DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

CIVIL WORKS
STRATEGIC PLAN

Fiscal Year 2004 – Fiscal Year 2009

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US Army Corps of Engineers

FOREWORD

We are pleased to provide to the employees of the U.S. Army Corps of Engineers a status report on implementation of the President's Management Agenda in the Corps of Engineers.

The President's Management Agenda, which was announced in 2001, includes six initiatives directed at improving the efficiency, effectiveness, and accountability of Federal programs. One initiative -- Budget and Performance Integration – focuses on improving program performance by linking budget and performance management decisions. Three initiatives – Strategic Management of Human Capital, Competitive Sourcing, and Expanded Electronic Government – include management measures that enable agencies to carry on their activities better, faster, and cheaper. A fifth initiative – Improved Financial Performance – is designed to improve program accountability to customers and taxpayers. The sixth initiative focuses on real property asset management. The overarching objective for the initiatives is to clearly show results for the funding and effort invested in Federal programs.

If these goals and objectives sound familiar, it is because the U.S. Army Corps of Engineers and its employees pride themselves on their ability to achieve results. Though there is sometimes debate on particular projects or programs, there can be no doubt as to the value the Civil Works program and other Corps programs add to the Nation's security and to the prosperity and quality of life of its people.

To make the most productive use of public funds, to carry out quality public activities on a timely basis, at lower cost, and to be accountable to the public and taxpayers are all long-standing management objectives of the Army and the Corps. Consequently, we believe that we are building on a strong base as we carry out these Presidential initiatives.

We commend to you the enclosed report.

John P. Woodley, Jr.
Assistant Secretary of the Army
(Civil Works)

Carl A. Strock
Lieutenant General, USA
Chief of Engineers

Foreword

The Army Corps of Engineers traces its origins back to the construction of fortifications at Bunker Hill in 1775. For more than 227 years, the Corps has responded to the nation's and the Army's challenges.

Throughout this period, the mission of the Corps has evolved from "Builder" to encompass "Developer/Manager" and "Protector" of water resources. What began as a military engineering mission for nation building in the 18th Century expanded into a major peacetime mission in the 19th Century. The Corps helped a young nation map the frontier and expand westward by surveying roads and canals. The Corps promoted economic development through a vast water resources infrastructure, initiated development of the first national parks, and tied an inland navigation system together to move commerce across states and keep ports and harbors open, a role critical for national defense. In the 20th Century, the Corps' civil mission expanded again with the adoption of more water resources development and management duties, including flood control, hydropower, recreation, water supply, shore protection, and disaster relief. More recently, environmental protection and restoration responsibilities were entrusted to the Corps. As society's requirements and values have changed, the Civil Works mission has reflected changing national priorities for public water management. The Corps' abilities to evaluate, facilitate, advise, develop, operate, and manage furnish a robust capability set for the nation's benefit. The Corps has the spectrum of capabilities to facilitate integrated water resources management.

Responsibilities for the development, management, and protection of water resources constitute the current Army Civil Works mission. One of the great strengths of the Corps is the force multiplier effect between civil and military missions. In addition to the direct contributions that the Civil Works mission makes to our economic and environmental security and prosperity, the Corps also applies its Civil Works assets to support the Army in times of national need to enhance homeland security. In turn, the Civil Works mission derives greater capability and effectiveness by being an integral part of the larger Army and Defense team.

As we enter the 21st Century, the Army Civil Works Strategic Plan provides a framework for enhancing the sustainability of America's resources. We aim to do this by focusing on solutions and services that benefit people and the communities in which they live. This plan's strategic goals embody a vision in which the Army Corps of Engineers continues to serve as a national problem solver and public advisor for integrated approaches to providing water resources solutions and services.

John Paul Woodley, Jr.
Assistant Secretary of the Army
(Civil Works)

Robert B. Flowers
Lieutenant General, USA
Chief of Engineers

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Executive Summary

Water resources needs facing the Nation are great. Research and public involvement steer us toward addressing five national water resources challenges.

1. Achieve greater balance between traditional water resources demands and environmental/ecosystem objectives.
2. Restore the vitality of the environment from degradation caused by past development.
3. Address the performance and safety implications of an aging water resources infrastructure.
4. Ensure the capability to respond to natural disasters and terrorism threats to water resources infrastructure.
5. Minimize institutional barriers to efficient and effective water resources planning, decision making, and management.

It is beyond the scope and capability of any single agency to solve these challenges. We need innovative and collaborative ways to stretch resources and capabilities. The approach advocated in this strategic plan emphasizes:

- A holistic focus on water problems and opportunities.
- Attention to the watershed as a logical geographic area for managing water resources.
- A systems approach for analyzing problems and solutions.
- Collaboration, partnerships, and teamwork for deriving and implementing solutions.
- An emphasis on efficiencies to achieve more within existing resources.

For over 200 years, the Nation has called upon the U.S. Army Corps of Engineers to solve problems. As a new century begins, many partners, stakeholders, and customers are calling for all levels of government to address future water resources requirements. America must invest wisely within economic constraints and prevailing priorities to develop and manage water resources in ways that preserve and protect our national prosperity, competitiveness, quality of life, and environmental sustainability. Our vision is to be the premier public service provider of comprehensive, sustainable solutions to water resources challenges.

The Corps will continue to play a leadership role in commercial navigation, flood and coastal storm damage reduction, and ecosystem restoration. This means that we will support the development and management of a safe and reliable world-class maritime transportation system so essential to U.S. economic and national security. We will provide water resources solutions and infrastructure to save lives and reduce property damage from floods and hurricanes. And we will restore, protect, and repair the environment to maintain the viability of our ecosystems. We will leverage other capabilities as our additional authorities permit. We are committed to

collaborate through an ongoing dialogue with stakeholders to forge solutions to water problems that are economically viable, socially acceptable, and environmentally responsible -- sustainable.

We will do all of this by focusing on five strategic goals:

1. Provide sustainable development and integrated management of the Nation's water resources.
2. Repair past environmental degradation and prevent future environmental losses.
3. Ensure that operating projects perform to meet authorized purposes and evolving conditions.
4. Reduce vulnerabilities and losses to the Nation and the Army from natural and man-made disasters, including terrorism.
5. Be a world-class public engineering organization.

We will achieve these five goals through 13 objectives that shape performance expectations in annual performance plans.

We view the strategic planning process as important beyond any single strategic plan. This document thus serves as a catalyst for ongoing strategic thinking and planning for the Corps' future.

Establishing a Strategic Direction
c Strategic Goals
Objectives and Strategies
Measurement and Evaluation

1. Establishing a Strategic Direction

A. Introduction

This strategic plan fulfills the first of three requirements of the Government Performance and Results Act of 1993 (GPRA) with respect to the Civil Works mission of the United States Army Corps of Engineers. GPRA requires: (1) a Strategic Plan laying out broad goals and strategic objectives for the next five years; (2) an Annual Performance Plan setting annual targets for us to move toward strategic goals and objectives; and (3) an annual Performance Report summarizing actual progress achieved toward Civil Works goals and objectives. The Strategic Plan, the Annual Performance Plan, and the annual Performance Report comprise a total performance management package.

The Government Performance and Result Act advises Federal agencies to consult with entities potentially affected or interested in their programs in preparing their strategic plans. The process used to develop this strategic plan involved consulting with our customers, partners, and stakeholders – with both supporters and critics.[1] We initiated a broad-based dialogue about pressing water resources challenges through a series of public "Listening Sessions" around the country between June and September, 2000. We participated in a national water policy summit sponsored by the American Water Resources Association on September 17-18, 2002. We received guidance from a re-energized Chief of Engineers Environmental Advisory Board and a new Federal Principals Group established to advise on the Upper Mississippi River Navigation Study. We solicited comments on a draft strategic plan -- which we posted on the Internet on September 13, 2002 -- from the Office of Management and Budget, congressional committees, Federal and State agencies, non-governmental organizations, our internal organization, and individuals potentially affected by or interested in our Civil Works mission. This strategic plan incorporates the feedback we received.

B. Overview of the U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers is an executive branch agency within the Department of Defense and a Major Command within the Army. The Corps employs nearly 34,600 people, including 650 military officers, and 24,800 civilians and who perform civil works duties. The Corps is the world's largest public engineering, design, and construction management agency. We leverage our expertise through contracts with civilian companies for all of our construction work and much of our design work. The Corps is organized into a headquarters located in Washington, D.C., nine regional divisions or Major Subordinate Commands, and

45 Districts, 38 of which carry out civil works responsibilities in the United States. The Corps also has several world-renowned research and development laboratories and other offices serving civil works missions. A civilian Assistant Secretary of the Army for Civil Works has the principal responsibility for overall policy direction and supervision of the Department of the Army functions related to all aspects of the Civil Works mission. A military officer serves as the Chief of Engineers who oversees execution of both civil and military missions. The Chief of Engineers delegates responsibility for the leadership and management of the Civil Works mission to the Director of Civil Works, a general officer.

The United States Army Corps of Engineers serves the Army and the Nation at home and abroad by providing vital public engineering services and capabilities across a full spectrum of operations in peace and war in support of national and global interests. Using the Army's command and control structure, we can quickly mobilize a trained force of engineering program managers and problem solvers into a seamless military-civil team to deliver critical infrastructure, engineering-related technical assistance, and coalition-building expertise worldwide. This integrated military-civil blend of expertise provides a flexible instrument for problem solving and the design and implementation of engineering solutions. As such, our expertise contributes to the economic development, security, and revitalization of the U.S. and the nations we support. The robust capabilities of the Corps thus provide an instrument of national policy to preserve and extend peace globally in support of the National Security Strategy.

Our strength is our public engineering technical expertise in planning, design, construction, engineering management, and project management. This expertise is grounded in solid scientific and interdisciplinary skills and knowledge, as enhanced by demonstrated competence in contract management, contingency and disaster response, real estate services, collaborative processes, and research and development. Our ability to integrate a wide-ranging interdisciplinary capability into a full spectrum engineering capability and our geographic dispersion uniquely enable the Army Corps of Engineers to meet national water resources requirements.

C. The Civil Works Mission

Civil works for the Army and the Nation is one of four primary missions of the U.S. Army Corps of Engineers; the others are military construction support to the Army, the Air Force, other Department of Defense and U.S. government agencies, and foreign countries; real estate, and research and development. The civil and military missions are accomplished with the assistance of real estate services and research and development efforts and a host of organizational capabilities. We also have an active Support for Others Program wherein we provide life-cycle public engineering and related services to complement the missions of non-Federal partners, other agencies, and international entities.

Civil Works Mission

Contribute to the national welfare and serve the public by providing the Nation and the Army with quality and responsive

- **development and management of the Nation's water resources;**
- **protection, restoration, and management of the environment;**
- **disaster response and recovery;**
- **engineering and technical services**

in an environmentally sustainable, economic, and technically sound manner through partnerships.

Unlike some other agencies whose missions are determined by a unified authorization, the Corps has no singular organic authority for the Civil Works mission. Rather, our Civil Works mission has evolved from hundreds of legislative enactments since 1824 into a robust set of authorities[2] to meet the needs of the country and changing public sentiment regarding the management of water and related resources.

D. Civil Works Programs

We accomplish our Civil Works mission through nine business programs (see Appendix A for a more complete description of each one):

Navigation
Flood and Coastal Storm Damage Reduction
Environmental Protection and Restoration
Regulatory
Hydropower
Recreation
Water Supply
Emergency Management
Support for Others

Navigation, flood protection, and environmental protection remain our three primary Civil Works programs.[3] We accomplish the other six programs in conjunction with these three primary programs. The spectrum of our authorities, responsibilities, experience, and expertise across the nine business programs provides the Nation with a full range of capabilities allowing us to protect people from water, protect water from people, and to make water useful.

The value of the Civil Works mission is measurable, producing significant benefits for the Nation's economy, environment, and quality of life. For example:[4]

- A 15-barge tow moving up to 22,500 tons of cargo in a single trip on the inland navigation system delivers the equivalent of cargo that would be moved by 225 rail cars or 870 tracker-trailer trucks with less adverse pollution impacts. Relying on rails or trucks to move this cargo would bring our transportation system to a standstill.
- The cost of transporting cargo using the inland waterway system is estimated to be $10.67 per ton less than alternate rail or truck modes, which results in $7 billion a year in transportation savings – a 14-to-1 return on the $500 million invested annually in operation and maintenance of the system.
- The nearly 800,000 jobs that result from the activities of the inland waterway system generate a total payroll of $1.7 billion and over $425 million in Federal and State payroll taxes annually.
- U.S. ports and harbors contribute $783 million to the Nation's Gross Domestic Product, $16 billion in jobs, $515 billion in personal income, over $150 billion in tax revenue, and $1.6 trillion in business sales each year.
- Flood damage reduction projects have prevented over $700 billion in riverine and coastal damages since 1928, returning approximately $6 in benefits for each dollar invested in flood damage reduction infrastructure.
- Shore protection projects have protected 426 critically eroding miles of the Nation's shoreline.
- Environmental projects implemented by the Corps have added more than 120,000 acres of aquatic, wetland, and floodplain ecosystems to America's natural habitats.
- The hydroelectric power generated at multi-purpose projects owned and operated by the Corps plays a vital role in stabilizing the Nation's electric grid. Hydroelectric power dams produce enough electricity to supply 4.64 million homes with power and produce $533 million in Federal Treasury revenues. Hydropower is presently the most efficient way to produce energy with each KW-hour of hydroelectricity being produced at an efficiency of more than twice that of any competing energy resource.
- The water stored for water supply in Corps reservoirs supplies water to meet the annual water needs of 10 million people.
- Visitors to Corps lakes spend about $15 billion annually on trip expenses and durable goods, which supports 500,000 jobs and generates $17 billion in income to promote the Nation's economic vitality.

E. Our Strategic Direction: Responding to the Nation's Water Resources Challenges through Integrated Water Resources Management and a Watershed Focus

Our research, consultations, and Listening Sessions provided invaluable input that helped focus our strategic direction toward meeting national water challenges. A summary report of our Listening Sessions is available on the Internet at: www.iwr.usace.army.mil/iwr/waterchallenges. A discussion of key water resources challenges is elaborated in Appendix B. For this strategic plan, we summarized five challenges:

Challenge Area	Description
#1 Balancing Objectives	**Achieve greater balance between traditional water resources demands and environmental/ecosystem goals.**
#2 Repairing the Environment	**Restore the vitality of the environment from the degradation caused by past development.**
#3 Aging Infrastructure	**Address the performance and safety implications of an aging water resources infrastructure.**
#4 Responding to Terrorist Threats and Disasters	**Ensure the capability to respond to natural disasters and terrorism threats to water resources infrastructure.**
#5 Minimizing Institutional Barriers to Effective Water Resources Management	**Minimize institutional barriers to efficient and effective water resources planning, decision making, and management.**

Whereas the identification of challenges was not constrained, constraints are imposed by the annual budgeting process such that water resources challenges can be addressed at the pace that resources are made available. Partnerships between Federal and State governments and with Native American tribes, public/private collaborations, and innovations become essential to combining resources in order to move forward in meeting key water resources challenges.

One of the frequently raised topics at the Listening Sessions was the need to address water challenges from a broader geographical perspective such as the watershed, highlighting collaboration and integration. The Corps believes that this concept of integration is the key to reforming America's water development, management, protection, and restoration. Policy Guidance Letter #61, *Application of Watershed Perspective to Corps of Engineers Civil Works Programs and Activities (1999)*, outlines nine Watershed Principles. These principles provide the approach the Corps will seek to follow in carrying out our water resources development and management responsibilities in the future. The principles reflect an appreciation for the

interdependency of water uses and the desired input of a wide range of stakeholders. The Corps watershed approach is based on:

- Seeking sustainable water resources management.
- Integrating water and related land management.
- Considering future water demands.
- Coordinating planning and management.
- Promoting cooperation among government agencies at all levels.
- Encouraging public participation.
- Evaluating monetary and non-monetary trade-offs.
- Establishing interdisciplinary teams.
- Applying adaptive management as changing conditions or objectives warrant.

The watershed approach that the Corps envisions reflects what is known internationally as "integrated water resources management." The benefit of a watershed approach is that it requires one to think about water resources development and management in the context of a larger system than a single project and thus facilitates the search for comprehensive and integrated solutions to achieve objectives set by all concerned parties. By taking into account a multitude of water uses over a wide area as opposed to concentrating on a single use at one project site, it becomes possible to integrate a complex array of public values, institutional policies and priorities, regulatory procedures, planning criteria, public participation, and private sector business interests. Integrated water resources management highlights four key concepts that encapsulate the Watershed Principles with respect to water projects:

1. Systems Approach. In order to solve water resources problems comprehensively, all major aspects of the natural and human systems need to be accounted for. This includes the hydrology, geology, ecology, man-made systems, and how they interact with one another. It also includes the sediments, pollutants, and water-borne species carried in the water. Systems models help predict how changes in one or more parts of the system affect the other parts of the system given the interdependence among elements. A watershed framework facilitates evaluation of a range of project options simultaneously to determine the best combination of projects to achieve multiple goals over the entire watershed rather than examining each potential project in isolation from others.

2. Spatial or Geographic Integration. It is important to define the geographic boundaries that are potentially affected by or that could affect a project and to examine the project in the context of a larger geographic area. Projects typically impact water quantity or water quality. The watershed is an appropriate geographic area to look at upstream and downstream impacts of a project. By enlarging the spatial zone of consideration – for example, to a watershed, coastal zone, or a prairie region -- it becomes possible to examine the potential for water resources synergies and tradeoffs among all resource elements in that zone.

3. Balance Across Multiple Uses or Functions. Considering the many elements related to water in a watershed illuminates a full range of ways in which water and other natural resources are used. Typically, there are many potential uses for water, some competing and some complementary. Each use generates requirements for water quantity and water quality. Any project should be evaluated in the context of the broad range of needs in the watershed or "problem-shed" so that conscious decisions are made about tradeoffs and opportunities for synergies are availed when they make sense. The objective is to seek greater balance across objectives. Interdisciplinary views and collaboration become germane to identifying how best to achieve multiple objectives.

4. Collaborative Approach. Clearly, collaboration is essential to bring together the expertise on natural and human systems over the appropriate geographic area, knowledge of problems that exist, and the range of current and potential uses for water resources. Collaboration can involve several Federal agencies (e.g., Environmental Protection Agency, U.S. Fish and Wildlife Service, Natural Resources Conservation Service, Bureau of Reclamation, U. S. Geological Survey, and land management agencies), State and local agencies, the private sector, and interest groups and can take many forms. Each participating entity will bring its own legal authorities, skills and knowledge, history, and contributions to funding. Corps involvement in various aspects of project planning, design, implementation, and management will vary depending on the nature of potential solutions to the problems and whether or not the Corps has relevant expertise.

A range of options for involvement characterize the watershed approach. The Corps can participate in problem solving within a watershed in several ways depending upon the circumstances: (1) collaborate with other agencies in developing and applying an engineering or economic model to inform the deliberative process as to how to use water; (2) provide data, expertise, or technical assistance (e.g., planning assistance) to an organization representing a watershed; (3) assist in implementing solutions crafted by watershed groups; and (4) lead a watershed study. Watershed efforts should spring from regional needs. The Corps and other Federal agencies, such as the Environmental Protection Agency, the U.S. Fish and Wildlife Service, can bring valuable expertise to regional efforts along with State and local governments and non-governmental entities. Several examples illustrate potential Corps roles:

1. The Corps might work as part of a team comprised of Federal, State and local organizations, interest groups, and other stakeholders on a regional integrated water resources effort led by an existing watershed planning body that was formed at the regional or State level. The Corps could develop one or more projects that will work in conjunction with other activities or projects designed to meet a number of specific regional needs.

2. The Corps might work with the Federal Emergency Management Agency (FEMA) on its map modernization program. If FEMA discovers that, as a result of years of development, several communities in a watershed that are protected by Corps levees are now considered to be in the 100-year flood plain and will have to pay flood insurance, FEMA may find that communities want levees raised to avoid the costs of flood insurance. In this scenario, the Corps might help communities join together to form a watershed management body and, in partnership with FEMA and the U.S. Geological Survey, develop a model of the watershed that not only helps determine how to remove communities from the 100-year floodplain in the near future but that also informs communities better about the impacts of future development decisions on flooding and other water resources concerns.

3. The Corps might advise a County or State natural resources department how to develop or implement an integrated lake management plan.

4. The Corps might provide its technical, planning, or project management expertise to parts of a watershed plan using funds from other sources on a reimbursable basis.

A few cases further illustrate several ways in which the Corps of Engineers is moving toward watershed approaches:

- Coastal America provides a model of Federal cooperation among Federal, State, local, and non-governmental entities who have joined forces to search for program and funding linkages around a common goal – improving America's coasts – in an attempt to counter the piecemeal approach of the past and to leverage existing limited funds so as to stretch the Federal dollar. Organizationally, there are a number of groups that coordinate at different levels: a Principals group of Under or Assistant Secretaries from partner Federal agencies; a National Implementation Team of senior managers from these agencies; a Coastal America office that serves as a hub for national products, multi-regional projects, education, and training; nine Regional Implementation Teams; and local Project Teams – all supported by hundreds of non-governmental organizations and thousands of volunteers. Coastal America has restored or protected hundreds of thousands of acres of wetlands; returned thousands of miles of rivers and streams to fish spawning use; reduced pollution; and protected numerous species of fish, shellfish, birds, and marine mammals. The Coastal America process empowers teams to identify issues with broad regional significance. Regional teams then set priorities, develop strategies, and coordinate efforts across geographic and political borders through local teams to promote sustainable development through a watershed approach to natural resource planning and management. The broader view leads to systemic solutions and educates each participant about the missions, functions, ideas, and ideals of each other. Collaboration provides an expanded number of programs from which to draw potential solutions and avails resources and procedures already in place. The Corps

participated with its Coastal America partners in a unified marsh restoration project, the Galilee Bird Sanctuary on the coast of Rhode Island, begun in 1992 to restore almost 130 acres that had been destroyed by disposal of dredged material and construction of transportation facilities. The goal of the effort was to identify and solve habitat restoration, non-point source pollution, and contaminated sediment problems in a coordinated fashion. Cooperation among Federal and State agencies, the University of Rhode Island, and Ducks Unlimited made it possible to take on the entire marsh area as one project rather than as separate projects under diverse jurisdictions. The Army Corps of Engineers' role included developing a computer-based hydrologic model for the project, which can be adapted for use in salt marsh restoration efforts nationwide, as well as reestablishing marsh elevations and normal tidal flooding by re-excavating natural channels and installing culverts. As a result of this partnership, 125 acres of marsh were restored to productive use as inter-tidal habitat and valuable resting, nesting, and feeding ground for Atlantic Flyway birds. Additional benefits included building trusting relationships among the partners for future success. Corporate colleagues are now joining the partnership to add their resources for coastal restoration and protection.

- The Corps of Engineers regional sediment management demonstration projects also illustrate integrated water resources management in the littoral system similar to a watershed. Regional sediment management is an approach for managing projects involving sand and other sediments within the context of coastal regions and riverine systems. Regional sediment management projects involve partnerships at all government levels and with the private sector to leverage constrained funds to promote ecosystem restoration through improved sediment management methods and erosion management. Regional sediment management projects combine the benefits of shore protection and ecosystem restoration with navigation objectives to manage dredged material as a beneficial regional resource rather than as waste material for disposal.

- Under Section 729 of the Water Resources Development Act of 1986, Congress authorized the Corps to study water resources needs of river basins and regions in coordination with the Secretary of the Interior and in consultation with appropriate Federal, State, and local agencies. Congress specifically authorized the Rio Grande Basin study under this authority. The Rio Grande Basin encompasses 160,000 square miles in Colorado, New Mexico and Texas. The Corps is a partner with the Rio Grande/Rio Brave Basin Coalition to facilitate local communities in restoring and sustaining the environment, economies, and social well-being of the Rio Grande/Rio Bravo Basin. The Corps Middle Rio Grande Bosque Study aims to identify ways to integrate the programs, policies, and resources of all concerned agencies into a multi-objective water resources plan. The Upper Rio Grande Water Operations Model Study joins the Corps with the U.S. Bureau of Reclamation and

the New Mexico Interstate Stream Commission to examine what they can do under existing authorities to improve how water is stored and delivered within the context of an integrated plan for water operations at their existing facilities in the upper Rio Grande Basin.

- The Corps has partnered with the Port of Los Angeles and contractors to expand the second-busiest port in the U.S. and the ninth-busiest in the world. The project is an example of a Federal-local partnership that aims to accommodate economic development through an increased movement of goods to keep the region competitive, to stimulate the regional economy, and to protect the environment. In addition to deepening channels to allow deeper-draft cargo ships to access the Los Angeles Harbor, the project will also create a 590-acre landfill that will support Pier 400 with the 58 million cubic yards of sediment material that will be dredged. More than 250 acres of shallow-water habitat and protected nesting acreage for the California least tern endangered bird will be part of Pier 400. Mitigation for dredging involves restoring water quality and wildlife habitat at the 600-acre Batiquitos Lagoon at Carlsbad in northern San Diego County and participating on the interagency restoration of the 900-acre Bolsa Chica wetlands with the California Department of Fish and Game, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service. The Corps is also contributing models of the Los Angeles Harbor created by its Waterways Experiment Station, part of its Engineer Research and Development Center.

- The Corps of Engineers Hydrologic Engineering Center at Davis, California has developed a tool that analyzes ecosystem response to changes in flood waters called the Ecosystem Functions Model. It has applied this model to the Sacramento and San Joaquin River Basins Comprehensive Study designed to examine flood management while integrating ecosystem restoration on a system-wide basis (including channels and floodplains of the two rivers and the lower reaches of their major tributaries) in the Central Valley of California. The study developed alternative master plans to achieve a range of flood damage reduction and ecosystem restoration outputs for selection of a recommended master plan that aims to mitigate the impacts of settlement and economic development in historic floodplains; the loss of 90 percent of the riparian and wetland vegetation; and threats to important ecological communities (open water, wetlands, vernal pools, riparian areas, uplands), waterfowl wintering areas, rare plants, and animals. The Corps is exploring using the Ecosystems Functions Model with other States.

The watershed approach can address issues the Corps faces with respect to its current way of doing business. First, the Corps has been criticized for being too narrow in its analysis of water resources problems and the range of options for solving them. Most Corps water resources projects are studied in relative isolation from the rest of the system that affects the

project or could be affected by it, including other parts of the watershed and other potential uses of the water resources (e.g., water supply, navigation, ecological uses, recreation, etc.). Until recently, the Corps has been limited in its ability to work on broader watershed issues that are important for understanding the context for specific Corps projects. This has implications for projects as well as the health of the watershed ecosystem. Second, the Corps must manage multiple demands by multiple stakeholders, some of which conflict. For example, the Corps and its cost-sharing partners plan for project funding levels using one set of assumptions provided by the President's budget but must be prepared for quite different assumptions (and funding levels) given congressional budget appropriations. Having different planning assumptions makes management of projects difficult and handicaps the reputation of the Corps and the Federal government as a reliable partner. An integrated water resources management approach and partnerships with other Federal, State, and local agencies, as well as non-profit and private sector stakeholders, aimed at solving problems at an appropriate broad geographic scale (e.g., watershed) would begin to address the first problem because it can afford opportunities for all stakeholders to bring their respective missions, authorities, and funding to the table. A working dialogue among the Corps, the Office of Management and Budget, and Congress might begin to address the second issue – especially if the dialogue is focused on developing a shared vision of how the Corps can meet the needs of all key stakeholders through wise use of taxpayer dollars.

The Corps intends to work within the Administration and with Congress to promote policies and legislation that will be more consistent with the strategic direction presented here. We want to build on our areas of strength and improve our reputation in areas in which we have received criticism. We want to be a world-class public engineering organization – knowledgeable on the latest technologies, capable in the latest skills, trusted as an honest broker and helpful collaborator who provides transparent analyses, a wise investor of taxpayer funds, and an organization that delivers projects on time and within budgets.

Partnerships become critical to achieving this vision. By working together through our respective authorities, capabilities, and resources, watershed stakeholders can jointly define problems and generate solution alternatives. Hopefully, the result is more complete and sustainable solutions to water resources problems. In addition, the Corps Environmental Operating Principles, formally adopted in 2002, directly support the watershed perspective in emphasizing principles of sustainability, partnerships, and systems thinking for more integrated solutions.[5] The Kaskaskia River Watershed Association provides a concrete example of how partnerships can enhance integrated water resources efforts at the local level.

Working a Watershed Approach in the Kaskaskia River Watershed

The Kaskaskia River Watershed Association provides one approach to how the Corps can partner with others to foster comprehensive and sustainable solutions within watersheds.

The Kaskaskia River Watershed covers more than 10 percent of the State of Illinois. Citizens became concerned about (1) the impacts of flood-control reservoirs at Lake Shelbyville and Carlyle Lake constructed by the U.S. Army Corps of Engineers to reduce flooding on the lower sections of the Kaskaskia River and lower Mississippi River in the 1960s, and (2) adverse impacts of a navigation project on the lower reaches of 36 miles of the river developed to encourage the movement of coal, grain, steel, and other commodities by barge. Adverse impacts include loss of high-quality bottomland hardwood forest, savanna, prairie, native mussel species, birds, and a degradation of the quality of streams.

Concerned about future water use conflicts from population expansion that will require a greater need for clean sources of public water, coal-fired fuel, and maintenance of navigation channels, and interested in recreation as a sustainable source of income, the Kaskaskia Watershed Association (KWA) rose to the task to protect and balance interests in navigation, recreation, water supply, conservation, and sediment management. A mixture of business persons, agency personnel, and other interested parties came together on a watershed basis in 1996 as an incorporated not-for-profit organization to address restoration needs comprehensively through partnerships.

The Corps of Engineers is one of six Federal agencies involved in the KWA along with other partners – including seven State agencies, five partners of the Illinois Department of Natural Resources, and 14 regional and local interests spread across four reaches of the watershed. The Corps partnered with the Illinois Department of Natural Resources to help the Southwestern Illinois Resource and Conservation Development, Inc., a non-profit corporation, develop the report entitled, Kaskaskia River Watershed: An Ecosystem Approach to Issues and Opportunities. This report details over 100 projects fashioned to address issues and opportunities around 7 goal categories: Business, Industry, and Agriculture; Habitat; Human Resources; Hydrology; Recreation; Research and Monitoring; and Water Quality. Plans are grounded in respect for the sustainability of natural resources, active local citizen involvement in planning, good science and economic data, and a clear sense of how success will be measured.

Project funding for the Association's efforts comes from local sources with the assistance of State and Federal agencies and legislators. For example, the Natural Resources Soil Conservation Service has provided a person to assist in grant writing; the EPA has helped the KWA compete for EPA's watershed grants; the Department of Commerce has facilitated the group in getting economic development grants; and the U.S. Fish and Wildlife Service has attended planning meetings.

The Corps of Engineers intends to address the pressing water resources challenges facing our Nation and implement its strategic direction by pursuing five strategic goals:

1. Provide sustainable development and integrated management of the nation's water resources.
2. Repair past environmental degradation and prevent future environmental losses.
3. Ensure that projects perform to meet authorized purposes and evolving needs.
4. Reduce vulnerabilities and losses to the nation and the Army from natural and man-made disasters, including terrorism.
5. Be a world-class public engineering organization.

F. Budget Principles for Program Performance

Our strategic goals must be achieved within the constraints of limited resources; as such, concerted attention will be given to establishing priorities, achieving efficiencies, and attaining sustainable cost-effective solutions. The following key Administration budget principles[6] will help inform our decision making:

1) The Corps should evaluate proposed water resources investments using analytically sound, modern methods, current data, and, where appropriate, external review. The Corps should only pursue authorized Federal water projects that meet economic and environmental standards and that address contemporary needs.

2) Until the Federal government has reduced the construction backlog substantially, the Federal government should only proceed with those new projects that provide a very high net economic or environmental return to society relative to their cost.

3) In each of its three main missions (flood and storm damage reduction, commercial navigation, and aquatic ecosystem restoration), the Corps should establish priorities across and within watersheds based on the comparative net economic or environmental return that a given level of further investment would bring to the Nation.

4) In order to focus on the backlog of projects actively under construction in the three main mission areas, the Congress should adopt legislation to de-authorize or disallow funding for: a) inactive projects automatically; b) navigation projects for harbors and river segments that have extremely low commercial use; and c) projects whose main purpose does not fall within the three main mission areas.

5) The non-Federal cost share should reflect the extent to which a water resources project economically benefits commercial interests, property owners, or other identifiable private parties.

1. Establishing a Strategic Direction
2. Strategic Goals
3. Objectives and Strategies
4. Measurement and Evaluation

2. Strategic Goals

A. Five Strategic Goals

The key themes of this strategic plan are seeking balance across water resources objectives out of respect for the natural interdependencies across program purposes, achieving sustainable solutions, and approaching problems and solutions in an integrated, holistic fashion. All of the goals are important in supporting the Civil Works mission and strategic direction. Strategic goals 1 – 4 are mission-oriented. The fifth goal is a cross-cutting organizational goal that focuses on improving trust and confidence in the Corps through attention to capabilities, processes, and systems. Goal 5 additionally supports the President's five Management Initiatives to:

1) Manage human capital strategically;
2) Compete a portion of inherently non-governmental work;
3) Bring government closer to citizens through responsive technology;
4) Improve financial performance;
5) Ensure that the budget is integrated with performance expectations for improved accountability to the taxpayer.

<u>Goal 1</u>: Provide sustainable development and integrated management of the Nation's water resources.

The Corps will be a facilitator and collaborator in a systems approach to integrated water resources management for the Nation in concert with Native American tribes, Federal, State, and local entities, non-governmental organizations, and the private sector to design shared visions regarding water solutions that better balance economic, environmental, and social objectives. We will lead in responding to valid demands where we have responsibility in our primary Navigation, Flood Damage Reduction, and Environmental programs while aiming to foster and implement more integrated and sustainable solutions. We will seek to create a portfolio of projects that achieve integrated solutions in a watershed or geographic region, including navigation and flood damage reduction projects. Regardless of whether or not the Corps is the lead agency in implementing water solutions, we will be cognizant of the impacts of our projects on the objectives of others in the region and will work to find mutually acceptable outcomes. The Corps will recommend funding those projects with the greatest economic and/or environmental benefits.

Goal 2: Repair past environmental degradation and prevent future environmental losses.

The Corps will be a proponent in the repair and restoration of damaged aquatic and related land resources. We will also be a proponent in the protection of water and related resources.

Goal 3: Ensure that projects perform to meet authorized purposes and evolving conditions.

The Corps will assure that our projects function as designed and constructed to provide their justified levels of service or outputs. We will work to integrate environmental considerations into the rehabilitation and modernization of existing projects.

Goal 4: Reduce vulnerabilities and losses to the nation and the Army from natural and man-made disasters, including terrorism.

The Corps will provide timely, effective, and efficient disaster preparedness, response, recovery, and mitigation services in flood fighting and through our support of the Federal Emergency Management Agency and Department of Homeland Security.

Goal 5: Be a world-class public engineering organization.

The Corps will ensure the ability to accomplish civil works missions and to provide expert scientific and engineering technical assistance to the Army, Department of Defense, other Federal agencies, and internationally by maintaining a solid technical foundation in our core competencies in engineering and related sciences and by promoting organizational effectiveness and fiduciary integrity.

B. Objectives

The five Civil Works strategic goals will be accomplished through attention to 13 objectives. In many cases these strategic objectives have related Civil Works business program objectives that are tracked through the Annual Performance Plan. Both the Strategic Plan and the Annual Performance Plan are used to guide the formulation and execution of the budget for the Civil Works program each year. Civil Works business program objectives and performance measures for them link the Strategic Plan to the Annual Performance Plan. We are working to develop an appropriate set of Civil Works program performance measures to better set targets and track performance. Table 1 summarizes the five Civil Works strategic goals, 13 strategic objectives, and specific business program objectives.

Table 1. Summary of Civil Works Strategic Goals and Objectives, and Program Objectives

Strategic Goals	STRATEGIC GOAL 1. Provide sustainable development and integrated management of the Nation's water resources.	STRATEGIC GOAL 2. Repair past environmental degradation and prevent future environmental losses.	STRATEGIC GOAL 3. Ensure that projects perform to meet authorized purposes and evolving conditions.	STRATEGIC GOAL 4. Reduce vulnerabilities and losses to the nation and the Army from natural and man-made disasters, including terrorism.
Strategic Objectives and Business Line Goals	*The following objectives presume that the Corps has a cost-sharing partner.* **OBJECTIVE 1.1. Seek water resources solutions that better balance economic, environmental, and quality of life objectives.** Navigation Objective 1.1.1. Invest in navigation infrastructure when the benefits exceed the costs. Future: Invest in navigation infrastructure that is fully capable of supporting maritime requirements in environmentally sustainable ways where economically justified. Flood and Coastal Storm Damage Reduction Objective 1.1.2. Invest in flood and coastal storm damage reduction solutions when the benefits exceed the costs. Future: Invest in solutions that reduce the Nation's flood and coastal storm losses in environmentally sustainable ways where economically justified. Hydropower Objective 1.1.3. Invest in hydropower rehabilitation projects when the benefits exceed the costs.	***Environmental Restoration*** **OBJECTIVE 2.1. Restore degraded, significant ecosystems structure, function, process to a more natural condition.** Ecosystem Restoration Objectives 2.1.1. Invest in restoration projects or features that make a positive contribution to the Nation's environmental resources in a cost-effective manner. ***Environmental Protection*** **OBJECTIVE 2.2. Protect the Nation's wetlands to prevent degradation from future development.** Regulatory Objectives 2.2.1. Administer the Regulatory Program in a manner that protects the aquatic environment (assures zero net-loss of wetlands). 2.2.2. Administer the Regulatory Program in a manner that enables efficient decision making. ***Environmental Remediation*** OBJECTIVE 2.3. Assist in the cleanup of contaminated, hazardous, toxic, and radioactive waste sites as authorized or requested by others.	**OBJECTIVE 3.1. Improve the efficiency and effectiveness of existing Corps water resources projects.** Navigation Objective 3.1.1. Operate and manage the navigation infrastructure so as to maintain justified levels of service in terms of the availability to commercial traffic of high-use navigation infrastructure (waterways, harbors, channels). Flood and Coastal Storm Damage Reduction Objective 3.1.2. Operate and maintain Corps infrastructure to ensure that designed levels of flood protection are realized. Environmental Stewardship Objective 3.1.3. Ensure healthy and sustainable lands and waters and associated natural resources on Corps lands held in public trust to support multiple purposes, i.e., 3.1.3.1. Protect, preserve, and restore significant ecological resources in accordance with master plans.	**OBJECTIVE 4.1. Prepare and provide for rapid, efficient, and effective all-hazards response and recovery.** Emergency Management Objectives 4.1.1. Attain and maintain a high, consistent state of preparedness. 4.1.2. Provide rapid, effective, efficient all-hazards response. 4.1.3. Ensure effective and efficient long-term recovery operations. **OBJECTIVE 4.2. Improve the safety and security of critical water resources infrastructure.** Homeland Security Objective 4.2.1. Reduce risks to critical water resources infrastructure.

Strategic Goals	STRATEGIC GOAL 1. Support sustainable development through integrated water resources development and management.	STRATEGIC GOAL 2. Repair past environmental degradation and prevent future environmental losses.	STRATEGIC GOAL 3. Ensure that projects perform to meet authorized purposes and evolving conditions.	STRATEGIC GOAL 4. Reduce vulnerabilities and losses to the nation and the Army from natural and man-made disasters, including terrorism.
Strategic Objectives and Business Line Goals	Hydropower Objective Future: Invest in environmentally sustainable hydropower infrastructure improvements where economically justified. **OBJECTIVE 1.2. Support the formulation of regional and watershed solutions to water resources problems.** 1.2.1. As approved and funded, provide a range of assistance to support sustainable regional, basin-wide, or watershed planning and activities in partnership with others. **Objective 1.3. Reduce the backlog of ongoing, budgeted construction projects.** 1.3.1. Deliver project benefits as quickly as possible within available resources. 1.3.2. De-authorize projects that no longer show a positive benefit-to-cost ratio. 1.3.3. De-authorize projects that no longer have the active support of a local cost-share sponsor.	4.3.1. FUSRAP Objective. Achieve the cleanup objectives of the Formerly Utilized Sites Remedial Action Program (FUSRAP). 4.3.2. Support for Others Objective. Assist the Environmental Protection Agency in achieving the objectives of the Superfund Program.	3.1.3.2. Ensure that the operation of all Civil Works facilities and management of associated lands, including out-granted lands, complies with the environmental requirements of the relevant Federal, State, and local laws and regulations. 3.1.3.3. Meet the mitigation requirements of authorizing legislation or applicable Corps decision document. Hydropower Objectives 3.1.4. Provide reliable power. 3.1.5. Provide peaking power. . 3.1.6. Maintain capability to provide power efficiently. Recreation Objectives 3.1.7. Provide justified outdoor recreation opportunities in an effective and efficient manner at Corps-operated water resources projects. 3.1.8. Provide continued outdoor recreation opportunities to meet the needs of present and future generations. 3.1.9. Provide a safe and healthful outdoor recreation environment for Corps customers.	

Strategic Goals	STRATEGIC GOAL 1. Support sustainable development through integrated water resources development and management.	STRATEGIC GOAL 2. Repair past environmental degradation and prevent future environmental losses.	STRATEGIC GOAL 3. Ensure that projects perform to meet authorized purposes and evolving conditions.	STRATEGIC GOAL 4. Reduce vulnerabilities and losses to the nation and the Army from natural and man-made disasters, including terrorism.
			Water Supply Objective 3.1.10. In partnership with non-Federal water management entities, manage Corps reservoirs to provide water supply storage in a cost-efficient and environmentally responsible manner. **OBJECTIVE 3.2. Address the Operation and Maintenance (O&M) backlog.** 3.2.1. Fund high-priority O&M.	
Organizational Goal and Objectives	**STRATEGIC GOAL 5. Be a world-class public engineering organization** **OBJECTIVE 5.1. Be a world-class technical leader.** 5.1.1. Develop a Human Capital Strategy* to recruit, maintain, and enhance technical capability in core competencies. 5.1.2. Competitive Sourcing*: Accomplish inherently non-governmental work through others in support of mission accomplishment. 5.1.3. Support for Others: Provide public works engineering and construction management services that meet the customer's expectations. **OBJECTIVE 5.2. Improve budgeting and financial performance.*** 5.2.1. Produce auditable annual Civil Works financial statements that receive an unqualified opinion. 5.2.2. Link the budget directly to performance.* **OBJECTIVE 5.3. Become a more efficient and effective organization through technology** (e-government*). 5.3.1. Ensure that the Civil Works mission is supported by an information architecture and capital investments in technology aimed at increasing work efficiencies and effectiveness.* 5.3.2. Develop and use electronic means and media to provide timely and easily accessible information about engineering and related services to customers, the public, and other interested parties.* * Part of the President's Management Initiatives			

The next chapter addresses strategic objectives and strategies intended to achieve them.

1. Establishing a Strategic Direction
2. Strategic Goals
3. Objectives and Strategies
4. Measurement and Evaluation

3. Objectives and Strategies

Our strategic goals remain long-term endstates that we want to attain. To move in the direction of these goals, we will focus on achieving our strategic objectives. Work remains to specify many of these objectives in more measurable terms, but we have begun to move concertedly to develop a budget-based performance management system that will allow us to gauge our progress toward objectives more directly. Overall, we aim to make progress by orienting our Civil Works business programs toward strategic objectives and by improving or leveraging our authorities, policies, processes, and partnerships. We describe our strategies in the sections that follow.

Strategic Goa1 1

Provide sustainable development and integrated management of the Nation's water resources.

Goal 1 addresses both a mindset and a desired endstate. It represents application of the watershed approach to our civil works activities.

Objective 1.1. Seek water resources solutions that better balance economic, environmental, and quality of life objectives.

Strategies to Achieve Objective 1.1.

- Continue to apply the 1983 *Principles and Guidelines* (P&G) for project development to meet economic standards and further develop mechanisms for evaluating environmental standards of the P&G.
- Review Corps authorities, policies, and processes to determine those that promote and inhibit integrated water resources management consistent with watershed principles and needs and recommend revisions to Corps authorities as needed.
- Build on current Corps authorities to promote sustainable development[7] as well as more integrated water resources management.
- Promulgate guidance that encourages the formulation of multi-objective economic and environmental projects when desired by non-Federal interests.
- Conduct outreach to other Federal agencies for collaborative watershed efforts.
- Improve planning processes through Planning Centers of Expertise and enhanced

training and development of planners in the Corps, especially in the area of analytic models.

- Seek ways to better align and integrate ongoing water management activities managed by the Corps.
- Align (synchronize) the biannual Civil Works authorization process and annual appropriations process to foster greater integration across project purposes and objectives in planning new projects to better meet the current and future water resources needs of this country.
- Improve the Corps systems-oriented engineering and economic evaluation methodologies. Use and develop state-of-the-art models, including economic models, in conducting our analyses and evaluations.
- Increase interagency coordination of system modeling capabilities.
- Facilitate discussions across Federal agencies related to watershed-scale success criteria and performance measures.
- Seek independent review of large and controversial projects.
- Enhance the capability of the Corps to perform policy compliance reviews and manage an independent technical review process, e.g., through creation of a project review capability.

Objective 1.2. Support the formulation of regional and watershed solutions to water resources problems.

Strategies to Achieve Objective 1.2.

- Work with others (tribes, Federal agencies, State and local entities, non-governmental organizations, and regional watershed commissions) in developing integrated water resources solutions at a watershed scale, drawing upon the examples of Coastal America and American Heritage Rivers for success criteria.
- Enhance collaborative working relationships with the Environmental Protection Agency, the U.S. Fish and Wildlife Service, the Natural Resources Conservation Service, the U.S. Geological Survey, the Federal Emergency Management Agency, and others to share data, models, methods, and other information, especially related to watersheds.
- Use budget-based performance measures to rate and rank projects within the Corps Major Subordinate Commands (Divisions), which are organized along watershed lines. Give preference to projects that are designed most effectively to achieve watershed goals.
- Support the planning of States, tribes, watershed coalitions, and regional planning commissions as appropriate and authorized.
- Use existing Corps authorities, processes, and tools to promote collaborative planning.
- Promulgate guidance that fosters watershed-scale planning and management.

- Orient the Civil Works Research and Development Program to develop and use tools and processes that enhance watershed-scale analysis and integrated water resources management.

Objective 1.3. Reduce the backlog of uncompleted, scheduled work on ongoing, budgeted Construction, General projects.

The balance to complete for all projects in construction – known as the "Construction Backlog" – was around $21 billion in Fiscal Year 2003. Our intent is to deliver project benefits as quickly as possible within available resources or to de-authorize projects that no longer show a positive cost-benefit ratio or the active support of a local cost-share sponsor.

Strategies to Achieve Objective 1.3.

- Use resources as efficiently as possible.
- Prioritize all projects in a business program based on performance.
- Do not budget for construction projects that lack a favorable benefit/cost ratio or that no longer have the support of local sponsors.
- Follow the formal process described in Section 1001 of the Water Resources and Development Act of 1986 (amended in 1996) to automatically de-authorize "inactive" projects that have not had funds obligated by Congress for their planning, design, or construction for a full 7 fiscal years plus a 30-month additional evaluation period.

Goal 2
Repair past environmental degradation and prevent future environmental losses.

Goal 2 addresses the need to identify and restore ecosystems degraded by past development in keeping with the Environmental Operating Principles. To make these principles real, we will actively design water resources solutions to advance environmental sustainability from the start and will mitigate for demonstrated environmental harm resulting from project designs. Our intent is to minimize the need for mitigation. The objectives of Goal 2 address different aspects of the Corps Environmental Program.

Objective 2.1. Restore degraded significant ecosystems structure, function, process to a more natural condition.

The focus of this objective is *environmental restoration* where the environment has been harmed by development activities associated with Corps projects or by the development activities of others. The objective is to bring the affected resources back to a natural ecosystem functional state.

Strategies to Achieve Objective 2.1.

- Strive to achieve zero net loss of wetlands.
- Fully utilize existing Corps ecosystem restoration authorities (e.g., the Continuing Authorities Program, Section 1135 of the Water Resources Development Act of 1986, Section 204 of the Water Resources Development Act of 1992; Section 206 of the Water Resources Development Act of 1996) to provide the highest environmental return on investment.
- Fully explore non-structural solutions.
- Identify programmatic impediments to doing restoration projects and propose modifications consistent with Administration policies and priorities.
- Foster partnerships with other Federal agencies, tribes, State and local governments, and non-governmental organizations to restore the environment.

Examples of Recent Partnership Agreements

1) **<u>EPA</u> - In July 2002 the Acting Assistant Secretary of the Army for Civil Works signed a Memorandum of Understanding with the U.S. Environmental Protection Agency to restore and clean up urban rivers contaminated by sediment.**
2) **<u>Ducks Unlimited</u> - The Corps has signed a Memorandum of Understanding with Ducks Unlimited to provide a foundation for collaboration related to the protection, restoration, and management of selected wetlands and associated uplands.**
3) **<u>The Nature Conservancy</u> - In December 2000 the Corps signed a Memorandum of Understanding with The Nature Conservancy to facilitate effective and efficient management of important biological resources within the context of civil works activities; protect and restore fresh and marine habitats; advance our understanding of biological diversity in these habitats; promote non-structural and other measures to sustain ecosystem functions; encourage sustainable water management; provide for demonstration projects; monitor the rate of endangered species; and promote the gathering and sharing of scientific information of mutual concern.**

Objective 2.2. Protect the Nation's wetlands to prevent degradation from future development.

The focus of this objective is *environmental protection*. Prevention and protection are preferable to mitigation for environmental losses. Under Section 404 of the Clear Water Act the Corps has a Regulatory Program to protect wetlands threatened by private development by encouraging developers to avoid losses. When losses occur, developers mitigate for the losses.

Strategies to Achieve Objective 2.2.

- Improve the Regulatory Program by establishing a process for consolidated regulatory permits review.
- Work with others to improve the ecological quality of new wetlands being created as replacements for wetlands destroyed by development.

Objective 2.3. Assist in the clean-up of contaminated hazardous, toxic, and radioactive waste sites as authorized or requested by others.

The focus of this objective is *environmental remediation*. The purpose is to repair contaminated land to a state that allows economic development activity to resume on that land. This objective typically does not involve restoring original natural ecological functions to the site.

Strategies to Achieve Objective 2.3.

- Provide reliable, efficient, and effective support to assist Federal agencies, States, and others to accomplish their clean-up responsibilities.

Goal 3
Ensure that projects perform to meet authorized purposes and evolving conditions.

This goal addresses the responsibility of the Corps to deliver authorized services from its projects to the end user and taxpayer. It also suggests the need to be mindful to review the services provided in light of new demands and changing circumstances.

Objective 3.1. Improve the efficiency and effectiveness of existing Corps water resources projects.

Strategies to Achieve Objective 3.1.

- Conduct benchmark studies to determine the most efficient level of service.
- Prioritize critical maintenance requirements using performance measures.
- Examine and implement ways to reduce operational breakdowns.
- Develop and apply state-of-the-art technologies.
- As appropriate and feasible, use adaptive management processes to adjust to changing conditions.
- Conduct post-audits as authorized and funded.
- Modify operating plans as justified.

Example

Reservoir operating plans can be modified to account for changed conditions that have occurred over time since the project was originally constructed, as was done on the Green River, KY project. Any changes must necessarily be done within the purview of existing authorities and limits of available funds, or else the Corps must seek new authority or increased appropriations for economically justified and environmentally sound modifications.

Objective 3.2. Address the Operation and Maintenance (O&M) backlog.

Strategies to Achieve Objective 3.2.

- Develop a plan to identify high-priority maintenance as a strategy to reduce the Operation and Maintenance backlog.
- Operation and Maintenance projects in the Civil Works Program will be prioritized based on budget-based performance measures along with studies and construction projects to create a total portfolio of high-priority projects for funding.

Goal 4

Reduce vulnerabilities and losses to the Nation and the Army from natural and man-made disasters, including terrorism.

The purpose of this goal is to manage the risks associated with all types of hazards and to increase the responsiveness of the Civil Works Emergency Management Program within the Corps Office of Homeland Security to respond to disasters in support of Federal, State, and local emergency management efforts. Emergency readiness contributes to national security. We have established two objectives to promote effective readiness, response, and recovery.

Objective 4.1. Prepare and provide for rapid, efficient, and effective all-hazards response and recovery.

Strategies to Achieve Objective 4.1.

- Continue to serve as the lead agency in public engineering in support of the Federal Response Plan.
- Work with the Department of Homeland Security in defining the Corps role with respect to homeland security and defense within the context of an all-hazards Federal Response Plan.

- Promote research and development work units to improve flood damage reduction and disaster recovery plans, processes, and operations, e.g., levee inspection and Advanced Measures programs, and readiness training.
- Improve simulations of our response to disaster scenarios to ensure optimum readiness planning.
- Seek partnership opportunities with the Federal Emergency Management Agency to align their mitigation and recovery efforts with the Corps'.
- Continue to work with stakeholders and State and local emergency management agencies to improve emergency response planning.

Objective 4.2. Improve the safety and security of critical water resources infrastructure.

The era of high-terrorism brings with it requirements for high security. We must ensure that dams, reservoirs, levees and other flood control works are secure from external threats and malevolent tampering to prevent devastating flooding and contamination of water supplies.

Strategies to Achieve Objective 4.2.

- Ensure that the infrastructure the Corps operates and maintains is protected through a program of seamless infrastructure protection within the Corps.
- Work with the Department of Defense and the Department of Homeland Security to develop infrastructure security standards for all Civil Works projects.
- Support infrastructure threat analysis collection.
- Implement water resources management policy related to critical safety and security.
- Share infrastructure engineering expertise across Federal, State, and local entities.

Goal 5

Be a world-class public engineering organization

Goal 5 is focused on ensuring that the Civil Works mission is performed in a technically skilled manner so as to build respect and confidence in the products and services the Corps delivers today and into the future. Building trust will come from the integrity of our engineering and scientific evaluations and recommendations, the soundness of our management decisions, the transparency of our decision-making process, the reliability and effectiveness of our business processes, and the contributions we make to the state-of-the-art within and across our core technical disciplines. To achieve Goal 5, we must pay attention to people, processes, fiscal responsibility, efficiencies, and technology. The President's Management Agenda helps us focus on major organizational effectiveness aspects central to being a world-class organization: human talent, financial integrity, sound business practices, and the advantages that technology

offers, especially to bring government closer to citizens. We have set three objectives to move toward Goal 5. We will draw upon the ongoing plans we have drafted in support of the President's Management Initiatives to make headway toward these objectives.

Objective 5.1. Be a world-class technical leader.

Strategies to Achieve Objective 5.1.

Our strategies focus on recruitment, retention, fiscal responsibility and accountability, business process improvements, innovation, and outreach. Providing quality and responsive engineering and scientific services to the Nation and others requires a solid technical foundation. Toward preserving our technical edge, we will do the following:

- Develop a Strategic Management of Human Capital Plan for USACE that addresses OPM's Human Capital Accountability and Assessment Framework within the context of corporate planning, competitive sourcing, and technology initiatives.
- Improve recruiting policies and procedures targeted to critical skill areas.
- Implement a Planning Excellence Program to enhance our planning capability and economic evaluations.
- Establish national and regional Planning Centers of Expertise.
- Heed the National Academy of Sciences recommendation to institute independent review on large or controversial projects.
- Support competitive sourcing initiatives proposed by the Administration in concert with the mandates of the Federal Activities Inventory Reform (FAIR) Act of 1998.
- Partner with the Department of Army to streamline and standardize the employment application process for individuals seeking employment with the Corps.
- Improve leadership training and doctrine.
- Preserve our world-class capabilities through a robust Research and Development program, in part oriented to development and application of holistic systems frameworks and watershed models and technologies.
- Improve our technology transfer to promulgate our skills and knowledge more widely.
- Share our knowledge and expertise with others through an active Support for Others Program.
- Improve technology implementation through a Strategy for Management of Science and Engineering Technology (SET).

Objective 5.2. Improve budgeting and financial performance.

Strategies to Achieve Objective 5.2.

- Work with the Department of Defense Inspector General (DODIG) to produce a Chief Financial Officer's Report summarizing performance results for the Civil Works Program that is worthy of an unqualified audit opinion from the DODIG.
- Improve business processes and automated information systems to improve our financial management.
- Work with the Defense Finance and Accounting Service to ensure that financial reporting requirements are met.
- Develop the annual Civil Works budget on the basis of business program performance measures and targets. Budget development will utilize a performance-based budgeting process to set budget priorities within and across Civil Works business programs.

Objective 5.3. Become a more efficient and effective organization through technology.

Strategies to Achieve Objective 5.3.

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- Develop a world-class enterprise-wide information technology environment through improved information connectivity within the Corps and with the public, respecting the need to assure information security.
- Ensure that Information Technology systems meet IT security objectives.
- Reduce reporting burdens, streamline business transactions and make decision making more transparent through web-based electronic mechanisms that promote information access and sharing.
- Improve government-to-citizen services by leveraging technology and e-government (E-Gov) initiatives.
- Focus Information Technology (IT) spending on high-priority modernization initiatives using a modernization blueprint for Enterprise Architecture.

Examples of How the Corps is Improving Government-to-Citizen Services

-The Corps' Navigation Data Center provides the Operations and Maintenance Business Information Link (OMBIL), an electronic system that links and standardizes operational data regarding navigation, flood protection, hydropower, environmental stewardship, recreation, and regulatory issues.

-The Corps' Emergency Management Program operates ENGLink, a GIS-based interactive system for emergency communications, command, and control that enables rapid access to maps and data regarding both baseline information and specific disaster events.

-We have integrated regulatory permits, outgrants, and other types of authorizations and licenses for ease of public access and completion.

-The Corps' Internet-based National Recreation Reservation Service serves as the one-stop recreation reservation system for the public for more than 145,000 recreation sites at over 1700 Federal lakes and parks, including National Parks and other public lands.

-Within the Regional Sediment Demonstration Program, a regional geospatial information system (GIS) is being developed to provide baseline data and historical data sets to facilitate regional sediment management decisions in the Alabama-Mississippi region.

-The Corps' Natural Resources Management Gateway provides a one-stop on-line entry point to a wealth of natural resources information for the general public.

-The Corps is taking the lead in partnership with the Coast Guard, the National Oceanic and Atmospheric Agency, and the River Boat Pilot Association under the Inland Electronic Navigation Chart Program to provide a geospatial one-stop source for marine transportation information consisting of maps of navigation channels and automated information systems related to shoreline and inland navigation.

-The CorpsMap Program will provide one geospatial interface for all nation-level databases, thus allowing any Federal agency to incorporate Corps data.

The next chapter describes performance measures and plans to evaluate performance progress toward strategic objectives.

1. Establishing a Strategic Direction
2. Strategic Goals
3. Objectives and Strategies
4. Measurement and Evaluation

4. Measurement and Evaluation

Strategic goals are operationalized through strategic objectives, business program objectives, and performance measures. Annual Performance Plans provide specific targets. We are working to define five-year performance targets. The Civil Works strategic goals and objectives become inputs for Major Subordinate Commands and Districts to include in their planning. Separate plans have been developed for the President's Management Initiatives regarding a human capital strategy, competitive sourcing, financial management, citizen-centered E-government, and integration of performance and the budget. These plans may provide additional goals and objectives that will be tracked outside this strategic plan. External factors that impact progress toward our goals include Department of the Army and Department of Defense policies and priorities.

We are working to refine our performance measures and see value in developing common measures across Federal agencies (e.g., wetlands management). In some cases, we lack performance measures or baselines to project 5-year targets, so our immediate objective is to refine our performance measures and collect baseline data. We recognize that work remains to allow for a full evaluation of how well the Civil Works mission is accomplished. We are working with our Business Managers to obtain critical information for future Performance Plans.

A. Performance Measures

Table 2 summarizes the five Civil Works strategic goals, 13 strategic objectives, selected Civil Works business program objectives, and performance measures. Some of these measures are evaluated through the Office of Management and Budget's (OMB) Program Assessment Rating Tool (PART) and others reflect a link between performance and the budget; the latter are submitted as part of our budget. We are currently initiating a performance-based budgeting process employing budget-linked performance measures to identify funding priorities. In essence, those potential investments demonstrating the best return on investment in either monetary or environmental benefits as shown by performance measures will receive the highest funding priority. Much remains to be done to establish priorities across business programs and where metrics other than dollars are used to gauge performance. Table 2 thus remains dynamic and will be revised as business program teams refine their program objectives and measures. However, the Corps is committed to improving its performance-based budgeting process and will work with OMB in this regard.

Table 2. Summary of Performance Measures

Goal 1: Provide sustainable development and integrated management of the Nation's water resources.	
Objective 1.1. Seek water resources solutions that better balance economic, environmental, and quality of life objectives.	
Program Objectives	Performance Measures
Navigation 1.1.1. Invest in navigation infrastructure when the benefits exceed the costs. Flood and Coastal Storm Damage Reduction 1.1.2. Invest in flood and coastal storm damage reduction solutions when the benefits exceed the costs. Hydropower 1.1.3. Invest in hydropower rehabilitation projects when the benefits exceed the costs.	Remaining BCR (project specific measure).
Objective 1.2. Support the formulation of regional and watershed solutions to water resources problems.	
Objective	Performance Measure
1.2.1. As approved and funded, provide a range of assistance to support sustainable regional, basin-wide, or watershed planning and activities in partnership with others.	The incorporation of watershed principles into the plan formulation process via guidance and training.
Objective 1.3. Reduce the backlog of ongoing, budgeted construction projects.	
Objectives	Performance Measures
1.3.1. Deliver project benefits as quickly as possible within available resources. 1.3.2. De-authorize projects that no longer show a positive benefit-to-cost ratio. 1.3.3. De-authorize projects that no longer have the active support of a local cost-share sponsor.	Percent change in constant dollar balance to complete programmed work on all ongoing, budgetable construction projects.

Goal 2: Repair past environmental degradation and prevent future environmental losses.

Objective 2.1. Restore degraded, significant ecosystems structure, function, and process to a more natural condition.

Program Objective	Performance Measures
Ecosystem Restoration 2.1.1. Invest in restoration projects or features that make a positive contribution to the Nation's environmental resources in a cost-effective manner.	Acres of habitat restoration completed. River miles of habitat restoration completed. Acres/river miles of nationally significant habitat restoration completed per dollar invested.

Objective 2.2. Protect the Nation's wetlands to prevent degradation from future development.

Program Objectives	Performance Measures
Regulatory Program 2.2.1. Administer the Regulatory Program in a manner that protects the aquatic environment (assures zero net-loss of wetlands). 2.2.2. Administer the Regulatory Program in a manner that enables efficient decision-making.	Compliance inspection -- percent completion rate for Individual Permits (standard permits and letters of permission) each year. Compliance inspection -percent completion rate for General Permits with reporting requirements completed each year. Compliance inspection -- percent completion rate for active permitted mitigation sites. Compliance inspection – percent completion rate for all active mitigation banks and in-lieu fee arrangements. Percent rate of resolution of outstanding un-authorized activities, which were unresolved at the end of prior FY. Percent of individual standards permits (excluding those with ESA consultations) issued in 120 days or less. Percent of General Permits issued in 60 days or less.

Objective 2.3. Assist in the cleanup of contaminated, hazardous, toxic, and radioactive waste sites as authorized or requested by others.

Program Objectives	Performance Measures
Environment Program 2.3.1. Achieve the clean-up objectives of the Formerly Utilized Sites Remedial Action Program (FUSRAP). 2.3.2. Assist the Environmental Protection Agency in achieving the objectives of the Superfund Program.	Quantity of contaminated material remediated. Quantity of contaminated material remediated per dollar invested. Customer (Environmental Protection Agency) satisfaction with the quality and timeliness of the Corps cleanup efforts, i.e., they meet quality standards and schedules.

Goal 3: Ensure that projects perform to meet authorized purposes and evolving conditions.

Objective 3.1. Improve the efficiency and effectiveness of existing Corps water resources projects.

Program Objectives	Performance Measures
Navigation Program	
3.1.1. Operate and manage the navigation infrastructure so as to maintain justified levels of service in terms of the availability to commercial traffic of high-use navigation infrastructure (waterways, harbors, channels).	Percent of time navigation infrastructure with high levels of commercial traffic sustains its functional purpose.
Flood and Coastal Storm Damage Reduction Program	
3.1.2. Operate and maintain Corps infrastructure to ensure that designed levels of flood protection are realized.	Percent of time flood and coastal storm damage reduction infrastructure sustains its functional purpose. Percent of projects maintained at design level.
Environment Program	
3.1.3. Ensure healthy and sustainable lands and waters and associated natural resources on Corps lands held in public trust to support multiple purposes, that is…	Percent of acres with completed natural resource inventories.
3.1.3.1. Protect, preserve, and restore significant ecological resources in accordance with master plans.	Percent of projects requiring Master Plans in accord with current regulations.
3.1.3.2. Ensure that the operation of all Civil Works facilities and management of associated lands, including out-granted lands, complies with the environmental requirements of all relevant Federal, State, and local laws and regulations.	Percent of all significant findings corrected annually. Percent of all identified major findings corrected annually.
3.1.3.3. Meet the mitigation requirements of authorizing legislation or applicable Corps decision document.	Percent of Corps-administered lands that meet the requirements in authorizing legislation or applicable Corps decision documents. Percent of completed projects that have successfully met mitigation goals.
Hydropower Program	
3.1.4. Provide reliable power.	Forced outage rate.
3.1.5. Provide peaking power. 3.1.6. Maintain capability to provide power efficiently.	Physical condition/failure risk index.
Recreation Program	
3.1.7. Provide justified outdoor recreation opportunities in an effective and efficient manner at all Corps-operated water resources projects.	Annual net benefits per dollar invested (programmatic measure).
3.1.8. Provide continued outdoor recreation opportunities to meet the needs of present and future generations.	Customer satisfaction.
3.1.9. Provide a safe and healthful outdoor recreation environment for Corps customers.	Facility Condition Index.
Water Supply	Acre-feet of storage under contract versus acre-feet available.
3.1.10. In partnership with non-Federal water management entities, manage Corps reservoirs to provide water supply storage in a cost-efficient and environmentally responsible manner.	Percentage of total costs covered by revenues returned to Treasury.

Objective 3.2. Address the Operation and Maintenance (O&M) Backlog

Objective	Performance Measure
3.2.1. Fund high-priority O&M.	Percent change in dollar amount of essential O&M backlog at key facilities.

Goal 4: Reduce vulnerabilities and losses to the Nation and the Army from natural and man-made disasters, including terrorism.	
Objective 4.1. Prepare and provide for rapid, efficient, and effective all-hazards response and recovery.	
Program Objective	Performance Measures
Emergency Management Program	
4.1.1. Attain and maintain a high, consistent state of preparedness.	Planning Response Team Readiness Index. PL84-99 Response Team Readiness Index. Percent of scheduled inspections performed for all non-Federal Flood Control Works in RIP, as required by ER 500-1-1.
4.1.2. Provide a rapid, effective, efficient all-hazards response.	Percent of time solutions are developed and implemented (either repaired to pre-flood conditions or possible non-structural alternative) prior to the next flood season.
4.1.3. Ensure effective and efficient long-term recovery operations.	Percentage of Federal and non-Federal flood control works in Rehabilitation and Inspection Program with a satisfactory condition rating.
Objective 4.2. Improve the safety and security of critical water resources infrastructure.	
Objective	Performance Measure
4.2.1. Reduce risks to critical water resources infrastructure.	Percent of personnel that have completed security training. Percent of sites passing security inspection.

Goal 5: Be a world-class public engineering organization.

Objective 5.1. Be a world-class technical leader.

President's Management Objective*	Performance Measures
5.1.1. Develop a Human Capital Strategy* to recruit, maintain, and enhance technical capability in core competencies.	Standards set by the Office of Management and Budget and the Office of Personnel Management in rating scorecard for the President's Management Initiatives.
5.1.2. Competitive Sourcing* -- Accomplish inherently non-governmental work through others in support of mission accomplishment.	Competitive sourcing guidelines established by the Office of Management and Budget.
5.1.3. Support for Others: Provide public works engineering and construction management services that meet the customer's expectations.	Score/rating from surveys of customer satisfaction with the quality, cost, and timeliness of public engineering and construction management services provided by the Corps.

Objective 5.2. Improve budgeting and financial performance.

President's Management Objective*	Performance Measures
5.2.1. Produce auditable annual Civil Works financial statements that receive an unqualified opinion.*	Unqualified rating by an independent audit of all relevant financial statements.
5.2.2. Link the budget directly to performance.*	Percent of business programs that have at least one efficiency measure. Percent of programs (measured in terms of dollars) that have been rated by the Program Assessment Rating Tool (i.e., PARTed).

Objective 5.3. Become a more efficient and effective organization through technology (e-government).

President's Management Objective*	Performance Measures
5.3.1. Ensure that the Civil Works mission is supported by an information architecture and capital investments in technology aimed at increasing work efficiencies and effectiveness.*	Standards set by Clinger-Cohen Act and other relevant laws that apply to the Chief Financial Information Officer in the Corps. Standards set by the Office of Management and Budget.
5.3.2. Develop and use electronic means and media to provide timely and easily accessible information about engineering and related services to customers, the public, and other interested parties.*	Commence at least one Information Technology initiative that affects approximately 4,500 citizens per day.

* Part of the President's Management Initiatives.

B. Civil Works Program Evaluation

This strategic plan is a living document that will continue to evolve and be updated through program results. By the time of the next formal revision of the Civil Works Strategic Plan, we aim to have quantifiable 5-year strategic performance targets and performance measures that reflect integrated water resources management. Several mechanisms provide the means to establish program expectations and to examine program results as we move toward more integrated water resources management.

- The expectations for the Civil Works Program are provided in the Consolidated Command Guidance issued prior to the start of each fiscal year to help field commanders orient their programs for the coming year. Additionally, the Budget Engineering Circular (EC) normally distributed in March of every year provides funding priorities and expectations based on Civil Works goals to guide the development of the budget.

- The Civil Works Strategic Plan is part of a larger corporate strategic plan. The corporate strategic planning process directs the Headquarters, Major Subordinate Commands (MSCs) at division level, and Districts to develop Campaign and Operations Plans respectively to achieve strategic organizational goals. Civil Works strategic goals are incorporated into a unified corporate strategic plan and into Campaign Plans at the MSC Level. Civil Works performance measures and performance targets guide progress toward strategic objectives for those Districts with civil missions. Periodic reviews are conducted in the MSCs to review and revise Campaign Plans or progress toward objectives.

- In the future, Major Subordinate Commands (MSCs) will shape a portfolio of projects in support of regional priorities and the Civil Works strategic goals and objectives. Performance standards may be reinforced through Command Inspections performed by Headquarters personnel during field visits to the Major Subordinate Commands. Gaps between desired and actual performance are discussed at Regional Management Board meetings held in the MSCs.

- Several evaluations take place at the headquarters level.

    - Progress toward Civil Works business goals is evaluated at the headquarters level through the Program Assessment Rating Tool (PART) by the Office of Management and Budget to ascertain how well the Civil Works Program is meeting performance targets.

    - The Civil Works Directorate conducts periodic Program Review Boards.

    - A corporate review of all Corps of Engineers' programs, including Civil Works, is conducted through a quarterly Command Management Review.

- A Strategic Management Review is also conducted at headquarters to assess the Civil Works Program along with the Military Program and other headquarter activities in concert with the Army's Strategic Readiness System and the Corps' Strategic Readiness System through a balanced scorecard approach that assesses performance in key areas using critical performance standards.

- Intermittently during the year, issues are raised and discussed at Issues Management Board meetings; this Board is comprised of all senior military and civilian leaders at Corps headquarters.

- Civil Works executives meet regularly at the headquarters in Washington, D.C. to review progress toward Strategic Goals and Objectives and to discuss emerging challenges that affect the Civil Works mission.

- Performance progress is also assessed at the annual Senior Leaders Conference.

- Feedback on projects is generated through the project planning and evaluation process, from comments offered by customers (e.g., through surveys) and stakeholders, public opinion proffered at public meetings and in the press, and by opinions communicated by advisory boards, such as the Chief's Environmental Advisory Board, the Transportation Research Board, the Inland Waterways Users Board, and the Coastal Engineering Research Board.

- In addition to internal evaluations and updates, the Strategic Plan will be updated periodically as the need arises and in consonance with the timelines established by the Government Performance and Results Act of 1993 and OMB Circular A-11.

This document remains a dynamic strategic plan to the extent that we learn from experience, especially upon reflecting about our performance results. We recognize that work remains to provide transparent performance measures and targets. We offer this document as a start in the spirit of making continuous improvements to our Civil Works mission accomplishment for the Army and the Nation.

Appendix A

Overview of Civil Works Business Programs

Navigation Program

The Navigation Program is responsible for providing safe, reliable, efficient, and environmentally sustainable waterborne transportation systems for the movement of commercial goods, for national security needs, and for recreation. Through authorities related to navigation, the Corps develops inland waterways, ports, and harbors through river deepening, channel widening, jetty construction, lock expansion, dam operations, and dredged material disposal activities. Civil Works operates and maintains 12,000 miles of inland and intracoastal waterways, nearly 13,000 miles of deep draft and coastal inlet channels, 240 locks, 300 major commercial harbors, and over 600 smaller recreational and commercial harbors. This business line totaled $1.9 billion or 41 percent of the Civil Works budget in Fiscal Year 2002.

- **The U.S. marine transportation industry supports nearly $1 trillion in commerce accounting for 27 percent of the Gross Domestic Product and creates employment for 13 million individuals.**
- **The inland waterways move about 630 million tons or 15 percent of the Nation's bulk freight.**
- **The inland and intracoastal waterways maintained by the Corps of Engineers handle over 625 million tons of cargo valued at over $100 billion.**
- **Nearly 800,000 jobs result from the activities of the inland waterway system.**
- **The inland waterway system generates a total payroll of $1.7 billion and over $425 million in Federal and State payroll taxes annually.**
- **On average, inland waterways save U.S. shippers and consumers more than $10 per ton of cargo shipped compared to an alternate overland mode.**

In a global economy, America's oceans and navigable waterways are essential to the Nation's economic growth and prosperity. The Civil Works Navigation Program plays a critical role in promoting America's economic strength. The system of coastal harbors and inland, intracoastal, and Great Lakes waterways remains one of the most important parts of the Nation's transportation system. Our ports and waterways help American farmers compete in the world market. Most of our corn and soybean exports move by inland waterway to deep water harbors for export. The Corps strives to sustain the ability of the inland waterways, ports, and harbors to keep commerce moving. The Corps spends about $500 million annually to operate and maintain the inland waterway system. Ninety-eight percent of America's international trade moves through America's ports, and 20 percent of American jobs depend to

some extent on this trade. Navigation infrastructure saves $7 billion annually in transportation costs by providing a more energy-efficient and environmentally friendly form of conveyance than road and rail transportation modes. For example, a barge that carries 1,500 tons of cargo delivers the equivalent of 15 jumbo rail hopper-cars with less adverse pollution impacts -- equivalent to taking 58 large semi-trucks off the highways. The waterways can move 500 ton-miles compared to the 400 ton-miles per gallon that rail transportation achieves. Waterways are by far the safest way to move large quantities of hazardous chemicals and other cargo, and to protect this cargo from security threats.

Flood and Coastal Storm Damage Reduction Program

The second largest Civil Works program is Flood and Coastal Storm Damage Reduction. In Fiscal Year 2002, it accounted for $1.4 billion and 30 percent of the Civil Works budget. This program is aimed at saving lives in the event of floods and storms and reducing the property damage they cause. Flood protection authorities provide for dams and related hydropower construction and operation, levee construction, large-scale pumping systems, and the protection and stabilization of shorelines through beach replenishment. Civil Works projects provide 8,500 miles of emplaced levees and dikes, 383 reservoirs, and more than 90 shore protection projects along 240 miles of the nation's 2,700 miles of shoreline. With the exception of reservoirs, most of the infrastructure constructed under this business line is owned and operated by the sponsoring cities, towns, and agricultural districts. The Flood Program has an impressive record. Through Fiscal Year 2000, the Nation prevented an estimated $419 billion ($709 billion adjusted for inflation) in riverine and coastal damages for the $43.6 billion ($122 billion, adjusted for inflation) it invested in flood damage reduction projects. This translates into a $6 return on investment for every dollar spent for flood protection.

In Fiscal Year 2000, the Civil Works Flood and Coastal Storm Reduction Program completed a project that will protect millions of Americans. In the early 1990s, the Los Angeles County Drainage Area, covering 2,000 square miles, found itself only partially protected from floods. The Federal Emergency Management Agency required residents to hold flood insurance because population growth in the area had rendered the existing flood control system inadequate. The Los Angeles Country Drainage Area project, initiated in 1996 for $450 million, built 21 miles of parapet walls, armored the back slopes of levees, and modified or raised 26 bridges. The project was completed five years ahead of schedule and $150 million under budget. As a result of these improvements, FEMA eliminated mandatory flood insurance.

Flood protection infrastructure has helped reduce loss of life. Where flooding caused 179 deaths between 1972-1981, between 1991-2000 89 lives were lost. Through Floodplain Management Services, the Corps annually advises property owners and communities about protective measures they can take to protect their property. In addition, the Flood Damage

Reduction Program seeks economical and environmental solutions to the problem of population migration toward the coast through shore protection projects. These projects, cost-shared with State and local governments on publicly accessible beaches, protect lives and property and protect and renew the shoreline and its habitats. Working with partners in Coastal America, the Corps addresses the environmental problems created by past development, erosion, and pollution that threaten our coasts. In addition to protecting millions of people and their homes, farms, and businesses, flood protection projects provide significant economic stimulus to local communities.

Environmental Program

Given a growing public demand for environmental restoration and protection, the Corps' Environmental Program emphasizes environmental protection, restoration and management through stewardship, ecosystem restoration, mitigation, environmental compliance, and research and development activities. In Fiscal Year 2002 this business comprised $705 million, or 15 percent of the Civil Works budget. Environmental work ranges from monitoring water quality at dam sites, to operating fish hatcheries with the States, to constructing fish passage facilities at Columbia River dams. In 1997 the Corps assumed responsibility for the Department of Energy's "Formerly Utilized Sites Remedial Action Program" (FUSRAP), which mandates the cleanup of former Manhattan Project and Atomic Energy Commission sites. Within the Civil Works Program, the Corps is also responsible for cleaning up former military sites and hazardous waste sites under the U.S. Environmental Protection Agency's "Superfund" Program as part of its Support for Others efforts.

Since 1998, the Corps has added more than 120,000 acres of aquatic, wetland, and floodplain ecosystems to America's natural habitats. Currently the Corps is engaged in the Comprehensive Everglades Restoration Plan – a project to restore 52 miles and 27,000 acres of wetlands of the Kissimmee River in Florida, and to improve the conditions for over 300 fish and wildlife species and water quality. This 103-mile river was degraded by earlier projects to build canals to control flooding.

Regulatory Program

The Corps has programmatic regulatory authority to act as a steward of lands and waters managed by the Corps. The Regulatory Program is responsible for issuing permits for construction and dredging in the nation's navigable waters, including wetlands. The property rights of private citizens and the views of Federal, State, local agencies, interest groups, and the general public must be balanced. This calls for the Corps to protect aquatic ecosystems while allowing reasonable use of private property and infrastructure development. Adverse impacts to the aquatic environment of a proposed project are offset by mitigation requirements to restore aquatic functions and values. Great effort is made to make permit decisions in a

timely manner to minimize the inconvenience caused to the regulated public. In Fiscal Year 2002, this $132 million program accounted for 3 percent of the Civil Works budget.

In Fiscal Year 2002, 88 percent of all permit actions were completed within 60 days.

Hydropower Program

The Corps' multi-purpose authorities afford hydroelectric power as an additional benefit of projects built for navigation and flood control. The Corps is the largest owner/operator of hydroelectric power plants in the United States and one of the largest in the world. The Civil Works $133 million Hydropower Program constituted 4 percent of the Fiscal Year 2002 Civil Works budget. The Corps' 75 multipurpose reservoirs with 345 generating units, mostly in the Pacific Northwest, generate about 24 percent of hydroelectricity -- 3 percent of the total electric power capacity in the United States. This capacity amounts to nearly 100 billion kilowatt-hours produced each year or enough energy to serve about ten million households – equal to ten cities the size of Seattle, Washington. Hydropower is a renewable source of energy and one of the least environmentally disruptive sources of electric power. It produces none of the airborne emissions that contribute to acid rain or the greenhouse effect. Hydro-electricity is distributed by Federal power marketing agencies. Currently, the Bonneville Power Administration directly finances the operation and maintenance costs at Corps hydroelectric projects in the Pacific Northwest. We are working with the Southeastern, Southwestern, and Western Power Administrations on a legislative proposal to authorize a similar direct financing arrangement for Corps hydropower facilities in those regions as well.

The contribution of the Corps' Hydropower Program plays a vital role in the stability of the nation's overall electric system far beyond 3 percent of the nation's electric capacity it generates. In 2000, revenue returned from power sales to the U.S. Treasury amounted to $444 million.

Recreation Program

The Corps is an important provider of outdoor recreation as an ancillary benefit of flood prevention and navigation projects. The Corps manages recreation areas on 12 million acres, or 2 percent of Federal lands. An additional 600 State parks, 600 local government parks, and 420 quasi-public areas are managed by others on Corps land. The Corps operates more than 4,300 recreation sites at 463 projects – mostly lakes – and hosts more than 370 million visits a

year at its facilities. The Corps currently collects about $34 million in recreation user fees annually. On January 1, 2003, the Corps administratively raised the fees it charges at its recreation areas to make them more comparable with similar facilities operated by private industry. Daily use fees, annual pass fees, special event permit fees, and camping fees were raised. The additional revenues coming from increased fees are estimated to be $8 million per year. The $287 million Recreation Program accounted for 6 percent of the Civil Works budget in Fiscal Year 2002. Recreation is the Corps' most public face. Over ten percent of the U.S. population visits at least one Corps project each year to swim, fish, go boating, hike, or camp out.

The Corps' Recreation Program has significant economic impact. Recreation projects provide 500,000 full- or part-time jobs generating $15 billion annually in visitor spending. In an average year, visitors spend just over $6 billion on trip expenses in local communities around Corps lakes for gas, food, and lodging.

Water Supply Program

Careful management of the Nation's water supply is critical to limiting water shortages and lessening the impact of droughts. The Corps has an important role to ensure that homes, businesses, and farms nationwide have enough water to meet their needs. The Corps has the authority for water supply as part of projects that serve navigation, flood protection, and hydroelectric purposes. There are over 9.5 million acre-feet of Municipal and Industrial (M&I) storage space – equal to 3.1 trillion gallons of water -- in 177 Corps reservoirs in 24 States plus Puerto Rico. At a rate of 750 gallons per day, this is enough water to fulfill every American's water needs for 17 days. The Water Supply Program accounted for $15 million in Fiscal Year 2002 -- less than 1 percent of the Civil Works budget.

The Corps supplies 3 trillion gallons of water to 10 million people in 115 cities, including some of America's largest metropolitan areas, such as Washington, D.C., Atlanta, and Dallas-Ft. Worth.

Emergency Management Program

The water resources infrastructure provided by the Corps supports homeland security and the swift return to normalcy from devastating natural disasters. In any given year, there are 30 presidential disaster declarations demanding a response from the Civil Works Program. The Corps has to be ready to respond to any and all emergencies with little or no notice, as the events of September 11, 2001 showed. The Civil Works Emergency Management Program

has adopted a unified and integrated corporate planning approach to raise responsiveness to the highest possible level. In addition, the Corps responds in the event of severe flooding under Public Law 84-99. In Fiscal Year 2002, the Emergency Management business investment for preparedness amounted to $6 million or 1 percent of the Civil Works budget.

When the word of the terrible events of September 11, 2001 reached Corps personnel, they responded instantly by ferrying more than 3,000 people safely out of Manhattan. Structural engineers in the Corps monitored unstable buildings. Others supported search and rescue operations. The Program also provided a mobile command center to support the New York Fire Department. In the aftermath of the tragedy, the Corps' Prime Power battalion sent 31 personnel to New York City to help install 50 generators to power medical triage facilities, temporary structures, and buildings in the financial district, including Wall Street's Mercantile Exchange and the NASDAQ Electrical Hub. Perhaps the Corps' biggest mission was debris removal. Civil Works experts helped to set up a management process and develop a plan for debris removal. The Corps dredged a section of the Hudson River to accommodate the barges needed to ferry away debris. More than 75,000 cubic yards of sediment was dredged in just nine days and 10,000 tons of debris were moved daily to the Kills Ferry Landfill site managed by the Corps on Staten Island. This eliminated the need for trucks to traverse the 20-mile land route from the site to the landfill. With each barge carrying 30 truckloads of debris, this also greatly reduced traffic, road wear, and pollution. In addition, the Corps used its geographic information system and thermal imaging to let emergency personnel know where fires were still burning in the rubble.

Support for Others Program

As stated above, we leverage the capabilities developed and applied in our Civil Works business programs in support of others. Through the Support for Others Program, the Corps provides reimbursable technical assistance and management expertise to Indian Nations, the Department of Defense, other Federal agencies, State and local governments, private U.S. firms, and foreign nations to complement their expertise. The Corps International and Interagency Services Division leverages the capabilities of the Civil Works Program to support the objectives of the National Security and Military Strategies. The Corps performs $600-$800 million of work each year for about 60 Federal entities outside the Department of Defense.

Appendix B

Addressing Water Resources Challenges Through a Watershed Approach

Water Challenges

To understand future water demands better, we conducted a literature review, met with water resources experts from academia and private industry, and talked to our partners, customers, and stakeholders at public Listening Sessions we held throughout the United States during 2000. A summary report of our Listening Sessions is available at www.iwr.usace.army.mil/iwr/waterchallenges. That report identified 18 challenges,[8] which we further distilled into five major sets of water resources challenges for the purpose of this strategic plan through a content analysis procedure. The challenges are:

1) Achieve balance between traditional water resources demands and environmental/ecosystem goals.
2) Restore the vitality of the environment from the degradation caused by past development.
3) Address the performance and safety implications of an aging water resources infrastructure.
4) Ensure the capability to respond to natural disasters and terrorism threats to water resources infrastructure.
5) Minimize institutional barriers to efficient and effective water resources planning, decision making, and management.

Integrated Water Resources Management

Addressing the challenges identified led us to the wisdom of integrated water resources management at a watershed level in partnership with others. It becomes possible to integrate water uses by considering environmental sustainability more equally with economic development as objectives. Water resources development and environmental protection are now viewed as an integral whole including economic, environmental, and social well-being objectives. Increasingly, single-purpose missions are not sustainable in an era where adverse environmental impacts must be prevented or mitigated by law. People have also come to appreciate that growth and development must occur in a sustainable manner so as to protect critical services, vital ecosystems, and native culture for the benefit of future generations.

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.[9] Principles of

sustainable development hold environmental considerations as an integral part of developing water resources projects, especially since passage of the National Environmental Protection Act in 1969 and the Endangered Species Act in 1973. The 1983 *Principles and Guidelines* for project development direct the Corps to give detailed consideration to the environment in project development. Sustainability is a common value today. Supporting sustainability implies working to protect and restore resources.

A resounding recommendation obtained from talking to our stakeholders and the public is the need to move toward greater integration in planning for and managing our Nation's water resources as a way to support sustainability. "Integrated water resources management is a process that promotes the coordinated development and management of water, land and related resources in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems."[10]

A comment made by a participant at one of the Listening Sessions summarizes the sentiment:

"The most significant water resources challenge facing us as a Nation is continually seeking the appropriate balance among social goals, economic development, and environmental quality in specific resource-use ways."[11]

Our stakeholders told us that a watershed approach opens opportunities to find sustainable solutions gained through an expanded perspective that considers all elements in a watershed. A watershed approach is conducive to integrated water resources management because it facilitates identification and integration of diverse objectives within a common geographic area. The call to manage water in an integrated fashion is echoed in various publications.

When the Corps met with the mayors of selected cities in 1999 and 2000 to discuss a variety of water infrastructure needs, the mayors recognized that "city water systems are sub-systems of the larger watershed" and said they wanted to create "an environment of intergovernmental cooperation to facilitate solutions."[12] They called for comprehensive watershed solutions; restoration of damaged ecosystems; flood damage reduction that preserves riverine and aquatic habitat while enhancing economic development potential; wetlands restoration; recreational enhancements; mitigation of ground subsidence; clean-up of contaminated sites (e.g., brownfields); and urban and water infrastructure (e.g., construction of combined sewer overflow storage, wastewater treatment, the full range of facilities required for urban water supply; and improved water quality data gathering mechanisms and methodologies). In fact, the U.S. Mayors Conference adopted a "Mayor's Plan for Sustainable Watershed Management" to better use technical, institutional, and financial resources in meeting water quality objectives. Cities such as Worcester, Massachusetts; Danbury, Connecticut; and San Jose, California have developed watershed plans to address water supply planning, community

preservation, habitat protection, ecological conservation and enhancement, and regulatory activities by integrating the planning of local, State, and Federal jurisdictions.[13]
A watershed approach is essential to achieve integrated water resources management. The watershed is the best unit of analysis because watersheds and river basins form logical hydrological units for integration.[14] Managing water resources in a watershed context promotes collaboration and combines or leverages current resources toward the achievement of common watershed goals within a defined geographic region and among competing water uses. A watershed approach implies a systems approach. Moreover, systems frameworks and tools are now available to promote analysis and integration.

Navigation Challenges

Beyond moving toward more holistic approaches and solutions to water problems, our traditional business lines are facing very real challenges. The world is both enlarging and shrinking from globalization. Global trade has stimulated the free movement of capital, paved the way for companies to expand around the world, increased wealth and raised living standards, brought national borders closer together, and fused national markets.[15] The expansion of global trade has implications for navigation in the U.S.:

- Foreign trade is expected to double over the next two decades.
- Inland traffic is projected to grow by as much as 37 percent over the next 20 years.
- Freight demand will increase by nearly 70 percent by 2020.[16]
- As global markets expand and shipping vessels grow to accommodate increased cargo, deeper channels and more efficient domestic ports and harbors will be needed.
- As navigation channels are deepened and widened, the demand for acceptable disposal sites and uses of dredged material grows just as the availability of such sites dwindles.
- Achievement of sustainable solutions emphasizes beneficial uses of dredged material.

Our nation's Marine Transportation System encompasses a network of navigable channels, waterways, and infrastructure maintained by the Corps, as well as publicly and privately owned vessels, marine terminals, inter-modal connections, shipyards, and repair facilities. The Marine Transportation System consists of approximately 12,000 miles of inland, and intra-coastal waterways, and 926 coastal, Great Lakes and inland harbors maintained by the Corps.[17] This system serves 41 states and connects to 152,000 miles of rail, 460,000 miles of pipelines, and 45,000 miles of interstate highways. Annually, the system handles nearly 2.5 billion tons of cargo.[18] These goods include strategic commodities such as coal, petroleum, chemicals, and industrial metals and materials. Improvements to the inland water system are estimated to provide $5.5 billion per year in cost savings compared to the cost of using rail and highway transportation alternatives. The Corps maintains 300 large commercial harbors that serve as the gateway for 98 percent of our foreign trade valued at nearly $700 billion. Thirteen of these

large harbors serve as strategic military ports that assist in the movement of military equipment for overseas deployment. Improvements to the deep draft navigation system are estimated to avoid $1.5 billion annually in transportation costs that would be incurred to move the same goods via train or truck.

The Marine Transportation System is nearing capacity while demands on it will grow substantially from the projected growth of international and domestic trade. The total volume of domestic and international marine trade is expected to double by 2020. The containership of choice is rapidly becoming a vessel requiring 45 to 50 feet of depth. Few U.S. ports have a 50-foot depth, but many international ports do. Global competitiveness requires ready ports, which in turn requires maintaining adequate channels. The deepening and widening of channels will produce greater quantities of dredged material, thus stressing both the physical capacity of the U.S. dredging fleet and the ability to dispose of the dredged material economically and in an environmentally acceptable manner. Managing sediment materials raises environmental issues on the inland system. Sustainable approaches that can reduce dredging and disposal needs include innovative and environmentally acceptable upstream sediment control and best management practices. Non-structural solutions include more reliance on traffic management planning on our inland waterways with the aid of new technologies for traffic control and lock operations that are compatible with aquatic ecosystems, and more efficient use of multi-modal transportation systems.

There are issues regarding capacity on the inland system as well as the deep draft system. Inland traffic movements are projected to increase over 30 percent by 2020. The Department of Transportation forecasts that America will not be able to compensate for the predicted growth in U.S. freight traffic with highways; they are saturated now, and it would be too costly to expand them sufficiently to accommodate growth. Europe – 20 years ahead of the U.S. in the problem of saturated highways – is turning to their waterways to move bulk freight through urban areas because waterways provide the only mode with long-term capacity. The use of container barges on inland systems will become more important.

Failure to respond to the navigation challenges means a second-class marine system with less competitive ports, higher prices for consumers, less income for farmers, less economic growth, and fewer jobs. Our nation's Marine Transportation System must be ready for 21st Century requirements. We must maintain the contribution of the MTS to our economic engine.

Flooding and Coastal Challenges

By 2015 more than half of the world's population will reside in urban areas.[19] By 2025, the U.S. population is expected to increase to a total of 338 million people.[20] It is estimated that 35 percent of this growth will occur in the Western U.S. and approximately 21 percent in the Southeast. Since 1980, population migration to the coasts has outpaced the total U.S. population growth by 15 percent.[21] Currently, more than half of the Nation's population resides

along the East and West coasts. The coastal states of California, Texas, and Florida are each expected to grow in population by more than 36 percent over the next 25 years. In recent years, these states have sustained the greatest amount of flood damages. Rapid population migration to coastal counties presents a challenge for protection from coastal storms. In addition, extreme weather events seem to be more common. The estimates are that as much as $2.7 trillion of the U.S. economy is directly affected by weather conditions.[22] Floods will continue to be a serious national problem as greenhouse effects increase, sea-levels rise, global warming trends continue, and the population migrates to the coastlines. Flooding is the most destructive and costly natural disaster in the United States, accounting for 85 percent of the number of natural disasters that occur annually. Water resources implications include:

- Droughts increase the chances for forest fires. By the end of August, 2002, the damage caused by wildfires was double the average annual amount.
- Water supply allocation problems worsen as droughts heighten competitive demands on water for drinking, irrigation, and hydropower.
- Crops are threatened.
- As coastlines absorb the impact of a predicted sea-level rise over the next 200 years, beach erosion will accelerate. As coastlines shift, habitats will continue to be threatened or lost. Erosion creates down-shore sediment management problems, flooding, and increased risk to life and property from storm-related coastal floods.
- Sea-level rise exacerbates problems of salt-water intrusion into fresh water sources, affecting water quality.
- The occurrence of severe storms cripples low-lying areas (e.g., Mississippi Delta) and inundates wetlands.

As U.S. communities expand, they experience growing stormwater drainage, and water supply and wastewater demands. In May 2002, the Congressional Budget Office estimated the annual investment in the Nation's water systems required to maintain high-quality drinking water and wastewater services to be between $11.6-$20.1 billion for drinking water systems and between $13-$20.9 billion for wastewater systems.[23] Population migration also increases pressure for electric capacity. The Federal Energy Regulatory Commission has conducted river basin studies showing a potential for 73,200 megawatts of additional U.S. hydroelectric capacity.[24] However, the National Hydropower Association anticipates that installing additional capacity will not be promoted unless domestic policy changes and commercial turbines become more efficient and fish friendly.[25] The American Society of Civil Engineers graded energy infrastructure a D+ in its 2001 report card because actual capacity is not keeping up with the 1.8 percent growth in demand, and the U.S. energy transmission infrastructure relies on older technology, which raises questions about long-term reliability.[26] Some implications for water resources include:

- Increases in population density in cities and suburbs will continue to push settlement to outlying areas, putting increased pressure on groundwater aquifers and rural water

systems – many of them aging and inadequate to accommodate the growing population.

- Groundwater contamination from toxic and hazardous disposal sites, abandoned brownfields, and abandoned coal, metal, and mineral mines is a public health threat and compromises domestic water supply sources.
- Population shifts to the coastline increase risks to people and property from coastal storms and hurricanes.
- Population increases also endanger species and threaten biodiversity.
- As the average age of the population increases, recreational demands on the use of water for leisure and lifestyle pursuits increase.
- Increasing demands for electricity will put a premium on hydropower to help stabilize the electric grid by meeting peak power demands.

The Nation has made a major investment in flood damage reduction infrastructure consisting of nearly 400 major dams and reservoirs managed by the Corps, 8,500 miles of levees and dikes, and hundreds of smaller local flood protection projects. These projects have prevented nearly $500 billion in riverine and coastal flood damages since 1950. On average between 1993 and 2002, flood control infrastructure has prevented $23.1 billion annually in flood damages. All evidence indicates that floods, and the monetary and personal losses associated with them, will continue in the future from growing development in the unprotected 100-year floodplains along the Nation's streams and shorelines, as well as development just outside the 100-year floodplain where floodplain regulations do not apply but where there is still flood risk. The Federal Emergency Management Agency estimates that 94 million acres of the United States lie within the 100-year floodplain. Although floodplain management is a local responsibility, the Federal government can influence floodplain management through Federal flood insurance and flood damage reduction solutions. Today less than 15 percent of the more than 20,000 communities in the United States have flood protection for their structures, and only 20-30 percent of at-risk buildings are covered by national flood insurance. A former administrator of the Federal Emergency Management Agency noted that the annual Federal budget for moving populations out of harm's way soared from $835,000 in 1993 to $10 million in 2000. Along the East and Gulf coasts, about $3 trillion in infrastructure adjacent to the shoreline is vulnerable to erosion from flooding and other natural hazards. The Federal Emergency Management Agency estimates that 25 percent of buildings within 500 feet of U.S. coastlines, including 87,000 homes, stand to wash away from erosion over the next 60 years, causing $530 million annually in lost or damaged property from erosion.[27] The problems from flooding and erosion increase the need for public education about the benefits of avoiding high-risk areas, advanced emergency measures, contingency planning, and evacuation planning.

Flooding damages are increasing despite flood prevention strategies and flood damage reduction policies. It is imperative to develop a sophisticated understanding of why damages are increasing and then work with other agencies to improve on a collective response.

Environmental Challenges

The Corps has had an environmental function as one of its primary Civil Works business programs since the Water Resources and Development Act WRDA of 1990 (Sec 306): *"The Secretary [of the Army] shall include environmental protection as one of the primary missions of the Corps of Engineers in planning, designing, constructing, operating, and maintaining water resources projects."* The Corps carefully evaluates the environmental impact of every riverine project it undertakes. For instance, we typically perform computer modeling of planned changes to river and estuary systems to fully assess and limit the adverse environmental effects before any work begins. Many times dredging projects are carried out during "environmental windows" when they will have the least impact on sensitive species. In addition, the Corps makes every effort to find beneficial uses for dredged material resulting from navigation projects, including using it to augment and restore wetland habitats. Through the Regulatory Program, the Corps strives to protect wetlands and other aquatic resources while allowing reasonable and necessary development to proceed through permitting construction of new homes and businesses and installation of utility lines. The Corps is committed to enforcing compliance with the permits it issues to ensure that companies that harm aquatic resources repair the damages they cause.

Over 60 environmental laws influence and direct the Civil Works Program by specifying National environmental goals and policies as well as compliance requirements. Key environmental laws that guide the Corps Environmental Program include the National Environmental Policy Act of 1969, the Clean Water Act of 1972 as amended in 1977, Endangered Species Act of 1973, and the Coastal Zone Management Act or 1972. Additionally, Water Resources Development Acts have authorized ecosystem restoration initiatives, for example, no net loss of wetlands (WRDA 1990). Until the passage of the National Environmental Policy Act (NEPA) in 1969, Federal water resources development often proceeded without much thought of environmental impacts: air pollution and contaminated water supplies, degraded water quality, loss of fish and wildlife species and their habitat, and a lowered quality of life.

The United States has more than 3.5 million miles of rivers and streams, ranging in size from the Mississippi River to small streams.[28] These river and stream corridors are complex ecosystems that perform a number of ecological services, such as modulating stream flow, storing water, removing harmful materials from water, and providing habitat for aquatic and terrestrial plants and animals. The cumulative effects of development have resulted in significant losses to these ecosystems. According to the Environmental Protection Agency's 2000 National Water Quality Inventory, 40 percent of the nearly 700,000 miles of rivers and streams surveyed were not clean enough to support fishing and swimming.[29] In its 2003 Draft Report on the Environment, the Environmental Protection Agency reported that between 1997 and 2001, the percentage of beaches affected by advisories or closings rose from 23 to 27 percent.

America has lost over 53 percent of the nation's original wetland acres within the contiguous United States. The U.S. Environmental Protection Agency reports an average annual loss of 58,500 acres of wetlands from filling and draining, conversion for agricultural uses, residential development, and road construction.[30] Wetland marshes, bogs, and swamps improve water quality by filtering pollution, help control floods by sponging up excess flow, stabilize shorelines, and provide important habitats for estuarine and marine fish and shellfish, waterfowl, shore birds, wading birds and mammals. Approximately 35 percent of all Federally listed rare and endangered animal species either live in or depend upon wetlands.

Fourteen percent of the assessed shoreline miles are impaired, due to pollution from urban runoff, storm sewers, non-point source runoff, and waste disposal, including 78 percent of the assessed shoreline miles on the Great Lakes.[31] Runoff from past industrial and urban development has degraded aquatic ecosystems resulting in the loss of habitat (both in-stream and riparian), risks to human health and safety, and aesthetic impacts. Runoff from agricultural lands, municipal point sources (sewage treatment plants and storm sewer outfalls), and hydrological modifications from channelization, flow regulation, and dredging are cited as primary sources of impairment. The U.S. Fish and Wildlife Service lists 126 species or subspecies of fish as threatened, endangered or of special concern[32] -- the vast majority of them at risk because of habitat destruction and poor water quality. Contributing to environmental problems is drainage from abandoned mine lands. For instance, acid mine drainage harms 12,000 miles of American rivers from pollution created by surface and underground mine lands abandoned prior to the enactment of the Surface Mining Control and Reclamation Act of 1977.[33] Abandoned mine lands have caused landslides and flooding, destroyed fish and wildlife habitats, impaired natural beauty, damaged private property, and generally degraded the quality of life in local communities. More cities are planning and implementing programs to protect and enhance urban stream corridors for multiple purposes. Restored stream corridors not only enhance urban parks and fish and wildlife habitats but, when properly designed, also serve as stormwater conveyances and floodways.

There is no official list of the most important environmental challenges facing the country and not enough money to address all of the environmental issues. We know that we need to prioritize. But we can also begin to work with others at the State and local level, as well as with non-governmental organizations, to establish priorities for environmental investments. The best solutions will be those adopted through partnerships to address regional requirements and characteristics.

Delivering Benefits through Water Resources Infrastructure

The Corps of Engineers has an obligation to taxpayers to deliver benefits for taxpayer dollars invested in water projects. The Corps manages a vast inventory of water resources infrastructure designed to solve water problems. This infrastructure must perform as expected

but also change as needed to accommodate new requirements. Much of the water resources infrastructure developed in the 1930s has surpassed its planned design life. Many people are concerned that the Nation's aging water infrastructure is at risk of under-performing if not failing – especially if not maintained in a timely manner or adapted to meet emerging demands.

Investment in public infrastructure has declined. Public infrastructure (including water resources infrastructure) investments in 1960 amounted to 3.9 percent of the Federal budget; today the figure is more like 2.6 percent. Of this amount, the share for water resources declined from 1.1 percent to about 0.2. Investment in water resources infrastructure is declining at a much greater rate than public infrastructure investment as a whole. At a time when the Gross Domestic Product (the indicator of U.S. productivity) is growing, the investment gap is widening. The American Society of Civil Engineers estimates that the total investments needed to restore infrastructure in the U.S. over the next five years is $1.3 trillion.[34] Failure to invest in maintenance, major rehabilitation, and new infrastructure will result in the gradual reduction in our public water resources infrastructure (capital stock), affecting the benefits the public can receive from it. This may have long-term repercussions on our economic prosperity, quality of life, global competitiveness, and environmental sustainability.

In 2001, the American Society of Civil Engineers (ASCE) gave America's infrastructure an overall grade of D+. Navigation infrastructure exemplifies aging infrastructure problems. Forty-nine percent of the inland waterway locks and dams are at least 50 years old and lock-out of service hours have more than doubled since the 1990s. Lock delays associated with aged facilities currently amount to over 550,000 hours annually, representing an estimated $385 million in increased operating costs borne by shippers, carriers, and ultimately consumers. Many locks are undersized for modern commercial barge movements, yet they are carrying more tonnage than they were originally designed for – and they will be asked to carry 30 percent more by 2020. The U.S. has already lost about 30 percent of former Europe market share of soybean sales to Brazil and Argentina, both of which have been investing heavily in their inland waterway systems to reduce transportation costs for farm exports.[35]

ASCE gave navigable waterways a D+ because of the Corps' backlog in active authorized projects and inadequate channel depths for the mega-containerships that are the world standard for international trade. The Corps backlog in maintenance projects is $772 million and is projected to grow to $1 billion Fiscal Year 2004. Despite a lock modernization program underway since the passage of the 1986 Water Resources Development Act, we currently have a construction backlog of $44 billion. This backlog has increased construction times by one to five years, resulting in direct cost increases of nearly $250 million from inflation and an estimated $1.7 billion in transportation savings foregone (compared to rail or highway) because of project delays.

One quarter of the nation's 4,340 outdoor recreation areas at Corps projects are in need of significant modernization. Many of these sites have deteriorated from a lack of adequate maintenance to the point where they have health and safety concerns; others are undersized for

contemporary outdoor recreation equipment, or do not support the diversity of outdoor recreation needs of our multi-cultural society.

People worry that an aging and unreliable infrastructure puts property, lives, and livelihoods at risk and may become more expensive to replace or repair than to maintain. At the Listening Sessions, people were especially concerned about under-funding annual maintenance now, leading to more costly requirements to replace or rebuild deteriorated facilities later. As funding is spread out, construction delays occur, creating a backlog of construction projects. A large backlog stymies progress on projects in the face of budget constraints, thus reducing project benefits.

Ensuring Readiness to Respond to Disasters

The dawn of a new century has revealed horrors beyond the comprehension of most Americans. Since the attack by terrorists on the World Trade Center Twin Towers and the Pentagon on September 11, 2001, the president has set a priority to protect people and vital infrastructure from terrorist attack. Of this infrastructure, the Army Corps of Engineer manages and maintains 541 dams, 240 navigation lock chambers, 926 coastal and inland harbors, nearly 12,000 miles of commercial (shallow draft) navigation channels, 8,500 miles of levees, 383 major lakes and reservoirs, 346 hydropower generating units at 75 hydroelectric power plants, 4,330 recreation sites at 456 Corps projects in 43 states, 12 million acres of water and related land resources, 1 drinking water treatment plant, and $1.2 billion in research and development facilities managed by the Corps.[36] This infrastructure keeps our economy vibrant, our towns and cities safe and working, and the quality of our life at high levels of satisfaction. As critical as this infrastructure is to the pursuit of productivity, health, and happiness, it is not necessarily secure.

Until recently, the focus of emergency management was natural disasters. Natural disasters result in loss of life and devastating property damages and relocations. People lose their jobs; family life is disrupted; business fail or lose income and tax revenues; communities experience chaos for weeks; public health care systems get taxed beyond their capability; public health risks rise due to disruption in safe water, sanitation, food, and shelter; transportation delays become chronic; physical and mental illness spreads like a virus; and tax dollars get redirected to disaster response, relief, and recovery. The U.S. has sustained 44 weather-related disasters over the past 20 years in which overall damages and costs reached or exceeded $1 billion per incident. In fact, the National Science and Technology Council estimate the average structural losses from natural disasters at $1 billion a week between August, 1992 and December, 1995. Given the magnitude of disasters in recent years, new ways are needed to address disaster preparedness, response, recovery, and mitigation. A highly trained and professional emergency management workforce is essential since there is no time for delay or indecision during disasters. Key agencies must work together to perform the readiness requirements under the

Federal Response Plan to avoid needless duplication of responsibilities and the inefficient and ineffective use of resources.

The Corps Emergency Management Program must be ready to prevent all types of hazards and in support of the Department of Homeland Security. Countering terrorism is a national priority. Terrorism threatens national security through contamination of, or disruption to, infrastructure, such as major water conveyance structures (aqueducts, tunnels, pipelines). Target threat areas include nuclear and radiological facilities, toxic chemicals and explosive materials facilities, transportation systems (navigable waterways and ports), and fixed infrastructure. Since 9/11, the Nation has maintained a heightened state of readiness to protect critical infrastructure. Concerns for water resources infrastructure focus on several things: dam failure causing massive flooding downstream; biological or chemical contamination – especially of water supplies -- and attacks on navigation facilities and hydropower plants. Implications for water resources development include:

- Resources will be diverted from domestic programs to homeland security and defense.
- There is a need to secure critical infrastructure, such as dams, hydropower plants, and reservoirs to protect vital resources for national security and to keep the domestic engine primed and pumping. Increased attention to planning is required to protect water supply systems, including treatment, pumping, and storage facilities.
- Better detection, warning, and alert systems for a terrorist attack are required.
- Water resources project designs must take security considerations into account.
- Planning must be done to assess system vulnerabilities.
- There is a need for centralized catastrophic disaster response coordination at the Federal level.
- Better coordination among the public health and disaster medical systems will be required.
- Need to improve core capabilities of some states and localities to respond to a massive disaster.
- Need improved detection and treatment for chemical and biological agents. Readiness programs must incorporate biological and chemical attack scenarios to a greater degree, especially in large metropolitan areas.
- Improved intelligence gathering and analysis from both domestic and international sources will be needed.
- Changes in emergency management systems and personnel training should be made.

The capability to provide rapid and effective response to hazards both natural and man-made (such as terrorism) protects lives and property, reduces damages (e.g., from flooding), provides reliable and safe drinking water during droughts and when supplies are contaminated, and facilitates rapid economic recovery after disasters. Americans expect and need to get their lives back to normal after a disaster event. The Corps responds to natural disasters under the Flood

Control and Coastal Emergency (FCCE) Program established by Public Law 84-99 (1955) and in support of the Department of Homeland Security under the Stafford Act (Public Law 93-288). The capability the Corps provides directly to communities during floods and in support of the Federal Emergency Management Administration (FEMA) within the Department of Homeland Security) augments State and local response and recovery capabilities. Trained regional planning and response teams; ready cadres; and in-place contracts, systems, equipment, and facilities provide a level of readiness that reduces risks and raises confidence that help is on the way. Preparedness to address both natural and man-made emergencies is required to ensure that the Corps is ready to respond to a broad range of disasters and emergencies through planning, training, response exercises, supplies and equipment, operations and maintenance, and program management.

Organizational and Technical Effectiveness

New and existing requirements must be met with sufficient capability. Therefore, there is a need to ensure that the Corps has the talent, tools, systems, processes, and perspectives in place ready to tackle whatever tasks are deemed important – with an eye toward managing strategic changes. Organizations must keep up with a technology revolution that is revolutionizing the way people live, work, and learn.

Information management capabilities are growing exponentially, allowing people to tackle more complex tasks, to grow their knowledge base faster, and to connect ideas, people, and technology more rapidly, effectively, and efficiently. Information technology facilitates extensive and intensive monitoring, analysis, archiving, and dissemination of information, thus increasing productivity. This has implications for water management. For example, efficient vessel transport is expedited through forecasting of vessel movements, timing for locks, modernized approaches to scheduling, dispatching, tracking, and routing the delivery of goods. But just as technology is increasing productivity, a human capital crisis is upon us. Every field seems to be experiencing a shortage of talented recruits at a time when Baby Boom retirements are on the near horizon. Although the Federal workforce is becoming more skilled, more educated, and more white-collar, it is also getting older. Nearly 75 percent of the Federal workforce is now over the age of 40 and beginning to think about retirement; a retirement surge in the Federal government will only exacerbate the human capital crisis. Unless workforce succession planning and concerted training and retraining take hold, agencies will be left with skill gaps. These challenges emerge in the face of other trends and facts:

- Privatization and Competitive Sourcing. The trend toward private competition has been taking place in government at all levels for the past two decades.[37] There is a strong and growing interest, supported by legislation, a resurgence of Federalism, and public sentiment, in privatizing and outsourcing government work to save money and improve the quality of public services.[38] The privatization trend emphasizes a limited Federal role, a strengthening of the relationship between the Federal government and citizens through citizen-

centered government operations, and an expanded reliance on resource allocation through market-based competition. The trend toward competitive sourcing, coupled with flat budget projections for the next few years, will exacerbate competing demands on available resources and affect decisions about investment in water resources solutions. One approach is to strengthen partnerships (Federal-state, Federal-private sector) so as to leverage resources and capabilities.

- A Push for Fundamental Reform of the Corps. The Corps has received much criticism and many suggestions regarding planning procedures for new water resources development, the Corps' project delivery process, and policies and processes for the regulation of the nation's waterways and wetlands.[39] Discussions during the 2000 Listening Sessions reinforced the need for improvement in the several areas:

    - Update and Integrate Water Resources Policy. Beyond the need to update policies, our critics seek greater consistency among policies across agencies where responsibilities overlap and, most importantly, independent technical review of large projects.

    - Improve the Corps' Project Delivery Process to deliver projects faster. Recommendations include delegating authority further down the chain of command; re-examining study methodologies and economic principles for benefit-cost analyses; take into account the full range of benefits (environmental, social, cultural -- not just economic) in deciding the worth of a project; and involving all stakeholders in the project development process from the beginning. Our critics want to see more transparency in our decision-making processes.

    - Streamline Businesses Processes – Especially the Regulatory Process. People want to see the regulatory permitting timeline shortened (especially for Clean Water Act, Section 404 permits) and simplified, a tracking system implemented, and permit decisions tailored to regional challenges. They would like to achieve a better balance between commercial/industrial beneficiaries and community and environmental beneficiaries.

    - Address Federal Funding Issues such as the level of funding to repair and replace aging infrastructure and problems with cost-sharing formulas for the poor. Some stakeholders desire greater attention on ability-to-pay issues and a re-examination of cost-sharing percentages of local sponsors.

- Improve Data Collection, Analysis, and Dissemination. We heard a lot about the need to share data across Federal agencies and with others outside government. Lack of coordination and communication leads to needless duplication of data collection efforts and studies or significant voids, thus limiting the potential for developing solutions to complex problems. Some people would like to see a one-stop data clearinghouse to make water resources data universally available to communities of interest for enhanced coordination, planning, and project development. This would support national assessments and the formulation of regional and watershed plans. In addition, people noted that many agencies are not applying the most advanced technologies and models available. But where the government excels, as in the use of geographic information systems (GIS) technology or modeling, such technology should be more readily available to the general public. Many cited a need to update floodplain studies and maps, taking into account potential dam failures.

The Corps maintains world-class capabilities throughout the organization at Centers of Expertise and especially in its laboratories through capital investment and research and development. Research and development (R&D) serves to improve operational processes and to get a leading edge on new capabilities needed for future requirements. Technology transfer promulgates engineering and scientific skill and knowledge. But there is a need to ensure that the critical talent is available today and into the future to accomplish the Civil Works mission. Building trust requires attention to people, processes, fiscal responsibility, efficiency, and technology.

Endnotes

[1] Our customers are beneficiaries of the water resources services we deliver. Customers include local communities, the public, industries served by navigation, hydropower, flood damage reduction, and environmental projects, visitors at recreational facilities, disaster prevention and recovery activities, and applicants for wetlands permits, and those for whom we do reimbursable work. Our partners are those who share the cost and responsibility of delivering these services. They include State and local government, the barge industry, and others who sponsor and share in the costs of water resources projects, as well as our sister Federal agencies who strive toward common goals. Our stakeholders include those who provide oversight for our mission accomplishment, such as the Office of Management and Budget and Congress, and those with an interest in the nature and quality of the products and services we deliver, for example architectural and engineering associations.

[2] The Corps' civil works role began with navigation, expanded to flood protection, and added hydropower, recreation, water supply, environmental, and emergency management missions. Our civil works mission is grounded in a series of laws enacted since 1824. The General Survey Act authorized the president to have surveys made of routes for roads and canals "of national importance, in a commercial or military point of view, or necessary for the transportation of public mail. The president assigned responsibility for the surveys to the Corps of Engineers. The second act, also signed in 1824, appropriated $75,000 to improve navigation on the Ohio and Mississippi Rivers by removing sandbags, snags, and other obstacles. Subsequently, the act was amended to include other rivers such as the Missouri. This work was also given to the Corps of Engineers. The Civil Works authority expanded to the 1909 Rivers and Harbors Act authorizing the consideration of hydroelectric power generation in the planning, design, and construction of water resource development projects. The 1917 Flood Control Act established a role for the Corps in flood damage reduction, which became a national flood protection role for the Civil Works Program in the 1936 Flood Control Act (P.L. 74-738). A recreation role was added as part of flood control at Corps reservoirs in the 1944 Flood Control Act (expanded to the authority to build recreational facilities as part of all water resource development projects in the 1962 River and Harbor Flood Control Act). The Water Supply Act of 1958 gave the Civil Works Program the authority to include water storage in new and existing reservoir projects for municipal and industrial uses. The environmental role to protect, restore, and manage the environment emanates from the Rivers and Harbors Act of 1899 that assigned the Corps the mission to prevent obstruction of navigable waterways). As concerns over the environment grew in the late 20th Century, the Clean Water Act of 1972 broadened the Corps' responsibility to fill in the waters of the United States, including wetlands, when dredging. Additional legislated passed in the 1986 Water Resources and Development Act further expanded the Corps' environmental role to include enhancing and restoring natural resources at new and existing projects. This legislation made environmental protection one of the Corps' primary water resources development missions. The Flood Control and Coastal Emergency Act (P.L. 84-99) and the Stafford Disaster and Emergency Assistance Act (P.L. 93-288, as amended) gave the Civil Works Program direct authority to help the nation in times of national disaster. P.L. 84-99 directed the Corps to provide emergency assistance during or following flooding events to protect lives, public facilities, and infrastructure. The Stafford Act authorized the Corps to support the Federal Emergency Management Agency in carrying out the Federal Response Plan, which requires 26 Federal departments and agencies to provide coordinated disaster relief and recovery operations. Title 10 of the U.S. Code, the Armed Forces, as further outlined in Title 33, Navigation and Navigable Waterways, enables the Civil Works program to provide services to other Federal entities, States, or local governments on a reimbursable basis. This work includes flood control, the improvement of rivers and harbors, research, and support to private engineering and construction firms competing for, or performing, work outside the United States. The Support for Others Program engages the Corps in reimbursed work that is determined to be in America's best interests. (Corps Office of History).

[3] Section 306 of WRDA 1990 added environmental protection as a primary mission.

[4] U.S. Army Corps of Engineers, National Challenges Report, Institute for Water Resources, Alexandria, VA, 2001.

[5] The Corps formally adopted seven Environmental Operating Principles in 2002. They are:

1. Strive to achieve environmental accountability. An environment maintained in a healthy, diverse, and sustainable condition is necessary to support life.
2. Recognize the interdependence of life and the physical environment. Proactively consider environmental consequences of Corps programs and act accordingly in all appropriate circumstances.
3. Seek balance and synergy among human development activities and natural systems by designing economic and environmental solutions that support and reinforce one another.
4. Continue to accept responsibility and accountability under the law for activities and decisions under our control that impact human health and welfare and the continued viability of natural systems.
5. Seek ways and means to assess and mitigate cumulative impacts to the environment; bring systems approaches to the full life cycle of our processes and work.
6. Build and share an integrated scientific, economic, and social knowledge base that supports a greater understanding of the environment and impacts of our work.
7. Respect the views of individuals and groups interested in Corps activities, listen to them actively, and learn from their perspective in the search to find innovative win-win solutions o the nation's problems that also protect and enhance the environment.

[6] Published in the President's Budget for Fiscal Year 2004.

[7] For example, Section 202 of the Water Resources Development Act of 2000 authorizes the corps to assess the water resources requirements of river basins and watersheds in the U.S.

[8] The attendees at the Listening Sessions identified 3.400 specific challenges, which were reduced to 18 challenge areas:

1. Integrated water resources management and planning
2. Communication/Coordination/Education
3. Regulatory issues
4. Floodplain management
5. Marine transportation system
6. Environmental/ecosystem health and management
7. Federal funding
8. Water quality
9. Emergency response
10. Water supply
11. Wastewater collection
12. General water resources infrastructure
13. Data collection, analysis, and dissemination
14. Corps project delivery process
15. Federal and Corps water resources policy
16. Recreation
17. Smart growth and development
18. Coastal/shoreline management

[9] The World Commission on Environment and Development [Brundtland Commission], 1987.

[10] U.S. Army Corps of Engineers, Listening Session, Louisville, 2000.

[11] U.S. Army Corps of Engineers, National Challenges Report, 2001, Institute for Water Resources, Alexandria, VA.

[12] The Urban Water Council, "Case Studies of the Local Government Role in Watershed Management," The U.S. Conference of Mayors, 2002.

[13] The Urban Water Council, "Case Studies of the Local Government Role in Watershed Management," The U.S. Conference of Mayors, 2002.

[14] Physical watersheds are areas of land where all surface waters drain into a single body of water, such as a stream, lake, wetland, or estuary. According to the U.S. Geological Survey, there are 2,149 watersheds in the United States within 21 large river basins.

[15] White House, "A National Security Strategy for a New Century," December 1999.

[16] Department of Transportation, "Freight Analysis Framework."

[17] Information paper on "Civil Works Program Statistics" produced by the Civil Works Directorate, February 28, 2002.
[18] David Grier, Internal working paper, "The Role of Commercial Navigation: A 2020 Perspective," Institute for Water Resources, Alexandria, VA, December, 2002.
[19] United Nations Population Fund. "Migration and Urbanization." http://www.unfpa.org/modules/6billion/populationissues/migration.htm
[20] US Census Bureau, "Population Projections, States 1995 to 2025," May 1997.
[21] USA Today, "Facing Mother Nature's Fury," August 28, 2000.
[22] USA Today, "Science confirms: USA's Summer Was Hot and Dry," September 13, 2002.
[23] Congressional Budget Office, "Letter on Future Investment in Drinking Water and Wastewater Infrastructure," May 2002.
[24] National Hydropower Association, "NHA Forecast for Hydropower Development through 2020." http://www.hydro.org/hydrofacts/forecast.asp
[25] National Hydropower Association, "NHA Forecast for Hydropower Development through 2020." http://www.hydro.org/hydrofacts/forecast.asp
[26] ASCE, "Report Card on America's Infrastructure, 2002." Available at www.asce.org/reportcard
[27] CNN, "FEMA: Erosion Threatens 87,000 Coastal Buildings in U.S., June 27,2000. Available at www.cnn.com/2000/NATURE/06/27/fema.erosion.02
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[32] U.S. Fish and Wildlife Service, Threatened and Endangered Species System, as of December 19, 2002. Available at http://www.ecos.fws.gov/tess/html/boxscore.html
[33] Renewable Energy Project, 2000. Available at http://www.repp.org/repp_pubs
[34] American Society of Civil Engineers, "Report Card on America's Infrastructure, 2002." Available at www.asce.org/reportcard
[35] Internal notes, Institute for Water Resources, Alexandria, VA, 2003.
[36] Information paper, "Civil Works Program Statistics," U.S. Army Corps of Engineers, February 28, 2002.
[37] Richard W. Stevenson, "Government Plan May Make Private Up to 850,000 Jobs," New York Times, November 15, 2002.
[38] The Administration is implementing a plan to identify commercial activities (activities resulting in a product or service) that can be obtained from the private sector to ensure that work that is not inherently governmental is done in the most efficient manner possible.
[39] For example, the Transportation Research Board issued the report entitled "Inland Navigation System Planning: The Upper Mississippi River/Illinois Waterway, 2001"; the National Research Council, an operating arm of the National Academy of Sciences, released a study, "Review Procedures for Water Resources Planning," in July, 2002.