing Risk," *Resources* 95 (Spring 1989): 4.

[31] The theoretical underpinnings of benefitcost analysis and the concept of economic benefits are found in "welfare economics" and a theory of consumer preferences. The assumptions include (1) Pareto Optimality and other measures of "efficiency," (2) the purpose of economic activity is to increase the well-being of the individuals as measured in terms of material goods and services valued by prices in an efficiently operating market system, and (3) more is preferred to less. Distributional effects are not included in a benefitcost analysis. Defining and measuring net economic benefits is based on individuals' "willingness to pay" (or demand curves), the amount for goods and services minus the costs of acquiring the goods and services. Willingness to pay includes the price paid for the goods and services as well as any amount over and above the price that the individual would have been willing to pay, which is called consumer surplus. Consumer surplus is derived by estimating what people would be willing to pay using a technique drawn from survey and market research. Analogous to the concept of consumer surplus, producer surplus is the measure of a change in the well-being of a firm. The change in consumer and producer surplus provides the conceptual basis for measuring net economic benefits. For more on benefitcost issues and applications, see Maynard M. Hufschmidt et al., *Environment, Natural Systems, and Development: An Economic Valuation Guide* (Baltimore: Johns Hopkins University Press, 1983); Charles W. Howe, *Benefit-Cost Analysis for Water System Planning* (Washington, DC: American Geophysical Union, 1971); John V. Krutilla and Anthony C. Fisher, *The Economics of Natural Environments* (Baltimore: Johns Hopkins University Press, 1975); Portney, ed., *Public Policies for Environmental Protection;* EPA, Office of Water, *The Economics of Improved Estuarine Water Quality: An NEP Manual for Measuring Benefits,* (Washington, DC, September 1990).

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[33] EPA, Office of Policy Planning and Evaluation, "EPA's Use of Benefit-Cost Analysis: 1981 1986"; GAO, "Cost-Benefit Analysis Can Be Useful in Assessing Environmental Regulations, Despite Limitations" (Washington, DC, April 1984).

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Chapter 3. Intergovernmental Processes and Procedures for Environmental Decisionmaking

Despite the problems inherent in the federal environmental decisionmaking process for public works projects, many federal and state agencies attempt to work together to streamline the process. There are success stories, but effective management of all federal environmental decisionmaking requirements is hindered by separate federal statutes and agency missions, the distribution of powers between state and local governments, lack of staff and budget resources, the absence of incentives for interagency cooperation, and lack of information exchange with the public and between agencies. This chapter is divided into three sections:

1. Problems that prevent or discourage efficient and integrated management of the federal environmental decisionmaking process and accommodation of divergent views and objectives.
2. Methods used to address and speed up the federal environmental decisionmaking process by local, state, and federal agencies.
3. Options to improve the federal environmental decisionmaking process. One set of options focuses on improvements within the existing framework of laws and regulations; other options include radical overhauls of statutes and regulations.

Improvements might move federal decisionmaking in the following directions:

- Beyond an EIS paperwork focus to instilling an environmental ethic in agency planning and decisionmaking;
- Beyond agency "turf wars" and sequential decisions to shared and integrated decisionmaking;
- Beyond federal-state/local conflicts over environmental decisions to a balanced partnership.

Three perspectives highlight the importance of intergovernmental processes to public works and environmental decisionmaking: the *National Environmental Policy Act* (NEPA), the applicant-federal agency relationship, and the federal-state/local relationship.

The mandates of the law include NEPA "integration," a term that encompasses two distinct but interrelated goals as defined in the law and related regulations:'

1. To foster a consideration of environmental consequences (an environmental "ethic") at all levels of project planning, design, decisionmaking, and implementation; and
2. To serve as an umbrella under which all federal, state, and local environmental requirements are coordinated or integrated (concurrent rather than consecutive) and undertaken in a timely fashion.

Are these two facets of NEPA working? What are the problem areas and solutions? There are differences of opinion about what NEPA integration requires in concept and in practice.

The interactions between the applicant (state or local public works project), the public, and the federal agencies affect the process and outcome of the federal environmental review. The applicant wants to know what to do to satisfy federal requirements and how to achieve greater predictability and consistency of process, time frame, and decisionmaking criteria. Citizens, public interest groups, and private companies want to influence the outcome of the federal environmental decision concerning the public works project. Some of them may fear sweetheart deals between the applicant and federal agency, and some may not want the project in their backyard. Federal agencies want to maintain accountability for implementing federal laws and seek to have state and local public works projects comply with federal requirements. If these parties proceed independently, they are likely to reach different conclusions and create frustrations for each other.

Many aspects of the day-to-day operation of federal environmental programs have been delegated to the states. As their implementation and funding roles have increased, many state and local governments have sought greater decisionmaking responsibility and discretion. Federal agencies, in turn, are attempting to balance state and local concerns with the federal agencies' need for program accountability. Federal agencies now depend on state and local agencies to carry out many aspects of federal environmental programs, but they retain key decisionmaking and review authority. What are the elements of a balanced federal-state-local partnership for environmental programs? Should federal involvement start at the local or state public works planning stage, or at the environmental impact statement (EIS) or permit stage, to make certain that federal environmental goals are implemented, or to encourage NEPA-like thinking, or to head off problems as early as possible in the permit application/decision process?

PROBLEMS WITH THE INTERGOVERNMENTAL ENVIRONMENTAL DECISIONMAKING PROCESS

Complaints about the federal environmental decisionmaking process for state and local public works projects are numerous. Section 404 of the *Clean Water Act* has received perhaps the greatest media attention and generated the largest number of complaints in recent years. However, as with other environmental regulations, the problem may be broader than a specific section of the law and include the way the law is applied. The institutional and intergovernmental environmental decisionmaking problems are grouped under the following headings for purposes of discussion:

- ***Sequential rather than concurrent, integrated decisionmaking*** and the reasons for lack of coordination, such as separate and overlapping federal environmental laws and implementing agencies, budget/staff constraints, lack of accommodation processes, and inadequate public participation and information exchange;
- ***Allocations*** of ***powers*** between the federal, state, and local governments;
- ***Environmental constraints*** on public works projects, such as Section 404 of the ***Clean Water Act;*** and
- ***Insufficient consideration of the environment*** in the design of public works.

Sequential Decisionmaking Analysis and Information Gathering

The regulations of the Council on Environmental Quality (CEQ) state: "Integrate the requirements of NEPA with other planning and environmental review procedures required by law or by agency practice so that all such procedures run concurrently rather than consecutively."[2] Despite NEPA requirements, federal environmental decisions about public works projects are often not made through a coordinated process; sequential decisionmaking and review processes still occur on a wide scale.[3] For example, a dam project may include the licensing review requirements of the Federal Energy Regulatory Commission (FERC), the preparation of an EIS, a Section 404 permit from the U.S. Army Corps of Engineers, determination of impacts on endangered species by the Fish and Wildlife Service (FWS), consideration of historic preservation effects, and state and local permits and reviews. The lack of coordination *can* delay a project and the public works benefits, increase costs, waste taxpayer dollars and agency resources, and divert attention and resources from the most important public and environmental needs.

Is NEPA integration (the coordination of environmental reviews under the NEPA umbrella) necessary or desirable? NEPA, CEQ, and many efficiency reasons argue for it. Others, however, contend that reviews by multiple agencies do not necessarily represent a duplication of effort because each agency has a different responsibility under the law and examines an issue from a different perspective? Environmental agencies also may be concerned that a public works development agency, such as the Federal Highway Administration (FHWA), has as its primary mandate building highways, not promoting environmental quality. This illustrates the "fox watching the henhouse" problem. Despite these different agency mandates, however, many tasks could be integrated: information gathering, analysis, public review, hearings. This is what NEPA charges federal, state, and local agencies to do.

Coordinating federal, state, and local permit and review requirements and the EIS process faces many obstacles reviewed below: conflicting laws and agency agendas; the number of federal, state, and local agencies; lack of resources, budget, and staff; lack of enforceable penalties for not complying with NEPA integration requirements; differences between the EIS and permit/review processes; lack of procedures for accommodation; inadequate public participation; and concern for EIS paperwork and legal challenges.

Forces against Interagency Cooperation

- Different agency mandates, goals, and programmatic agendas.
- "Report card" issue: agency staff is held accountable to its own agency's mandates and programs, not to another's. Usually, interagency cooperation is not recorded or rewarded.
- Agencies may be afraid of losing decisionmaking power to the lead agency, of losing control of timing, scope, and action. Big agencies fear they will be slowed by small agencies, small agencies fear they will be overwhelmed by the large ones.
- Coordination and power sharing requires agencies to make compromises and trade-offs that may be complicated and complex.
- Separate organizations create different cultures and a lack of mutual concern.
- Lack of resources, staff, and budget.
- No agreed-on beliefs that guide national environmental or public works policy and decisionmaking criteria and methods.
- Limited information exchange.

Separate Federal Statutes and Organizations

Federal agencies with environmental responsibilities affecting state and local public works have different, overlapping, and conflicting goals, mandates, and measures of success. To some extent, these differences are a positive reflection of our nation's pluralistic society and the complex nature of environmental and public works issues. But when these differences are not managed properly, the public welfare and the environment may suffer as a result of the delays and conflicts. Narrowly focused policies impede solutions that could address cross-media effects, incentives for pollution prevention, integration of federal environmental permits, priorities to focus greatest attention on the most serious environmental and health risks, and most efficient management to achieve the best environmental results. Almost every study consulted and ev-

ery person contacted for this study pointed to fragmented legislative authority as one of the chief obstacles to an integrated, cross-media approach. "Hortatory language to blend together to save time and money in the NEPA process does not mean much when agency authority is at stake. The incentives to preserve decisionmaking power are stronger than the incentives to save paper."[5]

Even within a single agency, lack of coordination and different goals and methods are a problem. The Environmental Protection Agency (EPA) was established as the primary federal agency responsible for implementing the nation's environmental laws. EPA, over time, created an administrative structure with separate program offices primarily responsible for implementing specific laws. Consequently, the efforts of the different, vertically integrated programs are difficult to coordinate, even though they are often attempting to control different aspects of the same multimedia or cross-media problem. This fragmented approach makes it more difficult to set priorities, allocate resources according to environmental needs, and spend budget dollars efficiently and wisely.

Sometimes, if the problems are very complicated and there is no lead agency, no one is in charge and nothing gets done. Salmon in the Pacific Northwest is an example.[6]

Salmon Summit

In response to the potential effects on the northwest region's economy of listing certain runs of salmon as endangered species, Sen. Mark O. Hatfield (R-OR) convened what has become known as the Salmon Summit. The Salmon Summit is a regional task force that aims to have the region develop a plan to improve the status of the petitioned salmon stocks in time for the National Marine Fisheries Service to consider the plan in its listing decision due in the spring of 1992.

The Corps of Engineers and the Bureau of Reclamation own and operate the dams in the region. Many agencies and interest groups are represented on the task force. The Bonneville Power Administration markets the power. The Northwest Power Planning Council, with representatives from the four northwest states, develops power plans and fish and wildlife programs. Various agencies of the departments of Agriculture and the Interior, Indian tribes, and state and local governments maintain interests in land management in the region. Other agencies manage fish and wildlife: National Marine Fisheries Service, Fish and Wildlife Service, the Pacific Fisheries Management Council, state agencies, and tribes. Special interest groups represent various segments of the public.

These agencies and interest groups had been unable to agree on how to address the challenge of improving salmon stock and how to conduct a shortened EIS process of evaluating action alternatives. However, under the auspices of the Salmon Summit, they are now in the final stages of negotiation over a management plan to protect the fish.

Number of Federal, State, and local Agencies

The size and breadth of the federal, state, and local environmental management structure are formidable and complicate coordinated decisionmaking. For water resources alone, at last count, there were 18 federal agencies in seven departments and seven independent agencies, and 25 separate water programs with some 70 separate appropriations accounts. There are 23 congressional committees and subcommittees and approximately 200 federal rules and regulations. There are 123 interstate compacts dealing with water, bridges, ports, and environmental protection. There also are more than 100,000 state and local water agencies of every size and description.'

lack of Budget and Staff Resources

A widening gap between environmental agency responsibilities and resources one of the principal causes of the conflicts and delays in the decisionmaking process. Federal, state, and local agencies are being asked to shoulder greater responsibilities with less money. Environmental legislation reauthorized or proposed by the Congress in recent years places significant additional resource requirements on all governments, increasing their costs and demands on staff time. For example, EPA projects that about 54 new regulations will be needed to implement provisions of the 1990 *Clean Air Act* amendments in the first two years after their enactment.* The *Corps* of Engineers has only 600 staff to evaluate 15,000 permit applications and 40,000 "general permit" decisions per year? New federal environmental requirements and pending legislation and regulations include new sludge disposal regulations, more stringent water quality and drinking water standards, increased emphasis on groundwater pollution, new landfill performance criteria and siting restrictions, and increased requirements for wellhead protection. EPA's operating budget is smaller in real terms than it was ten years ago, even though the agency has been given new responsibilities by the Congress.[10] As federal funding programs have been reduced or made more restrictive, and as the demands and expectations of environmental programs have increased, the staffing and budgetary constraints on governments have been tightened. This is a recipe for falling behind on public works permit/review case loads.

Early coordination, interagency consultation, and preapplication consultation are the classic ways to avoid interagency problems. However, these activities (NEPA integration) are labor intensive. Because EPA, the Corps of Engineers, and other agencies do not have enough staff to address their permit and program responsibilities, they may not send staff to early coordination/consultation sessions and may not want to enter the decision process until all of their mandatory commitments have been met. This perpetuates sequential decisionmaking. As the number of public works projects increases to meet expected demand for services, agency resources may be stretched further unless budgetary, staff, and coordination constraints are loosened.

Differences between EIS and Permit/Review Processes and Requirements

There are fundamental differences between an EIS and a permit-federal review decision that work against integra-

tion and cause duplication of effort by the applicant and by federal agencies. The EIS is a disclosure, analysis, and informational tool—a procedural step. A Section 404 permit or an endangered species jeopardy ruling is a "hammer" or decision point that depends on specific details concerning decision criteria (e.g., biological impacts on wetlands in the case of Section 404). The types of alternatives analysis conducted for an EIS and a 404 permit may also differ. The EIS considers reasonable alternatives, any one of which could be selected; a 404 permit applicant must show that it does not have an alternative with less effect on the environment than its preferred option. Some permit or review agency offices shelve the EIS and conduct their own analysis. In general, local, state, and federal permit and review processes are likely to have a greater influence than the EIS on where and whether public works will be built. The EIS is only one document of several and is not necessarily important in decisionmaking.

The person who makes the decision (404 permit, endangered species jeopardy determination) is not the same person who approves the EIS. The permit decisionmaker does not control the EIS process. This may encourage different approaches and assessments. The decisionmaker has to balance the decisionmaking criteria/factors following the rules established by the agency's statute or regulations. The EIS preparer is concerned about legal defensibility, agency or personal ideas about impact assessment, determining what is a "reasonable" range of alternatives, and mitigation commitments that may be included in the record of decision that accompanies a final EIS.

Lack of Processes for Accommodation

Despite interagency and federal-state memoranda of agreement (MOA), guidebooks on wetlands and interagency coordination, and the use of dispute-resolution techniques in some cases, government agencies encounter irreconcilable differences over aspects of state and local public works projects. Methods for accommodating these diverse views may be inadequate.

Public Participation

Public participation is one of the hallmarks of federal environmental legislation. Most federal environmental decisionmaking processes include notice and opportunity for interested parties to participate, the generation of a public record at public hearings, and agency decisions that can be appealed. The public participation process, however, can be adversarial, time consuming, costly, cumbersome, litigious, and likely to heighten antagonistic relationships between government, industry, and the public. Members of the public often get frustrated by the real or perceived lack of give and take, access to information, and substantive participation in the decision process. Public works projects may attract attention from the media, special interest groups, and "not in my backyard" (NIMBY) opponents. The public is sometimes uninformed or misinformed about federal environmental decisions concerning public works projects." Government agency management and encouragement of public participation in environmental decisions requires staff, budget resources, and communication that allows public understanding of the issues. An uninformed public cannot contribute. A misinformed public with little trust in government may not be constructive.

Another potential problem may be insufficient time for public review. No federal decision on a proposed action on draft and final EIS may be made for 90 days and 30 days, respectively, after notice of their availability is published in the *Federal Register* by EPA. The public interest review period for a Section 404 Corps of Engineers permit application is 30 to 60 days.

EIS Procedures and Paperwork

Agencies are concerned with fulfilling EIS requirements and producing a document that will stand up in court if challenged. This preoccupation to avoid litigation may have overshadowed NEPA's broader goals of instilling an environmental ethic in all federal activities and of integrating and streamlining federal permitting and review processes.[12] The EIS can involve a substantial commitment of agency resources and time, and it opens the review process to public scrutiny. Therefore, federal agencies may try to avoid having to undertake an EIS with all these complications. The environmental assessment (EA) is sometimes used to justify an operational alternative rather than to explore environmental impacts. Some EAs are as long and detailed as an EIS in part because the agency wants to be ready in case it is forced to undertake an EIS for a proposed project. In addition, an EIS is sometimes prepared as justification of project decisions after the fact.

Separation of Powers and Shift to State Responsibility for Environmental Programs without State Decisionmaking Authority

The federal environmental regulatory and decisionmaking processes now involve federal, state, tribal, and local governments. The Congress sets goals, EPA and executive branch agencies promulgate federal regulations, and states that choose to assume primacy adopt their own implementation programs. In many cases, local governments and Indian tribes implement state programs. The traditional distribution of powers between federal, state, and local governments presents inherent roadblocks to environmental decisionmaking because of the following factors:

- Needs and objectives of federal, state, and local governments differ.
- State and local governments have assumed much of the burden of implementing national programs but federal agencies retain decisionmaking authority.
- Federal environmental programs may conflict with what had been state prerogatives.
- Federal funding of state and local environmental programs has been reduced.
- Separate federal and state permits must be obtained in some states.

Historical Changes in Federal-State Environmental Responsibilities

The responsibility for implementing and funding environmental programs has swung back and forth between federal and state governments. Environmental quality before 1970 was almost entirely in the hands of state and local governments. The federal environmental statutes of the 1970s imposed national goals and solutions on state and local governments. To encourage state and local compliance, the federal government sent grants to states and localities to cover a portion of their costs for construction of sewage treatment plants and other state programs. Now, the pendulum is swinging again, returning responsibility to state and local governments to implement and fund federal programs.

Needs and Objectives of Federal, State, and Local Governments Differ

Problems naturally arise when the federal, state, and local governments have different interpretations of how to implement the goals set by the Congress. This occurs because state, local, and federal agencies have different needs and objectives. The state and local governments want flexibility to tailor programs and permits to local conditions, to influence federal decisions that affect them, and to create a climate of mutual respect. The federal agencies do not want to hand over total control because the President, the Congress, and the public may hold them responsible even if the programs are implemented by others. To satisfy their need for accountability, federal agencies issue regulations, standards, and detailed guidance documents; supply financial and technical assistance to states; monitor state performance; and, in some cases, review state permit decisions. According to the U.S. General Accounting Office (GAO), some EPA staff members do not want to give more authority to state agencies because they fear inconsistent performance in meeting federal environmental mandates. Increased state flexibility and decreased EPA control of delegated programs would make it more difficult to ensure that the states take the necessary actions to achieve national goals.[13]

State and Local Governments Implement National Programs but Federal Agencies Retain Decisionmaking Power

The problems can be compounded when state and local governments assume much of the burden of implementing and funding national programs while the federal agencies retain final say in many cases. Through its decisionmaking or environmental veto powers, the federal government oversees programs delegated to states and retains final authority on many permits, licenses, and funding reviews. Some observers argue that the federal government's role of establishing national goals has given way to dictating minute program requirements that state and local governments are mandated to implement, often at their own expense.[14]

Building an effective federal-state relationship for environmental decisionmaking has been the subject of a number of studies during the past decade.[15] These studies point to difficulties in phasing out day-to-day federal control of programs delegated to the states, federal retention of a "senior partner" role in the federal-state relationship, standards and regulations that do not allow enough state flexibility, and excessive oversight (such as EPA review of major NPDES permits).

Regulating Stormwater

"The stormwater program proposal goes far beyond simply setting the parameters of state authority in determining minimum standards for regulation. This heavy-handed approach not only is impractical in its disregard for regional variances in climatology and topography, it practically mandates an antagonistic state-local relationship by upsetting the established balance in local land use decisionmaking and by precluding state and local governments from pursuing efforts that make better sense. . . . [I]t would be enough for the Agency (EPA) to identify the various program areas to be addressed in the stormwater rule, the goals to be achieved by those programs, and to focus its efforts on continuing the development of guidelines for local control strategies and technologies. Beyond that, the Agency should relegate its oversight role to determining that state proposed programs are adequate, assuring that states continue to make reasonable efforts toward the goal of reducing stormwater pollution. . . resolving interstate and interjurisdictional disputes. . . , and establishing a national clearing house for information."

Source: City of Colorado Springs, Testimony at the Public Hearing on Restoring Balance in the Federal System, Council of State Governments and ACIR, June 9, 1989, p. 13.

Federal Requirements and Traditional State Prerogatives

Some federal environmental programs conflict with what had been state prerogatives. In particular, FERC authority under the *Public Utilities Regulatory Act* of *1978* for hydroelectric power licensing and Corps of Engineers and EPA authority under Section 404 of the *Clean Water Act* for wetlands and instream flow can supersede state control over water allocation.

lack of Funds for Federal Environmental Programs Delegated to States

As the role of the states expands, federal funding for many environmental programs is either being reduced or is not growing as quickly as total program costs; therefore, states are funding a growing percentage of the costs.[16] Some state and local governments complain that they are overburdened by their new responsibilities and are, or will be, unable to raise the necessary revenues to continue to manage and enforce existing programs and develop new ones (especially stormwater).[17]

State NEPAs and Requirements

About a dozen states have their own NEPA laws and requirements ("little NEPAs"). Many states patterned the state law on the federal one and strive to integrate the federal and state information gathering and process requirements.'* However, some states maintain separate processes and documentation requirements, and substantive and procedural requirements of federal and state NEPAs are not the same in some cases.[19] In states that do not operate the federal NPDES wastewater discharge program, facility development may have to obtain both state and federal discharge permits (e.g., Louisiana and Texas).[20] In many states, applicants must obtain separate federal, state, and local wetlands permits.

Environmental Constraints: Section 404 of the *Clean Water Acf*

All of the problems concerning federal environmental decisionmaking in state and local public works projects converge in the Section 404 wetlands permitting program. Section 404 of the *Clean Water Act* presents particular difficulties for state and local public works projects:

- Section 404 is an environmental constraint placed on public works projects, many of which traverse, fill, or affect wetlands.
- Large numbers of public works and other cases are submitted to the Corps of Engineers and to EPA for review. Staff and budget resources devoted to 404 cases are inadequate (see box). Time delays and lack of coordination among agencies are the direct result of this imbalance between case load and resources.[21]
- Satisfying other federal environmental requirements, such as those for endangered species and historic preservation, are part of the Section 404 permit review and therefore involve many agencies, compounding the time delays, interagency conflict, and lack of coordination.
- Wetlands definitions and decision criteria for 404 permits have been altered a number of times during the past decade, changing the "rules of the game" for public works applicants.
- The Wetlands Forum and others have recommended that the 404 program, and wetlands regulatory programs in general, are best implemented by state and local governments. The 404 program has been delegated to only one state, Michigan, and only a few states have applied for program delegation, due to the costs, complexities, and limitations of the program.
- High expectations are placed on the 404 permit and other regulatory programs to protect wetlands; yet, according to one estimate, these programs leave about 80 percent of wetland losses uncovered by regulatory programs.[22] Also, although the trend in federal programs is to encourage wetlands preservation, several federal programs still provide incentives for conversion. Public works projects suffer from a lack of coordinated, consistent, federal wetlands policy.
- Some 404 permits must receive approval from the *Corps* of Engineers and EPA, causing additional uncertainties, delays, and costs for public works applicants.

Several problems presented by the 404 program and their implications for public works are outlined in the following subsections. Ongoing and potential solutions are addressed in later sections of the chapter.

Corps of Engineers Annual 404 Program Statistics

- 15,000 permit applications; 11,000 applications issued or denied
- 40,000 "general" permit decisions (for classes of permits with similar characteristics and minimal environmental impacts)
- 25,000 jurisdictional determinations
- 600 staff assigned to evaluate permit applications
- regulatory expenditures ranged from $50 million to $70 million during past seven years; FY 1991 budget request of $75 million

Delegation of the 404 Program to the States

The Wetlands Forum, a national forum of public, private, and nonprofit groups hosted by the Conservation Foundation in 1989, recommended that the 404 and other wetlands programs be implemented by state and local governments (with adequate federal oversight) for several reasons: state and local governments are closer to the issues/permit cases, can use local planning tools like zoning, and could increase the consistency of 404 permit decisions by tying the 404 program to comprehensive state wetlands programs. In addition, state adoption of the 404 program would avoid the permit duplication (and concomitant delays and costs) faced by public works applicants. However, unlike most national environmental programs, only one state, Michigan, has received Corps of Engineers permission to implement 404 permitting at the state level (a few other states administer selected portions of the program). The reasons include:[23]

- Federal grants are not provided to assist states to operate the program.
- Only permitting for nonnavigable wetlands can be delegated to the states.

- States cannot assume jurisdiction of the program gradually; it's all or nothing.
- States fear excessive federal oversight.

There is some indication that when states implement federal environmental programs, there are fewer problems with NEPA integration and coordination requirements. NPDES water pollution, historic preservation, and *Coastal Zone Management* Act provisions of federal programs, for example, do not appear to cause as many decisionmaking conflicts between federal and state-local governments and between federal agencies as do Section 404 cases.

lack of Coordinated and Comprehensive Wetlands Programs

Although Section 404 is worded as a pollution control dredge-and-fill discharge program, it has become one of the key elements in a national effort to maintain, enhance, and restore wetlands. Greater consistency and predictability of public works permit decisions (with accompanying reductions in delays and costs) might occur if Section 404 was part of a comprehensive federal and state wetlands program. Federal wetlands policies remain inconsistent and direct activities in opposing directions. For example, wetlands conversions are encouraged by agricultural subsidies and flood-control and some drainage projects of the C o p of Engineers and U.S. Department of Agriculture (USDA). At the same time, other programs administered by EPA, the *Corps* of Engineers, FWS, and USDA encourage and subsidize wetlands preservation and restrict their uses. The Project 88 report summarized some of the issues in federal wetlands policy that need to be resolved:

> Federal wetland protection and acquisition programs are not up to the challenge. Budgets for wetland acquisition are limited and regulatory defects, plentiful. Restricted jurisdiction and limited statutory authority leave about 80% of wetland losses uncovered by regulatory programs; for those wetlands which are covered, regulatory authorities often underassess developmental impacts, especially cumulative ones. Penalties are too low to discourage violations of law, and despite much talk about new forms of mitigation, the fact remains that the techniques for creating and restoring wetlands are experimental at best.[24]

EPA's Section 404 Veto Powers

Differences between EPA and the Corps of Engineers authority over proposed Section 404 permits can present additional difficulties for state and local public works projects. The law gives EPA authority to reject Corps permits for projects affecting wetlands. EPA has used the power sparingly, vetoing only eleven projects in the past 18 years from the more than 10,000 permits per year issued by the Corps.[25] EPA Administrator William Reilly recently said that use of EPA's 404 veto power is "a sign the system is not working."[26]

EPA's 1990 veto of the Two Forks Dam in Colorado, the largest proposed nonfederal water project in the West, demonstrated the magnitude of the difficulties posed by the federal environmental review process.[27] The City of Denver planned to dam the South Platte River to supply water for its burgeoning suburbs. EPA's veto decision in November 1990 cited unacceptable adverse effects of the dam, including significant loss and damage to the area's wetlands, fisheries, and recreational opportunities, and inadequate mitigation of potential wetlands losses.[28] EPA's veto came after a ten-year planning process involving dozens of Colorado state and local agencies and citizen groups, $40 million of local funds spent on studies, including a major EIS that reviewed all of Denver's water supply options, a dispute resolution process, $90 million promised in mitigation measures, and approval of the dam by state and local governments, the Corps of Engineers, and the regional office of EPA.

A project applicant can take EPA to court to have a Section 404 veto overruled. James City County, Virginia, did just that, and a federal judge overruled EPA's veto in December 1990 by agreeing with the county that a proposed reservoir was the only reasonable alternative for the county's pressing water needs and that the EPA veto showed little understanding of the county's water problems.[29]

Design of Environmentally Sensitive Projects

Designing public works to reduce adverse environmental effects would lessen potential conflicts with environmental regulations and, in some cases, avoid the need to submit a project to federal environmental decisionmaking. This is another way of saying that NEPA and Section 404 encourage or require consideration of the environment and of alternatives with the least environmental impacts at every stage of a project. Federal environmental laws and regulations have been enacted and promulgated for a reason: Americans want to maintain and improve environmental quality. Many obstacles stand in the way of sustainable development with public works projects that meet the needs of both economic development and environmental quality.

Many people contend that current lifestyles—how we live, consume, farm, transport people, produce products, and plan for the future—too often threaten the health of the environment and work against the goal of sustainable development.[30] Usually, there are many alternative ways of meeting a public works need. For example, a high-speed rail link may be more efficient and cost effective and cause less environmental damage than building new airports in heavily traveled corridors, such as the Northeast and California. America's road, auto, and petroleum approach to transportation—as opposed to high-speed rail, mass transit, alternative fuels, and cluster development—is one example of how these alternatives can have profound implications for public works and environmental quality. Changing approaches to public works is difficult, however, in part because many groups have a vested interest in the status quo and consumers change their habits slowly. Using the transportation example, although mass transit revenues (including local, state, and federal subsidies) have increased from about $8.5 billion in 1980 to $14 billion in 1990, ridership has remained about the same, and transit's

share of all trips taken by individuals continues to decline.[31] The reasons are many and include suburbanization, tax advantages of homeownership, people's preference for automobile travel, and the small number of mass transit facilities relative to roads and highways. The net capital asset value of the nation's highways is 14 times larger than that of mass transit facilities ($470 billion versus $34 billion in 1984 dollars).[32] The fragmented nature of federal, state, and local responsibilities makes it difficult for agencies to think broadly at the policy or program level rather than the project level (e.g., airport, road, and rail project decisions rather than a transportation program).

Approaches to Integration, Coordination, and Accommodation

Despite seemingly intractable problems, many local, state, and federal agencies get the job done. The environmental ethic of NEPA is taken to heart by many agencies, which also strive to cooperate and to integrate information gathering, procedures, and environmental decision processes affecting public works. Some of the approaches include: coordination, including early review of projects, NEPA integration, improvements to the EIS, interagency coordination, general permits, regional cooperation, and information management; state and local innovation; state implementation of federal law; setting priorities; advance designation and ecosystem management; environmental dispute resolution; alternative sources of funding and public-private partnerships; and mitigation.

Coordination

Coordination takes many forms: early review of project design and applications, state management of the federal environmental review process, interstate and regional approaches, federal agency coordination, NEPA integration, and information exchange.

Early Review of Project Designs or Applications

Meet and negotiate early and often. This adage is invariably at or near the top of everyone's list when discussing the federal environmental decisionmaking process. Scoping sessions, preapplication conferences, and early identification of potential problems are key aspects of developing a project. All agencies involved in the decision process must participate for the early coordination approach to work. Early candor as to an agency's likely reception or ruling on a project may also help avoid potential problems.

EPA and other federal agencies could not complete their work without extensive cooperation with state and local governments. Whether led by a state, local, or federal agency, there are many examples of early coordination. Preapplication consultation between an applicant and the *Corps* of Engineers for a Section 404 permit is a fairly routine procedure. Many states have instituted permit streamlining, one-stop permit shopping coordinated by a lead state agency, to assist local government or private applicants (e.g., South Carolina for aquaculture projects).[33] Many state and local governments take the initiative to instigate and manage the federal environmental review process for their public works projects. The Arkansas State Highway and Transportation Department addresses the federal review process by practicing NEPA integration.[34] Pennsylvania's Department of Transportation has set up a process designed to reach consensus between different agencies and units of government for major highway projects.[35]

Arkansas Highway Planning and NEPA Integration

The Arkansas State Highway and Transportation Department's planning staff is multidisciplinary, prepares environmental impact statements and environmental assessments in-house, and works closely with the department's engineering staff. Environmental considerations are included from the beginning of the design stage. The department maintains an excellent rapport with other state and federal agencies (including FHWA, the Corps of Engineers, EPA, and FWS regional offices). Completing the federal review process is also assisted by the department's sophisticated and trained staff, a top-down management emphasis on environment, and the rural nature of the state that allows moving the highway to another site to avoid 90 percent of potential conflicts with federal environmental regulations.

NEPA Integration: Concurrent Environmental Reviews

Several federal and state agencies are making a concerted effort to embrace NEPA integration, including coordination of the process (concurrent rather than sequential) and consideration of environmental factors at the planning, design, and implementation stages.[36] The Federal Highway Administration and the Federal Aviation Administration (FAA) use NEPA as the umbrella for all environmental requirements for federal highway and airport grants. The Department of Transportation Order 5610.1C (September 18, 1979) establishes procedures for consideration of environmental impacts (the order fulfills DOT's responsibilities for coordinating environmental reviews as required by NEPA regulations). The procedures include coordination of information gathering, public review, interagency review, and department decisionmaking for the requirements of federal environmental legislation (including NEPA, EIS, Section 4(f) of the *Department of Transportation Act of 1966* as amended, airport and highway legislation, and other major federal environmental legislation such as the *Clean Water Act, Clean Air Act, Endangered Species Act, Coastal Zone Management Act,* and the *National Historic Preservation Act).* Despite DOT's efforts to coordinate federal environmental decisionmaking for public works projects, the cooperation of other federal agencies is not always forthcoming.

DOT agencies encourage their state, local, and regional counterparts to incorporate the objectives of NEPA integration through planning grants, training and techni-

All phases of a major project are coordinated at joint monthly meetings with representatives of all concerned environmental agencies, including the Corps of Engineers, EPA, and state game, fish, environmental, and historic preservation agencies or commissions. At these meetings, agency representatives are asked for their concurrence with project need and purpose, the analyses of wetland and other environmental impacts, and mitigation measures. The meetings do not eliminate an agency's permitting authority. Rather, the meetings allow regular scrutiny of projects, eliminate surprises, and diminish the chance of any adversarial interactions.

Pennsylvania's consensus process was also applied to a $500 million airport terminal project in Allegheny County. A memorandum of understanding was entered into by the county, federal and state environmental agencies, and FAA to assure the participating agencies that the impacts of airport development would be recognized and mitigation would occur in an environmentally satisfactory and economically realistic manner. The memorandum set forth procedures for mitigation of wetland and habitat impacts, called for water quality and stormwater management plans, and established coordination procedures between the county and environmental agencies.

cal assistance, and frequent contacts between federal and state agencies. Airport master plans that receive federal FAA grant assistance, for example, must complete an environmental assessment. Arkansas' state highway planning procedures and Pennsylvania's consensus process for transportation projects are examples of NEPA integration and federal-state cooperation.

Improvements to the EIS Process

The EIS process acquired some unfortunate "barnacles" in the mid-1970s,[37] but there have been improvements during the past 15 years. The most frequent complaints were the about length of the EIS and the delays that the NEPA process was perceived to cause in decisionmaking. Revised NEPA regulations promulgated by CEQ in 1978 sought to reduce unnecessary paperwork[38] and improve coordination of all federal environmental reviews, including EIS preparation. "To some unmeasurable but significant degree, the regulations have proven successful. Many (though by no means all) federal agencies have improved their compliance with procedural requirements of the statute. Litigation is decreasing."[39] In addition, CEQ has received few written complaints about the process.[40]

Formal, Scheduled Interagency Coordination

Federal agencies are making efforts to coordinate environmental decisionmaking for state and local public works projects, including regular meetings, MOAs, and guidebooks outlining procedures and program or permit definitions and requirements. Federal agencies regularly comment on each others' projects and plans to ensure that all federal actions include appropriate consideration of the environment and public interest. All major state and local public works projects are likely to receive comments from several federal agencies on 404 permits, the EIS, highway and airport funding, and dam licensing.

Interagency agreements address generic issues, coordination steps, thresholds for coordination, joint public involvement activities, scoping, programmatic approaches and permit considerations, agency roles and functions, and policies and operating procedures. For example, the Arkansas State Highway and Transportation Department, FHWA Arkansas division office, and the Corps of Engineers Memphis, Little Rock, and Vicksburg districts have an MOA for Section 404 permitting that addresses early coordination, scoping, processing, and joint hearings.[41]

The regional offices of EPA, the Corps of Engineers, and FWS meet regularly in some regions to review upcoming and ongoing projects of significance and to cooperate, compromise, and "wheel and deal" on aspects of proposed projects (e.g., Region 3).

Also, within the federal government, there is a variety of coordination activities concerning wetlands: examples are the Domestic Policy Council's Interagency Task Force on Wetlands in the White House, the MOA between EPA and Corps of Engineers on mitigation, and the joint "Federal Manual for Identifying and Delineating Jurisdictional Wetlands" signed by EPA, the Corps, FWS, and the Soil Conservation Service (SCS) in January 1989. The manual reconciled interagency differences in technically identifying wetlands and should lead to more uniform, consistent, and rapid wetlands delineations.[42]

The regional approach of federal agencies is an attempt to work closely with state and local agencies. Half of EPA's staff, for example, is located in regional offices. The Corps of Engineers permit decisionmaking process also is decentralized.

Federal-Aid Highway Projects and the 404 Permit Process

The time, cost, and complexities faced by highway project applicants in the 404 permit process prompted FHWA to form regional work groups in September 1985 to identify methods to improve interagency coordination for highway 404 permits. Regional administrators of the Corps of Engineers, EPA, FWS, NMFS, and FHWA focused on innovative cost-effective approaches to help field offices do their jobs faster and better. The 1988 summary of their recommendations, known as the "Red Book" (*Applying the Section 404 Permit Process to Federal-Aid Highway Projects*), identifies opportunities for coordination at every step of the highway development process.

General Permits

The Corps of Engineers issues general or nationwide permits for classes of Section 404 activities having similar characteristics and minimal environmental impacts. These permits maybe used by all states (e.g., placement of aids to navigation, road and utility crossings, and nontidal "headwaters and isolated waters" activities involving wetlands of less than 10 acres in size).[43] General permits eliminate some of the time and effort required for case-by-case review of similar projects.[44] EPA is considering a general permit approach for classes of NPDES stormwater permits.

Interstate and Regional Programs

Environmental concerns cross local and state boundaries. River basin and aquifer boundaries, for example, often traverse or underlie portions of several states. In a number of cases, state, local, and federal agencies have addressed the intersection of public works needs and environmental quality within the context of regional and interstate cooperation. Benefits of planning and coordination through regional programs are more efficient provision of public works, reducing the need for new structural projects, and procedures for addressing problems of drought and air pollution.

Regional and interstate cooperation to manage water resources has a long tradition in some American river basins. Implementing the agreements required for regional compacts and operating procedures and sharing of water supplies may require substantial and lengthy negotiations. However, the environmental benefits and cost savings can also be substantial. Improved coordination and management of watershed water supply systems has avoided the need for new reservoir projects in several cases. It has been estimated that coordinated water authority activities in the Potomac basin eliminated the need for new reservoirs (with significant environmental impacts), saving $200 million to $1 billion.[45]

Numerous additional opportunities exist around the country for interstate, intrabasin, and interbasin coordination of water deliveries. In the East, consolidation of or coordination among fragmented urban water supply authorities can achieve economies of scale in water delivery, decrease the risk of shortage in one subsystem within a region, and provide drought management procedures. Other examples of interstate and regional cooperation that affect public works, especially sewage treatment plants, water supply, and electric power, include the Great Lakes program, the Chesapeake Bay Initiative, the Northwest Power Planning Council, the International Coalition in the Red River Basin, and EPA's estuary management programs.

Several interstate water authorities have significant allocation authority. The Delaware River Basin Commission allocates water to users in the Delaware basin and transfers of water to New York City under a 1954 Supreme Court ruling[46] and 1961 federal legislation establishing the commission and granting it regulatory, licensing, and project construction powers. Water authorities in the Washington, DC, metropolitan area operate Potomac River water supply projects as integrated systems under a 1982 agreement. Both the Delaware and Potomac regional compacts include provisions for drought allocations.[47] Overall, however, the success of interstate agreements or compacts is mixed. J. B. Ruhl argues that the states and the federal government have not used compacts to their full potential.[48] The *Clean Water Act* barely mentions compacts, and the federal process for approving compacts is burdensome. States are equally to blame for not charging the interstate commissions with adequate regulatory and enforcement powers. And the compact process has proven even less effective in addressing air pollution and land development issues.

Information Management

Environmental statistics and data bases, the results of scientific studies, and wetlands mapping contribute to environmental decisionmaking. Government agencies need access to this information to make informed decisions and to avoid duplication of research effort. The National Governors' Association, for example, has an EPA grant to work on improving cooperation with states in environmental programs delegated by the *Resource Conservation and Recovery Act* (RCRA). NGA's work will address the organizational and technical difficulties that limit the collection of information needed for environmental decisionmaking and examine ways to promote additional data sharing.[49]

State and Local Government Innovation

By cutting federal assistance, the nation challenged the states to do more with fewer federal resources. "And they have!"[50] State and local governments have developed innovative programs, procedures, institutions, and financing methods to protect their environmental resources and to implement public works projects. The federal, state, and local roles continue to be defined and redefined. Federal air and water quality programs are designed with built-in expanding roles for state governments, and a growing portion of both program and funding responsibility is being delegated to states. In areas of emerging importance, such as toxic air pollution and groundwater contamination, states are taking the initiative to plan and implement programs concurrently with federal efforts. Some state programs are more comprehensive than their federal counterparts, especially in larger states with major environmental issues, resources, and staff.

At the policy level (which affects project decision and review processes) state initiatives include New Jersey's comprehensive, cross-media environmental permitting program; Arizona's groundwater management districts; Bellevue, Washington's, stormwater management programs implemented before the 1987 amendments to the *Clean Water Act;* and Florida's efforts to halt the drying up of the Everglades.

State Implementation of Federal Law

State governments implement many facets of federal environmental programs, including federal permits. Even federal laws are "federalist." In the *Clean Water Act* and the *Clean Air Act,* the federal government sets ambient environmental and sources discharge standards. Yet, the

states implement (write the permits), monitor, and enforce many of the programs. Some ambient and source standards, such as water quality, are set by the state. RCRA gives states authority to administer all or part of EPA's hazardous waste program. State primacy for federal environmental programs with full delegation of decisionmaking authority (within federal guidelines) presents a number of advantages for state and local public works projects:[51]

- State and local governments are closer to the public works projects and are in a better position than federal agencies to understand local needs and characteristics and to tailor federal programs to local situations.
- State primacy avoids the duplication of federal and state permits.
- States can combine permitting authority for federal programs with state comprehensive plans (e.g., watersheds, wetlands, or air pollution), zoning, easement, and critical areas programs for more effective, planned, and consistent environmental review of public works projects.

The potential of state primacy or delegation of federal environmental programs has been limited by a variety of factors, including excessive federal oversight of state programs (need for accountability) and inconsistent state programs.

The ***Clean Air Act*** is mentioned as an illustration of how some local governments believe federalism should work.[52] The federal government establishes uniform ambient air quality health standards, the states coordinate the design of state implementation plans tailored to local conditions, and locally appointed councils coordinate local efforts to meet and exceed the national health standards. State and local governments prepare and implement state plans for control of existing point sources to meet national air quality standards. This decentralized approach was in part a political decision: state and local governments are closer to the people and companies that must bear the burden of changing existing emissions. The ***Clean Air Act*** allows local governments to retain the flexibility to implement politically palatable solutions.

The federal NPDES wastewater discharge program is now administered by state agencies in more than half of the states. By contrast, only Michigan has been granted approval to implement the **404** program (for inland waters); a few others implement parts of the program (e.g., Maryland for inland wetlands of small sizes).[53] Among the reasons why more states have not attempted to take over the federal **404** program are that state primacy for implementing a federal program requires state funds and staff time and still includes federal oversight (i.e., supervision, review, approval, and audit), difficulties in obtaining federal approval for delegation, and an absence of federal financial and technical assistance to states for wetland permitting (unlike many federal programs that delegate responsibility for federal programs to states).[54] However, there are many examples of state and local initiative and federal, state, and local government cooperation in wetland protection and permitting.[55]

EPA's oversight of delegated programs remains extensive. EPA's control tools include standards and regulations, guidance documents, financial and technical assistance grants with grant requirements, and reporting and evaluation requirements. Several EPA and **GAO** studies have indicated that with EPA guidance and oversight, federal-state relations in implementing delegated programs and the consistency of state performance in delegated programs can be improved.[56] The recommendations of these studies include providing states with a clear understanding of expectations, a phasing out of day-today federal involvement, increased federal technical and other support for state programs after delegation, and increased capacity to monitor state activities without excessive paperwork. GAO has also proposed that EPA recertify delegated state programs on a three-year cycle as a way to implement these recommendations.[57]

State primacy/adoption of federal environmental programs and acceptance of the concomitant federal grants is optional. Failure to apply for primacy and grants results in less funding and fewer conditions to be met; failure to seek primacy results in direct federal implementation of national goals and less state administrative costs for programs forgone.[58]

Setting Priorities

At the heart of many differences over how to implement federal environmental programs are different perspectives on priorities and the absence of priorities (or a lack of vision). Effective long-term planning and risk management can spur an agency to marshal resources toward priority objectives. By so doing, EPA and other agencies could devote greater resources more effectively and efficiently to review applications for permits and funds for state and local public works projects. Planning gives more bang for the buck. Planning allows public works agencies to anticipate and avoid environmental problems through alternative designs and to match up facilities with public works demands.[59]

Public perception of risks translates into political pressures for action and into agency programs and spending. One of EPA's risk management challenges is that public perceptions do not necessarily correspond with the risks identified by scientists and agency staff. There is a need for public education about environmental risks, for transfer of scientific information into language understood by the public, and for a public debate on "green" priorities. Radon and the destruction of wildlife habitat may be far greater environmental risks than hazardous waste dumps, which voters care far more about.[60] At the same time, those who would identify risks should not exaggerate their gravity.

During the past 20 years, EPA and other federal agencies have provided environmental planning grants as an incentive to include federal environmental priorities in state and local programs and projects. ***Clean Water Act*** Section 208 planning grants, FHWA and FAA planning or airport master plan grants, and ***Coastal Zone Management Act*** grants offer federal funds (the "carrot") in return for adopting federal environmental objectives (the "stick"). FAA-funded airport master planning studies must include

EPA Science Advisory Board Recommendations

EPAs Science Advisory Board has called for a risk management effort at EPA to identify priority risks to health and environment and to build a consensus and direct resources to those priorities. The board's report, which has become EPAs blueprint for the future, states:

> For the past 20 years, EPA has been basically a "reactive" agency. As environmental problems were identified, the public conveyed its concern to Congress, and Congress passed laws to try to solve the problems. . . . Because of EPAs tendency to react to environmental problems defined in specific environmental laws, the Agency has made little effort to compare the relative seriousness of different problems. Moreover, the Agency has made very little effort to anticipate environmental problems or to take preemptive actions that reduce the likelihood of an environmental problem occurring.

Source: EPA, Science Advisory Board, *Reducing Risk: Setting Priorities and Strategies for Environmental Protection* (Washington, DC, September 1990), p. 3.

an environmental component (which usually points to "showstoppers" such as noise and wetlands). The approval of an airport layout plan (which includes an EA requirement) is the first NEPA point, or federal environmental review, for FAA.[61]

The National Governors' Association in 1990 surveyed the ways that states set environmental priorities, identify and rank the risks posed by various environmental contaminants, and factor such information into state budget and management decisions.[62] NGA found that about half of the states have some sort of environmental strategic plan or priorities document. Washington recently completed a report, "Washington Environment 2010," which includes an agenda designed to fulfill the citizens' vision of the environment in two decades.[63] Florida, Connecticut, Iowa, and Kentucky also have completed strategic environmental plans.

Putting together a state strategic plan is costly. EPA gave grants to five states to conduct pilot projects in strategic environmental planning. Washington and Colorado have detailed reports and action strategies. Vermont, Pennsylvania, and Louisiana were the other states."

Advance Designation and Ecosystem Management

One approach to avoiding potential conflicts over land use is to identify environmentally sensitive areas that are not likely to obtain federal environmental approvals for development purposes. Under Section 230.80 of EPA's 404(b)(1) guidelines, EPA has been using its "advanced identification" authority to notify the public of areas unsuitable for fill or dredge discharges and, thereby, to steer development activity away from wetland areas. EPA is planning to expand its advance designation activities,[65] and states can seek this assistance in protecting wetlands they regard as important. EPA also has advanced identification authority under Section 404(c) that is a binding designation prohibiting the use of a site for disposal.[66] This authority has not been used. The work of EPA and FWS in wetlands mapping is contributing to the effectiveness of advance designation of sensitive environmental areas. *Also,* the "special area management plan" concept added to the ***Coastal Zone Management Act*** in 1980 could be used for advance designation of coastal wetlands.[67] Advance designation is akin to state critical areas programs or local zoning for growth management.

Ecosystem management includes a collection of operational strategies, land use decisions, and land purchases that take EPA's advance designation a step further by managing the areas and/or purchasing the type of land that would be identified.[68] Ecosystem management then becomes a design constraint for a proposed public works project. Ecosystem management aims to sustain the natural functions, biological diversity, and other values of the ecosystem in question as a unit, even if parts of the ecosystem are separated by political or land-ownership boundaries. The methods can be applied to public land, such as wildlife refuges, or to private land. UNESCO, The Nature Conservancy, and others have adopted a strategy of long-term conservation and preservation of ecological complexes entitled regional landscapes, "megasites," or "greater ecosystems." Acquisition criteria include shape, interconnectedness, proximity to other resources, landscape diversity, and size. The UNESCO-designated biosphere reserves are to have core areas and buffer zones with limited uses. The Nature Conservancy purchases strategically located properties, especially buffers to wildlife reserves, and resells some land with conservation restrictions. Ecosystem management approaches are being applied to or have been advocated for national wildlife refuges, national parks and wilderness areas, the Great Lakes, EPAs National Estuary Program, and the Florida Everglades.[69]

Negotiation, Mediation, and Environmental Dispute Resolution

Interest in finding effective means of resolving disputes regarding public works and natural resources has prompted consideration of a variety of approaches in addi-

State of Washington Resource Damage Valuation for Oil Spills

The State of Washington has designed a resource damage valuation method for determining in advance the assessments that would be levied on oil and tanker companies for oil spills in the Puget Sound. The program is a form of advance designation. The environmental importance and sensitivities of each area or sector of Puget Sound has been mapped and a penalty for oil spills assigned to each sector, with high penalties for environmentally sensitive or important areas. Companies have rerouted their tankers to avoid the high penalty areas.

tion to litigation. Dispute resolution has been used in several classic cases of natural resources conflict that involved political disputes, a long time horizon, many stakeholders, and complex and multiple issues. The Denver Water Roundtable, for example, was an attempt to mediate disputes concerning the proposed Two Forks Dam in Colorado.[70] Environmental dispute resolution has been applied to several Indian rights cases, federal coal management programs, and groundwater cleanup in California.[71] Often, the approaches are not new and include the use of negotiation, mediation, and accommodation; what is new is the attempt to use such an approach in situations where litigation has been common.

Typically, a dispute is triggered by a proposed action. People then take opposing positions because they have different stakes in the outcome or disagree as to the use of the resources. Dispute resolution is used to determine the use and ownership of resources. Public sector disputes are traditionally resolved through administrative, legislative, or judicial means. Supplements to these traditional methods include nonlegal, voluntary approaches, such as arbitration, mediated negotiation, and mini-trials. Gail Bingham reviewed 138 site-specific and 47 policy environmental conflicts submitted to some voluntary dispute resolution process between 1974 and 1984.[72] Of the site-specific disputes, 50 percent dealt with land use, 20 percent with public lands, 12 percent with water resources, and 7 percent with energy projects. The research found that the type of issue was not a significant factor in whether voluntary dispute resolution was likely to be successful.

For voluntary processes to work, the parties must find it in their interest to make the effort necessary to reach agreement.[73] This suggests that there must be a recognition of interdependence (that the objective of each party can best be met through mutual agreement) and that the parties must see this process as preferable to any other alternative. There also must be a commitment to the process, including the execution of any agreement. Extensive literature describes dispute resolution methods and case studies, and there is a growing number of trained dispute resolution professionals. Environmental dispute resolution is being institutionalized by municipalities, state governments, and federal agencies.[74] However, environmental dispute resolution is not a panacea, does not work in many cases, and has been used to negotiate EPA enforcement actions that opponents termed "caving in" to industry.[75]

Alternative Sources of Funding and Public-Private Partnerships

Lack of funding, resources, and staff at environmental agencies is cited by many as the cause of conflicts and delays in federal environmental decisionmaking. As federal funding programs have been reduced or made more restrictive, and as the demands and expectations of environmental programs have increased, staffing and budgetary constraints on governments have been exacerbated. In response to these needs, federal, state, and local agencies are devising new and innovative methods of financing and leveraging budgets of environmental and public works programs. The methods include public-private partnerships, federal-state and state-local revolving loan funds, user fees, and pollution trading or "bubble" approaches. One of the thrusts of these efforts is to harness the use of market forces by creating an institutional framework for private sector participation in environmental programs. Techniques include federal support in the form of tax incentives, investment credits, blending government and private funding, funds recycling of government grants through asset sales, sale/leaseback, or other refinancing methods. These are not new techniques, but they are being applied on a broader scale.

Many of the objectives of the new financing methods will improve the federal decisionmaking process for state and local public works projects. These objectives include:

- Improve state and local government ability to finance environmental programs (and thereby increase funds for state and local regulatory work and better project coordination and review);
- Build public and private involvement and support;
- Increase private investment in environmental projects through market-based incentives, corporate voluntarism, and partnerships with all units of government (private involvement can increase the timeliness and cost effectiveness of solutions to environmental problems); and
- Increase the leverage or efficiency of federal resources spent on environmental programs.

Examples of innovative financing are found in all governments. EPA's Public-Private Partnerships Initiative was set up to help state and local governments develop new ways to finance required environmental improvements. One of the initiative's goals is to increase private participation in all phases of environmental infrastructure development, from financing to ownership of facilities to state revolving funds.[76] A major example of public-private partnerships with implications for all public works projects that affect bird habitat is the North American Waterfowl Management Plan (NAWMP), a program administered jointly by the Canadian Wildlife Service and FWS.[77] Utah's Wastewater and Water Loan Program illustrates a state funding initiative that makes state funds available for local wastewater treatment, new water source development, and delivery systems.[78] Since 1983, the program has funded 75 projects, resulting in $150 million of capital construction using $48 million of assistance from the state. The program works by leveraging the state loan money at a ratio of three local dollars for every state dollar. Eighty-five percent of the funds have been used to bring projects into compliance with state or federal wastewater treatment standards. The state loan assistance comes in the form of loans to communities to buy municipal bond insurance, to purchase locally issued bonds at favorable interest rates, and to issue loans that can be blended with locally issued bonds to yield a desired repayment rate. Repayments to the state then are made available for other projects. The Utah fund is similar to the state revolving fund program, which is replacing EPA's Wastewater Construction Grants Program.

NAWMP: An Example of Public-Private Partnership

The U.S. and Canadian wildlife services realized that they were unlikely to receive the budget resources necessary to achieve their waterfowl population objectives by purchase of land. The federal agencies now work with as many as 200 state, provincial, local, nonprofit, and private organizations to implement the North American Waterfowl Management Plan. Participants include hunting, wildlife, farm, business, and environmental groups. The administration of the program is participatory and decentralized via regional habitat joint ventures.

Mitigation

The term mitigation as used in federal environmental programs is defined broadly by NEPA to include avoiding, minimizing, rectifying, reducing, eliminating, or compensating for adverse environmental effects. Compensating for the impact entails replacing or providing substitute resources or environments. In an airport project, for example, mitigation may include changing runway designs or locations to reduce or avoid impacts on wetlands or historic sites, creating or restoring other wetlands to replace those unavoidably filled, and directing flight paths over the least populated areas to minimize noise effects. The costs and benefits of mitigation have to do with the effectiveness of the mitigation measures in meeting particular criteria. To identify and measure these costs and benefits requires narrower definitions of mitigation, opens up the Pandora's box of valuation issues, and is constrained by the limited amount of data and information about the costs of mitigation measures.

Use of Mitigation in Federal Programs

Mitigation may be required for public works projects as a condition of Section 404 permits from the Corps of Engineers or licenses issued by FERC, and of federal grants for highway or airport projects. In addition, there are questions about whether NEPA requires an agency (or permit or federal funds recipient) to undertake mitigation measures outlined in the EIS record of decision. This issue may be addressed by the U.S. Supreme Court.[79]

The federal government has a variety of wetlands programs that can be termed mitigation. For example, the Administration's fiscal year 1993 budget proposal to the Congress, requested almost $800 million (35 percent more than the FY 1992 appropriation) for enhancement, protection, and research activities to back the "no net loss" wetlands policy. Over fiscal years 1993-1995, the administration proposes $800 million for easements on up to a million acres of wetlands as authorized under conservation reserve provisions of the 1990 farm bill.[80]

Effectiveness of Mitigation

The Wetlands Policy Forum concluded in 1989 that "limited information is available on the current extent of mitigation requirements, and less exists on their effectiveness.'"[81] For wetlands issues, the effectiveness of mitigation as a policy tool in terms of frequency of use may be limited. The Office of Technology Assessment estimated that in 1980 and 1981, Section 404 permit applications originally proposed the alteration of about 100,000 acres of wetlands. Permit processing resulted in the avoidance of 50,000 acres of wetland loss annually (avoidance is one of NEPA's mitigation measures). For the 50,000 acres that were allowed to be converted, only 5,000 acres of compensatory mitigation were required. Thus, 90 percent of the permitted losses were uncompensated.[82]

The memorandum of agreement between EPA and the Corps of Engineers on wetlands mitigation and "no net loss" may increase the use of compensatory mitigation measures. That memorandum indicates that the preferred project alternative will be the one that avoids potential impacts to the maximum extent practicable. Only then will mitigation measures be considered in granting a 404 permit. Some developers argue that this policy of mitigation as a last resort (also known as "sequencing") puts an undue burden of proof on the applicant and may foreclose alternatives with greater overall environmental benefits. These development arguments generally assume that wetlands creation and restoration efforts will produce environmentally valuable wetlands.[83]

There is much work in the area of wetlands restoration and creation. The costs of wetlands restoration are highly variable and case specific.[84] Current information is based on actual site-specific mitigation activities and on test cases conducted by university researchers. Environmental groups support the sequential mitigation approach of the EPA-Corps of Engineers Memorandum of Agreement, assert that the role of compensatory mitigation should be limited because efforts to create wetlands have had limited success, and argue that avoiding and minimizing wetland losses in the first place should be the "first line of defense against wetland losses."[85]

Excerpts from the EPA-Corps of Engineers Memorandum of Agreement on Wetlands Mitigation

"In evaluating standard Section 404 permit applications. . . , the Corps. . . first makes a determination that potential impacts have been avoided to the maximum extent practicable; remaining unavoidable impacts will then be mitigated to the extent appropriate and practicable by requiring steps to minimize impacts and, finally, compensate for aquatic resource values. . . . Compensatory actions (e.g., restoration of existing degraded wetlands or creation of man-made wetlands) should be undertaken, when practicable, in areas adjacent or contiguous to the discharge site. . . . Mitigation banking may be an acceptable form of compensatory mitigation under specific criteria designed to ensure an environmentally successful bank." (February 6, 1990)

Definitions of Mitigation and Compensation

Unlike NEPA, others use narrow definitions of mitigation and distinguish between mitigation and compensation—compensation is a payment to someone or some group affected by a project; mitigation includes works or replacement activities at or near the project site to replace resources eliminated or damaged by the project. The economic efficiency and equity valuation issues of mitigation are complicated:

> Conventional economic analyses suggest that, all other things being equal, compensation will normally be a more efficient and preferred means to deal with losses. The assumed advantage is due to the lack of restrictions attached to a compensation payment which permits recipients to use the funds for whatever good or service is of most value to them. An equal sum spent on mitigation would restrict reparation to the benefits of reducing the particular harm. . . . The results of . . . studies suggest an alternative view of the relative merits of compensation and mitigation. People may view the compensation remedy as two events: a loss associated with the harm, and a gain of the money payment. As the compensation will be heavily discounted because it is viewed as a gain, more money will need to be paid to make up for any given harm. A mitigation measure, on the other hand, may well be treated as reducing the loss associated with the harm and will consequently be regarded as being more important. The strength of this intuition was borne out by survey results indicating that affected parties may well value mitigation or replacement measures more highly than compensation payments, even when the size of the payments exceeds the expenditure on the mitigation works or when the mitigation seems to serve little beneficial purpose.[86]

In addition, the incidence of benefits and costs matters: a dollar's worth of benefits to person A is anything but equivalent to a dollar going to person B, and the question of who should receive this dollar requires value judgments that often are hotly contested.

Consideration of the Environment at the Design Stage

Many conflicts could be avoided by finding nonstructural solutions or public works designs that do not create environmental permit and review problems. Federal laws enacted to protect the environment serve as a design constraint on public works projects and other human activities. The lack of environmentally sensitive project designs was identified earlier in this chapter as a cause of problems in the federal environmental decisionmaking process. Nonstructural demand management and environmentally sensitive ways of meeting public works needs are increasingly being considered and adopted. For example, policy approaches to water resources may be grouped under supply (or structural) approaches and demand (or nonstructural) approaches: water shortages may be addressed either by increasing developed supply (storage capacity) or decreasing water consumption and improving water quality. Many or most of the nonstructural water resources policy approaches have been recommended by water resource experts for 20 years. Likewise, for transportation, mass transit, high-speed rail links, cluster developments, and higher city parking fees have been proposed as ways of reducing the environmental deterioration caused by automobile-based transportation.

FHWA Environmental Policy Statement

- **Communication and coordination**
- **System planning**
  - integrate transport, land use, and environmental objectives
  - interagency coordination and public involvement
  - public/private initiatives
  - corridor preservation
  - new dollars into planning activities
- **Project development**
  - continuity with planning
  - interagency coordination and public involvement
  - range of alternatives
  - interdisciplinary
  - integrate NEPA, FHWA, Section 404, and other federal environmental requirements

FHWA's 1990 environmental policy statement directs the agency to integrate "full" consideration of the environment at all levels of its activities.[87] Special efforts are to be made to avoid, minimize, and mitigate environmental impacts; seek opportunities to enhance, restore, and replace environmental resources; and to abide by the federal goal of no net loss of wetlands. FHWA is supplying technical and grant assistance to three pilot projects in North Carolina to demonstrate that the agency's environmental policy approach can work. The objective of the pilot projects is to have NEPA considerations applied at the local planning level before the highway lines are drawn on the map. FHWA also uses environmental mitigation grant funds as one of the keys to implementing FHWA's environmental objectives. FHWA will provide grants (as part of the overall highway project cost) for mitigation activities required to satisfy federal environmental mitigation requirements (and in some cases those required by state law).[88]

In addition to changing project design and agency policies, lifestyles and values may have to change if public works needs and environmental quality are to be met in the next century. Educational programs and greater use of NEPA's goals and objectives (integration) are ways to find and encourage nonstructural or other alternatives, such as conservation, waste minimization, structural changes in design or type of public works, and changes in lifestyle, to minimize needs for public works projects. Pollution prevention, recycling, and source reduction have public works analogies. EPA's Science Advisory Board's recommendations are but one of many recent recommendations on this subject:

> The sources of risk often are to be found in the day-to-day choices made by individuals, communities, and businesses. Environmental risks posed by many human activities can be reduced sharply if different choices are made. Choice is influenced by a number of factors, including education and ethics. Growth and reductions in environmental risk are not necessarily incompatible if past patterns of individual, community, and business choice can change.[89]

Some of the pressures on federal environmental decisionmaking are external to the process. For example, the western states are and. The demands of population growth and development are coming up against the region's naturally limited water supply. Changing human values expressed through federal legislation are directly affecting the uses of the region's water, and increased value placed on instream flow functions for tourism, effluent dilution, endangered species, and wetlands is limiting water withdrawals for urban and agricultural uses. Similar situations are repeated in other sections of the country.

LEGISLATIVE AND ADMINISTRATIVE REFORM PROPOSALS

Changing or improving the federal environmental decisionmaking process can be accomplished through:

(1) Changing or improving the existing process under current laws and regulations;

(2) Changing the laws or current rules of the game; or

(3) Avoiding the problems by changing the nature of the public works projects.

Some changes and adaptations to public works projects occur under the first option—better coordination or early consultation may result in selection of an alternative with fewer environmental effects. Other ways of avoiding environmental impacts entail changing lifestyles and values and the nature of public works.

Some proposals for reform involve undertaking more of the ongoing efforts described earlier: cooperation, innovation, planning, and public-private partnerships. However, given the complexity of the issues and the increasing demands for public works and environmental quality, these efforts may not be enough. One general group of options for changing the process focuses on additional improvements within the existing framework of laws and regulations. Many impediments to integration and accommodation can be overcome without new legislation. However, existing regulations and approaches may encompass fundamental structural obstacles to improving the process. The second group of options includes a radical overhaul of statutes and regulations, changes in specific statutes and environmental policy approaches, and changes in decisionmaking methods and criteria.

Leading or promising reform options within the current rules of the game include:

1. Reinvigorating the NEPA process;
2. Changes to the EIS process;
3. Regulatory flexibility and state/local implementation; and
4. Communication, education, and research and development.

Changing the legislation or rules includes:

1. Consolidated federal environmental statute;
2. Consolidating federal environmental agencies;
3. Making EPA a cabinet-level department;
4. Changes to specific laws (the *Clean Water Act* amendments);
5. Consistency of decisionmaking criteria and administrative discretion; and
6. Market and economic incentive approaches.

Reinvigorating the NEPA Process

NEPA remains in place after 20 years, CEQ's regulations are generally applauded, and parts of the NEPA process do work. NEPA simply may need help, a reinvigoration, a rededication to its goals and objectives by the people who implement the process. The problem, according to these arguments, is with the federal agencies, not with NEPA or with environmental laws.

Participants at a March 1991 conference hosted by CEQ and entitled "NEPA Integration: Effective, Efficient Environmental Compliance in the 1990s" called on CEQ leadership to renew the NEPA "ethic" throughout federal agencies. Recommendations included CEQ work on training programs, public relations, education, uniform procedures, and model MOAs. There was a recognition that agency decisionmakers and the federal senior executive service staff need to be actively involved and committed to NEPA's goals. Methods to secure policymakers' commitment included high-level meetings, conferences, training, and education. The conference participants also urged greater education about NEPA integration at the junior staff level. Another suggestion was to have CEQ conduct a systematic review of federal agencies' implementation to determine the status of NEPA integration and to be better able to put pressure on agencies to implement the act.

There also is a need to sort out what NEPA integration means in terms of interagency coordination and sequential versus combined or coordinated decisionmaking. The options include:

- All permit decisions combined (an ideal);
- Key permit decisionmaking factors (showstoppers) identified (a more realistic, pragmatic possibility)—if the permit cannot be issued when the EIS is completed, at least enough information for a permit would have

been gathered so that the EIS information gathering and analysis is not duplicated;

- Tiered decisionmaking if problems occur with the "ripeness of the process"—tiering is encouraged by NEPA (e.g., first tier for a transportation corridor, second tier for the specific alignment).

Changes to the EIS/NEPA Procedures and Process

Time is money. Some state and local government applicants for federal permits or review might be willing to pay a fee (or a larger fee) to cover some federal agency administrative costs of permit review. Such an approach might be applicable to large projects but not to small projects or small local agencies. In addition, the fees would have to be related to function and go to a dedicated fund, not to "the bottomless pit of the Treasury."[90]

CEQ could provide additional guidance on EAs. The variations on the EA and the EIS include: mitigated EA, mitigated FONSI (finding of no significant impact), and EA/FONSI tiered from EIS. CEQ regulations provide detailed directions for the EIS but not for the EA or for "categorical exclusions," actions that do not have significant effects and do not require either an EIS or EA. Inconsistent approaches to an EA are perceived to be a problem because the assessment can be used to sidestep the EIS process or become a surrogate EIS.

Regulatory Flexibility and State/Local Implementation

There is a growing chorus calling for a more equitable balance between federal and state/local environmental decisionmaking power. The Western Governors' Conference White Paper, as well as recent reports by the Engineering Foundation, Harvard University, and the Interstate Conference on Water Policy, call for reforms to transfer more of the environmental decisions and activities now conducted by federal agencies to state and local governments.[91] These reports ask questions about the fundamental role of the states in environmental and natural resources policy within a federal system, building a balanced federal-state model in natural resources policy, vital functions the federal government should perform, and appropriate functions for state and local governments. At the heart of these issues is how to create a climate of mutual respect between governments that will allow for more flexibility and decentralization in implementing federal environmental policies.

A number of state and local agencies and officials would like federal agencies to comply more fully with the spirit of Executive Order 12612 to improve intergovernmental relations and the execution and efficiency of environmental programs. In testimony at an ACIR public hearing, the City of Colorado Springs noted:

> At times, it seems that the federal officials forget that state and local officials are also representatives of the citizens that are being asked to pay for these programs. It is the environmental values of those citizens that should drive the environmental programs, consistent with federally set goals and objectives. Given the appropriate climate of mutual respect among the various levels of government, which respect can be premised on both constitutional and practical considerations, it would become possible to achieve environmental progress on a cooperative, cost effective, and priority basis. The alternative is to risk losing the environmental forest by focusing on the regulatory trees.[92]

Excerpts from Executive Order 12612 on Federalism

In most areas of governmental concern, the states uniquely possess the constitutional authority, the resources, and the competence to discern sentiments of the people and to govern accordingly. In Thomas Jefferson's words, the states are "the most competent administrations for our domestic concerns and the surest bulwarks against anti-republican tendencies."

The nature of our constitutional system encourages a healthy diversity in the public policies adopted by the people of the several states according to their own conditions, needs, and desires. In the search for enlightened public policy, individual states and communities are free to experiment with a variety of approaches to public issues. . . .

With respect to national policies administered by the states, the national government should grant the states the maximum administrative discretion possible. Intrusive federal oversight of state administration is neither necessary nor desirable.

(Federal Register 52 (October *30,* 1987): 41685

Communication, Education, and Research and Development

Sen. Quentin Burdick, chairman of the Senate Environment and Public Works Committee, recently wrote:

> As any parent knows, it is more effective to teach an infant not to throw food than to clean the kitchen floor after each meal. Likewise, it is easier to increase environmental awareness than it is continually to clean up waste, pollution, and other damage to the environment.[93]

Education, communication, and research are on everyone's list of activities to address development and environmental issues. Two of the seven general impediments to water quality identified by Water Quality 2000 addressed training and education needs. Inadequate attention to the need for trained personnel has created a serious gap between a limited supply of new and retrained professionals and a growing demand for their skills. In addition, inadequate communication means that citizens are largely unaware of the linkages between daily life and water resources, what they can do to improve the quality of

water and aquatic habitat, or why they should participate in the first place. Additional research and development in many areas is necessary to improve the scientific basis for public works environmental decisionmaking.

Consolidated Federal Environmental Statute

EPA's creation more than 20 years ago was premised on a new vision of environmental management. As proposed by the Ash Council, which recommended the creation of EPA, pollutants would no longer be dealt with in media-specific straitjackets, but through a multimedia approach to environmental management.[94] In fact, EPA has never shaken the media-specific approach. The Conservation Foundation and others have once again proposed an integrated multi-media approach to reducing health and environmental risk through consolidation of environmental laws into a single new statute.[95] "The potential of reducing risks and costs simultaneously makes it an idea worth contemplating," notes EPA Administrator William Reilly.[96] A number of European and other countries have or are drafting a single environmental law with integrated pollution control (e.g., Great Britain, Germany, the Netherlands, and the Scandinavian countries).[97] Russell Train, a former EPA administrator, wrote that it is time to bring all environmental laws under one statute, an "organic" environmental protection act:

> Management and efficiency problems that arise because of our fragmented and unrelated environmental laws cannot be fixed by tinkering with each law as it comes up for reauthorization. What is needed is a wholesale change in our overall approach to environmental protection. This change should most properly come as a federal initiative, rather than simply allowing state governments to tailor their own solutions. Although the states have proven their capacity to test and adopt new methods, these innovations are mostly reactions to federal policies?*

Benefits of a Single Environmental Act

The benefits of a single environmental act may include:

- Replacing numerous permits with a comprehensive permit;
- Instituting an integrated approach to the problems that require multimedia control solutions and creating greater opportunities for pollution prevention (many control technologies now used to meet regulatory requirements simply shift it around or change its form or delay its release into the environment);
- Reaping efficiencies through elimination of competition for funding sources and reducing administrative costs;
- Setting priorities among different programs and control/prevention measures (the existing fragmented system makes this difficult);
- Funding permit work through a comprehensive state environmental fund similar to the current state revolving fund and funded by a single larger permit fee collected from the applicant;
- Reducing the cost of pollution control (for example, work by the Electric Power Research Institute indicates that an integrated approach to pollution control applied to a new coal-fired power plant would reduce the capital and operating costs of the plant's pollution control system by 25 percent);[99]
- Increasing popular support for the environment and a greater budgetary support link between popular support and willingness to pay for environmental quality.

Conservation Foundation Proposal

The highlights of the Conservation Foundation's proposed single environmental protection act include:

- A single permit for each major polluting facility;
- A unified system of control standards based on unreasonable risk and best available technology; "unreasonable risk" is the one primary standard for taking action;
- Innovative approaches to pollution prevention and waste reduction;
- Combining EPA and the National Oceanographic and Atmospheric Administration into a Cabinet Department of Environmental Protection;
- More effective enforcement against both mobile and stationary pollution sources;
- Much greater use of economic incentives and market mechanisms to protect the environment; and
- Unification of all major statutory research authorities.

Raising EPA to Cabinet Status

Some members of Congress and President Bush have signaled their desire to raise EPA to Cabinet status. Several members of Congress argue that making EPA a Cabinet department might be one small step toward giving environmental issues the priority they deserve.[100] It might also give EPA increased clout in obtaining budget funds, working with other departments, making national policy decisions, and negotiating with other nations that send Cabinet-level ministers to environmental meetings. However, given that EPA has not been able to develop a multimedia approach to environmental management, making the agency a Cabinet department may not solve the problem of fragmentation in environmental reviews of state and local public works projects. Balkanization might be aggravated if EPA grew in size and power.

Consolidating Federal Environmental Agencies

Combining environmental and natural resources functions into one Cabinet department is another suggestion for avoiding bureaucratic overlap, duplication, and inefficient use of resources. Should the Department of the Army instead of EPA be writing or overseeing domestic wetlands permits? Proponents of continuing roles for the Corps of Engineers and EPA in the Section 404 permit program argue that the two-agency approach provides for "checks and balances" between the environmental criteria of EPA and the broader range of criteria represented in the Corps of Engineers public interest review.[101] A holistic or sustainable development approach points to managing public natural resources and environmental protection within the same federal department.

Specific Environmental Legislation Changes

It is expected that reauthorization of the *Clean Water Act* will be the focus of congressional hearings and intense debate during 1992. Wetlands issues and Section 404 will be at the center of the reauthorization debates. Proffered opinions about Section 404 are likely to include: make wetlands definitions and regulations more specific, give all regulatory responsibility to one agency, and allow greater state and local definition of wetlands and wetlands permitting. Several of these proposals may reduce costs, delays, and program inconsistencies that afflict state and local public works applying for 404 permits; these recommendations also may make state adoption of the federal 404 program more attractive:

- *Provide federal funding for state implementation* of the 404 program (EPA received $8.5 million for state wetlands programs in fiscal 1992);
- *Extend the geographical reach of wetlands that the state may regulate* under a delegated program to all wetlands of the state, including navigable waters (as long as proper coordination is maintained with the Corps of Engineers and EPA);
- *Focus wetlands protection efforts on the most valuable wetlands* and create classes (no development on high-value wetlands, some development possible on low-value wetlands);
- *Encourage states to establish comprehensive wetlands programs* (coordination of permitting, acquisition, zoning, water banks, critical areas, and easement programs); and
- *Increase advance designation* of preservation areas on a regional basis.

Decisionmaking Criteria and Administrative Discretion

Federal environmental laws encompass two types of decisionmaking criteria. As outlined in Chapter 2, some laws call for a balancing process, other laws call for absolutes or specific environmental constraints, such as "fishable and swimmable water," "zero discharge," or a biological imperative. In enacting NEPA, the Congress never intended that national environmental policy should overmde other policies,[102] but sought accommodation or a balancing of competing policies. However, one could argue either that federal environmental decisionmaking criteria are inconsistent or that different types of issues demand different types of decision criteria. Is a more consistent approach possible, feasible, desirable?

A related issue concerns administrative discretion. There is increasing sentiment for specifying in federal environmental laws which substances or land uses are to be regulated and how. This loss of administrative discretion results in part from misplaced blame: EPA could not meet congressional deadlines in many cases because expectations were unreasonable. Complex problems, however, may require flexibility and diverse instruments, not uniform solutions like best available technology wastewater standards or national ambient air quality standards. But the Congress has neither the time nor the inclination to provide other solutions.[103]

The Conservation Foundation's proposal for a single environmental statute addresses both decisionmaking criteria and administrative discretion. "Unreasonable risk" would be the one primary standard for taking action. Although costs would be considered in deciding whether to undertake an action, the proposed act makes it explicit that such benefit-cost analysis is unfeasible and undesirable as the (only) way to make decisions. Judgment by the secretary of the proposed department of environment is necessary in almost all cases, and the act states that, if a choice must be made between the costs of a regulation or its benefits, the secretary should err on the side of benefits (i.e., on the side of environmental protection). In essence, the Conservation Foundation's proposal would allow a balancing of competing policies (a goal of NEPA and the aim of economic and multiple objective decision methods) within the constraint of sustaining environmental quality.

Market and Economic Approaches

Economic, market, and private and other innovative approaches to environmental programs are being considered and, in some cases, implemented for several reasons:

- Pollution taxes, public-private partnerships, and other economic tools can be a source of additional revenue for environmental programs.
- Effluent taxes and tradeable emissions permits can provide market incentives and cost-effective approaches to reduce pollution.
- The goals of environmental quality and economic development (or public works projects) should complement one another if either of them is to be achieved.

The nation has made substantial progress in improving environmental quality with the use of the conventional regulatory programs of the 1970s. These programs, however, may have tended to pit economic and environmental

goals against each other instead of encouraging "sustainable development." The environmental programs of the 1970s and 1980s applied relatively prescriptive, command-and-control, single-media, fragmented, sometimes inflexible, engineering approaches to pollution control. Little use has been made of economic tools and other strategies capable of directing resources to pollution prevention and reduction, and to sustainable development. These alternative approaches have been proposed as supplements to the conventional command-and-control regulatory policies.

Economic, market, and private sector approaches have been described in a variety of reports.[104] A team of 50 members drawn from academia, industry, environmental organizations, and government summarized many of the market techniques in "Project 88: Harnessing Market Forces to Protect Our Environment." The report emphasizes the practical employment of economic forces to achieve increased protection of the environment at a lower cost to society. Other economic policies with potential environmental benefits include the gasoline tax and automobile-related fees. In the past, public, congressional, and interest group opposition to raising gasoline and automobile-related taxes has eliminated a potentially effective environmental policy tool. A number of studies indicate that gasoline, smog, and congestion taxes and the end to subsidized parking would discourage automobile driving, increase mass transit ridership, cut the need for new roads, and reduce air pollution and the cases of conflict between road projects and the environment.[105]

Benefits and Costs of the Time Delay in the Federal Environmental Decisionmaking Process

Environmental decisionmaking requires time—federal review and permit processes, the EIS, procedural obstacles, citizen review, litigation. Controversies between and among citizen groups and government agencies contribute to delays. Environmental issues are only one factor in delays; others are financial, safety, labor-related, or technological issues. However, some well documented cases of delay for dams, highways, power plants, offshore oil and gas leases, pesticide and chemical product licensing, pipeline construction, and mining permits are the direct result of environmental issues. In the 1970s, EIS time requirements became excessive, according to complaints received by the Council on Environmental Quality.[106] CEQ revised the EIS regulations in 1978 to streamline the process. Although CEQ now receives few if any written complaints, the average EIS takes at least a year to complete.[107]

Some of the material in this section is based on a review of time-delay issues conducted in 1979 by a multidisciplinary team of researchers at the University of Michigan's School of Natural Resources under a National Science Foundation grant, and on the 1984 Office of Technology Assessment report *Wetlands: Their Use and Regulation*.[108]

Time creates costs in terms of lost opportunities—resources that must be committed now or in the future as a consequence of the added use of time. The more time is required, the most costly the process will be, everything else remaining equal. Time-related costs include:

1. The forgone net productive value of the resources already tied up in the process (the time costs of capital);
2. Opportunity cost of the additional resources that must be committed to the process on an ongoing basis until it is resolved;
3. Additional costs of hastening the completion of a project to meet a deadline after any delay (such as overtime payments for construction projects);
4. Losses resulting from late completion (e.g., costs of electric power outages due to the unavailability of electric generating capacity); and
5. Potential losses from the deterioration or reduction in value of existing resources (such as unchecked pollution).

But the use of more time also may bring benefits. These benefits include greater opportunities to analyze the underlying valuation problems, accommodation of changing social values, creation of better information flows, improved layouts and designs, avoidance of third-party losses, and greater consensus among affected parties with potential beneficial results. The benefits of time extension are more difficult to identify and evaluate than the costs of delay. Many such benefits consist of hoped-for (or prevented) changes in environmental conditions, although there are some commercial benefits from delay. Commercial benefits are usually related to changes in the outcome of a decision process due to changes in laws, regulations, or standards during the delay period as the result of lobbying or negotiations. Temporary benefits may accrue to a firm when activities are allowed to continue (such as pollution) until the decision process is completed.

Valuing and comparing the benefits and costs of time delay, whether on balance these costs are justified, can rarely be answered with certainty because diverse value systems lie at the heart of these disputes. Sorting this out requires identifying who gains and who loses from delay and calculating the values of environmental resources.

Notes

[1] 40 CFR 1500.

[2] 40 CFR 1500.2(c).

[3] U.S. Council on Environmental Quality (CEQ), *Environmental Qualify: 21st Annual Report* (Washington, DC, 1991), pp. 189-220; Western Governors' Association, "White Paper on Federal Water Policy Coordination," May 11, 1989; Dan W. Reicher, "Case Study—Energy Workshop," CEQ Conference on NEPA Integration: Effective, Efficient Environmental Compliance in the 1990s, Fairfax, VA, March 1991.

[4] Thomas P. Dunne, Acting Associate Administrator, U.S. Environmental Protection Agency, letter to John Kincaid, Executive Director, Advisory Commission on Intergovernmental

Relations, with responses to ACIR's questions about intergovernmental coordination (Response No. 5).

[5] "NEPA Case Study: The Salmon Summit," CEQ Conference on NEPA Integration.

[6] Ibid., and "Campaign is on to save remaining salmon runs," *US. WaterNews,* February 1991, p. 12.

[7] Stephen S. Light and John R. Wodraska, "Forging a New State-Federal Alliance in Water Management," *Natural Resources Journal* 30 (Summer 1990): 479.

[8] Howard K. Gruenspecht, "Forging New Links with Economic Policy," *EPA Journal* 16 (September/October 1990): 38.

[9] John S. Doyle, Jr., Assistant Secretary of the U.S. Army, Public Works, Hearings before the House of Representatives, Committee on Public Works and Transportation, Subcommittee on Water Resources, Committee Print 101-69, April 12, 1989, pp. 66 and 84.

[10] U.S. General Accounting Office (GAO), *Environmental Protection Agency: Protecting Human Health and the Environment through Improved Management* (Washington, DC, August 1988), p. 21.

[11] Reicher, "Case Study—Energy Workshop."

[12] Many of these concerns were expressed by participants and section chairmen in summarizing NEPA concerns at the CEQ Conference on NEPA Integration.

[13] GAO, *Environmental Protection Agency,* p. 164.

[14] City of Colorado Springs, Testimony at the Public Hearing on Restoring Balance in the Federal System, Council of State Governments and U.S. Advisory Commission on Intergovernmental Relations, Colorado Springs, June 9, 1989; Western Governors' Association, "White Paper on Federal Water Policy Coordination."

" A number of these studies are referenced in GAO, *Environmental Protection Agency,* pp. 159-161.

[16] U.S. Congressional Budget Office, "Environmental Federalism: Allocating Responsibilities for Environmental Protection," Staff Working Paper, September 1988.

[17] Gary B. Cohen, "Storm Water Permitting Deadlines Set: EPA's Ambitious Regulatory Approach Will Be Costly to Communities," *Environmental Decisions* 3 (February 1991): 15-17; Geoff Wilson, Colorado Municipal League, summary of information received by the Colorado Advisory Commission on Intergovernmental Relations, Environmental Subcommittee, testimony gathered in 1990 following Request for Information on Financial and Administrative Burdens Associated with Complying with Federal and State Environmental Mandates (October 11, 1990).

[18] U.S. Council on Environmental Quality, *Environmental Quality: Twentieth Annual Report* (Washington, DC, 1990), p. 41.

[19] "Integration of the National Environmental Policy Act and the California Environmental Quality Act," Case Study for CEQ Conference on NEPA Integration.

[20] GAO, *Environmental Protection Agency.*

[21] The imbalance between Section 404 case load and staff/budget resources is noted by federal, state, and local officials and by private sector representatives in testimony in *Status of the Nation's Wetlands and Laws Related Thereto,* Hearings before the U.S. House of Representatives, Committee on Public Works and Transportation, Subcommittee on Water Resources, Committee Print No. 101-69 (1991).

[22] Timothy E. Wirth and John Heinz, sponsors, *Project 88: Harnessing Market Forces to Protect our Environment* (1988), p. 64.

[23] Brenda S. Davis, Chief of Policy and Planning, State of New Jersey, Testimony (pp. 127-136); Henry A. Shilling, Director, Office of Legislative Affairs, EPA, Letter (p. 18); and David G. Davis, Office of Wetlands Protection, EPA, Testimony (p. 47), *Status of the Nation's Wetlands and Laws Related Thereto;* Hal F. Harrington, "Michigan's 404 Program Assumption," in Symposium Proceedings: *Wetland Protection: Strengthening the Role of the States,* September 19-21, 1984, Gainesville, Florida (Chester, Vermont: Association of State Wetland Managers, July 1985), pp. 488-492.

[24] Wirth and Heinz, p. 64.

[25] William K. Reilly, Administrator, Environmental Protection Administration, "A New Way with Wetlands," Address to American Farmland Trust, March 7, 1991, p. 6.

[26] Ibid.

[27] For discussion of Two Forks Dam case, see Denver Water Department, "Two Forks Dam and Reservoir: An Outline of the Process," Staff Paper, January 1990; Jim Schwab, "Two Forks Stalled—for Now," *Planning* (April 1990): 26-29; Michael Weisskopf, "EPA's Reilly to Veto Dam," *Washington Post,* November 23, 1990; Todd Sloane, "Denver Area Hits Fork on the Road to Water Project," *City & State,* December 3-31, 1990, p. 1.

[28] U.S. Environmental Protection Agency, Statement of EPA Administrator William K. Reilly on the Two Forks Dam and Reservoir, March 24, 1989.

[29] "Judge Upholds Virginia Pipeline," *US. Water News,* April 1990; "Judge Overrules EPA on Dam Veto," *U.S. Water News,* January 1991, p. 1.

[30] *Water Quality 2000,* "Phase II Report Problem Identification" (Alexandria, Virginia, August 3, 1990); Frederick Krupp, "Win/Win on the Environmental Front," *EPA Journal* 16 (September/October 1990): 30-31; Herman E. Daly, ed., *Toward a Steady-State Economy* (San Francisco: W.H. Freeman and Company, 1973); James A. Lee, *The Environment, Public Health, and Human Ecology* (Baltimore: Johns Hopkins University Press for the World Bank, 1985); World Commission on Environment and Development, *Our Common Future* (New York Oxford University Press, 1987).

[31] U.S. Department of Transportation, "National Transportation Strategic Planning Study" (Washington, DC, March 1990), pp. 12-6 to 12-5, A2-A6.

[32] National Council on Public Works Improvement, *Fragile Foundations: A Report on America's Public Works* (Washington, DC, February 1988), pp. 133, 144.

[33] M. Richard DeVoe and Jack M. Whetstone, "An Interim Guide to Aquaculture Permitting in South Carolina" (Charleston: South Carolina Sea Grant Consortium, August 1987).

[34] Arkansas highway department information from Mike Webb, Environmental Division, Arkansas State Highway and Transportation Department, case study presentation at CEQ Conference on NEPA Integration, March 1991.

[35] Willard C. McCartney, "Balancing Development and Wetlands Preservation," *APWA Reporter* (January 1991): 10-11.

[36] See examples in CEQ, *Environmental Quality: Twentieth Annual Report,* pp. 29-43.

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[38] 40 CFR 1500.2.

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[40] Dinah Bear, personal communication, February 21, 1991.

[41] U.S. Department of Transportation, Federal Highway Administration, *Applying the Section 404 Permit Process to Federal-Aid Highway Projects* (Washington, DC, September 1988), pp. 4 3.

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[55] *Wetland Protection: Strengthening the Role of the States and Status of the Nation's Wetlands and Laws Related Thereto.*

[56] GAO, *Environmental Protection Agency*, pp. 144–166.

[57] Ibid., pp. 167-185.

[58] Hamilton, "Regulatory Federalism," p. 33.

[59] Bruce D. McDowell, "Transportation and the Environment," *APWA Reporter* (November 1990): 8; EPA, Science Advisory Board, *Reducing Risk: Setting Priorities and Strategies for Environmental Protection* (Washington, DC, September 1990), p. 3.

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[63] Chris Gergoire, "What Do You Expect of EPA? A State Official," *EPA Journal* 16(September/October 1990): 50.

[64] Heidi Snow.

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[75] Lloyd Burton, "Negotiating the Cleanup of Toxic Groundwater Contamination: Strategy and Legitimacy," *Natural Resources Joumal 28* (Winter 1988): 106.

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[79] Bear, "NEPA at 19."

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[81] Conservation Foundation, *Protecting America's Wetlands: An Action Agenda—The Final Report of the National Wetlands Policy Forum* (Washington, DC, 1989).

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[83] State of Alaska, Testimony (p. 1676); National Wetlands Coalition, Testimony (p. 1652); and National Association of Indus-

trial and Office Parks and International Council of Shopping Centers, Testimony (p. 1616), ***Status of the Nation's Wetlands and Laws Related Thereto.***

[84] Officeof Technology Assessment, ***Wetlands: TheirUse and Regulation,*** pp. 117-138, 155; Ken Adler, EPA, Office of Policy, personal communication, February 22,1991; Beverly F. Birkitt and Susan Gray, "Wetland Impact Evaluation and Mitigation: Comparing Apples and Oranges," in David F. Fisk, ed., *Wetlands* ***Concerns and Successes,*** Symposium Proceedings, Tampa, Florida, September 17-22, 1989 (Bethesda, Maryland: American Water Resources Association, 1989), pp. 259-267; EPA, ***Bibliographic Series: Wetlands Protection,*** (Washington, DC, October 1988).

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[92] City of Colorado Springs, Testimony, **p. 2.**

[93] Sen. Quentin Burdick, "Starting Fresh with Environmental Education," ***EPA Journal*** 16 (September/October 1990): 32.

[94] Al Alm, "A Dream that Hasn't Come True," ***EPA Journal*** 15 (September/October 1990): 12.

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[96] William K. Reilly, "A Vision for EPA's Future," ***EPA Journal*** 15 (September/October 1990): 6.

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[98] Russell Train, "The Case for an Organic Environmental Protection Act," in EPA, ***Paying for Progress:*** *Perspectives on* ***Financing Environmental Protection,*** p. 84.

[99] Davies, ***The Environmental Protection Act,*** p. 3.

[100] See several articles on the subject by members of Congress in ***EPA Journal*** 16 (September/October 1991).

[101] Officials of EPA and Corps of Engineers have testified that they favor continuing roles for both agencies in the 404 program. See testimony of David G. Davis @. *46)* and John S. Doyle, Jr., Principal Deputy Assistant Secretary of the Army, Civil Works (p. 69), in ***Status of the Nation's Wetlands and Laws Related Thereto.***

[102] CEQ, ***21st Annual Report,*** pp. 190-195.

[103] Paul R. Portney, "Overall Assessment and Future Directions," in Portney, ed., ***Public Policies for Environmental Protection,*** p. 286.

[104] Wirth and Heinz; a summary of Project 88 by the project's director is in Robert N. Stavins, "Harnessing Market Forces to Protect the Environment," ***Environment*** 31 (January/February 1989): 5-7, 28-35; Kenneth I. Rubin and Mark Alderson, ***Financing Marine and Estuarine Programs: A Guide to Resources*** (Washington, DC: EPA, Office of Marine and Estuarine Protection, September 1988); Evelyn Shields, ***Funding Environmental Programs: An Examination of Alternatives*** (Washington, D C National Governors' Association, 1989).

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Each Commission member serves a two-year term and may be reappointed.

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