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Global Changes
USACE SUSTAINABILITY: DEFINITION AND
CONCEPTS GUIDE

1. Purpose. This pamphlet clarifies sustainability-related terms and definitions to help orient and align staff on practices consistent with the Environmental Operating Principles (EOP), Guiding Principles for Sustainable Federal Buildings (GP), Civil Works Strategic Plan (CWSP), and other directives.
2. Applicability. This pamphlet applies to all HQUSACE elements, major subordinate commands, districts, laboratories, centers, and field operating activities.
3. Distribution Statement. Approved for public release. Distribution is unlimited.
4. References.
 - a. CECW-CP Memorandum, 14 October 2016, Subject: Reissuance of the USACE Environmental Operating Principles (EOP)
 - b. Guiding Principles for Sustainable Federal Buildings, 26 February 2016 (GP)
 - c. Sustainable Solutions to America's Water Resource Needs: Civil Works Strategic Plan 2014-2018 (CWSP)
 - d. USACE Strategic Sustainability Performance Plans, Annual Updates
5. USACE Sustainability: Definition and Concepts.
 - a. Sustainability-related terms are often used in foundational USACE documents and statements, as well as external federal mandates and other requirements and guidelines. These terms, their definitions, and their applications have varied. As a result, practical applications for how USACE can best exemplify sustainability have also varied.

b. The EOP (Ref. 4.a.) encourages staff to “create mutually supporting economic and environmentally sustainable solutions.” For building construction, USACE currently adheres to the Guiding Principles for Sustainable Federal Buildings (Ref. 4.b.). For water resources, the CWSP (Ref. 4.c.) is titled “Sustainable Solutions to America’s Water Resources Needs” and presents the Civil Works Vision, “Contribute to the strength of the Nation through innovative and environmentally sustainable solutions to the Nation’s water resources challenges.” Additionally, annual USACE Strategic Sustainability Performance Plans (Ref. 4.d.) present ongoing activities with respect to federally-mandated sustainability requirements, including energy and water conservation, sustainable buildings, and other targets and metrics.

c. Consistent use of terms is important to provide staff with clearer direction and understanding so that activities may be appropriately aligned within the USACE community. This pamphlet defines *sustainable solutions* as “solutions that balance environmental, economic, and social benefits and impacts to meet present needs without sacrificing the ability of future generations to meet their needs.” This definition encompasses core basic principles of sustainability, balancing multiple considerations, including future needs and capabilities. The definition applies throughout USACE to the extent that it does not conflict with any Army and/or USACE policies.

d. USACE achieves its sustainability objectives as team members identify and implement sustainable practices in their actions, projects, and programs. This pamphlet provides a multitude of examples of how sustainability principles are followed across different functions and levels of the organization.

e. USACE is actively preparing a series of products to help staff better understand and improve their delivery of sustainable solutions. This pamphlet is a fundamental first step in the process, helping staff identify sustainability-related practices across USACE and setting the overall direction of this initiative. The information contained in this pamphlet will be used to inform future applicable guidance.

FOR THE COMMANDER:

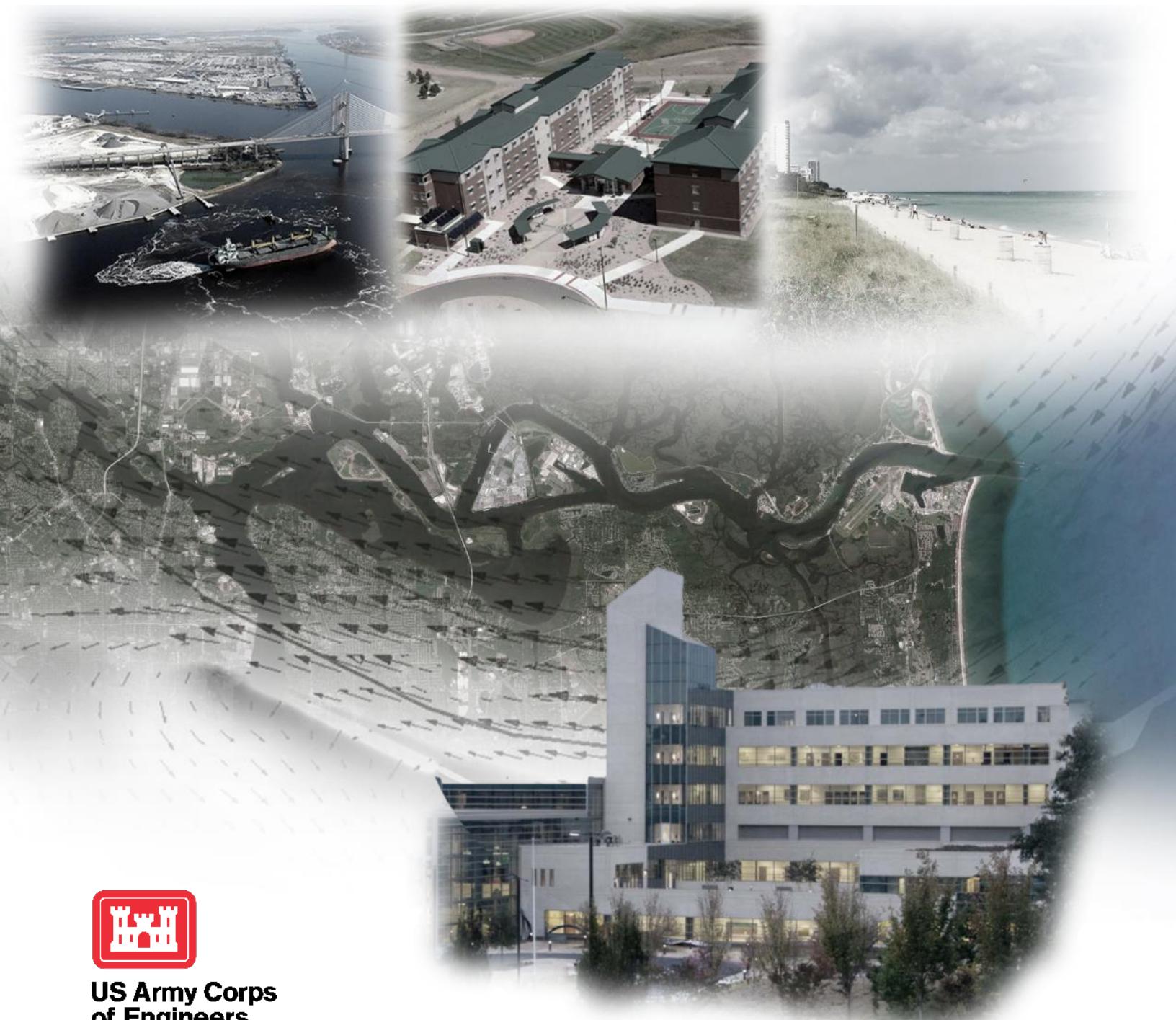


KIRK E. GIBBS
COL, EN
Chief of Staff

1 Appendix
USACE Sustainability: Definition and Concepts Guide

APPENDIX A

USACE SUSTAINABILITY: DEFINITION AND CONCEPTS GUIDE



**US Army Corps
of Engineers**

USACE Sustainability: Definition and Concepts Guide

For more than 240 years, the U.S. Army Corps of Engineers (USACE) has been a leader in the support of the Nation's defense and civil works infrastructure. USACE projects and programs encompass a wide range of activities that include the construction of buildings and other infrastructure for government agencies, and water resources management, including flood control, navigation, recreation, aquatic ecosystem restoration, environmental stewardship, hydropower, regulatory, water supply, and emergency response.

USACE strongly values sustainability and reflects this tenet in many ways across the organization. The USACE EOP encourage staff to "create mutually supporting economic and environmentally sustainable solutions." For building construction, USACE currently adheres to the GP for Sustainable Federal Buildings. For water resources, the CWSP is titled "Sustainable Solutions to America's Water Resources Needs" and presents the Civil Works Vision, "Contribute to the strength of the Nation through innovative and environmentally sustainable solutions to the Nation's water resources challenges." Additionally, annual USACE Strategic Sustainability Performance Plans present ongoing activities with respect to federally-mandated sustainability requirements, including energy and water conservation, sustainable buildings, and other targets and metrics.

Principles of sustainability require USACE to balance the economic impacts of its activities with their associated environmental and social impacts, and conduct its activities in consideration of both current and future needs and capabilities. This Guide establishes a uniform definition for *sustainable solutions* to help orient and align staff on practices consistent with the EOP, GP, CWSP, and other directives. Practices that promote sustainable solutions are also provided in this Guide as examples.

Sustainable Solutions

USACE develops and implements solutions for the Nation's toughest infrastructure challenges. **Sustainable solutions balance environmental, economic, and social benefits and impacts to meet present needs without sacrificing the ability of future generations to meet their needs.**

USACE's focus on sustainable solutions is motivated by the need to accomplish our missions and carry on operations despite many factors that contribute to current and future conditions and challenges, including:

- Legislative and administrative authorizations and mandates;
- Demographic shifts and growth with consequent effects on energy and water demand;
- Changing sea levels, climate change, floods and droughts, altered habitats;

- Cultural shifts leading to changes in environmental and social priorities;
- Governance and the allocation of resources to address deteriorating infrastructure;
- Economic trends;
- Energy and water security and preparedness requirements; and
- Changes in risk appetite and tolerance.

USACE seeks solutions that recognize three pillars of sustainability – environmental, economic, and social. The pillars are overlapping and can be complementary. For example, maintaining deep draft navigation channels supports economic sustainability, which in-turn is a major factor in social sustainability; dredged materials can be used to create habitat providing healthy environments for species that support fisheries. Solutions that provide functions and services in ways more acceptable, equitable and viable with respect to the three pillars are generally considered more sustainable.

Sustainable Solutions

Solutions that **balance environmental, economic, and social benefits and impacts** to meet present needs **without sacrificing the ability of future generations** to meet their needs.

Delivering Sustainable Solutions

USACE operationalizes sustainable solutions when team members identify and implement sustainable practices in their actions, projects, and programs. Teams must conduct their activities while seeking to balance environmental, economic, and social benefits and impacts. Characteristics of practices that support sustainable solutions may be grouped into five categories, as listed below.

1. Taking a life cycle view and recognizing risks.
2. Conserving resources, promoting efficiency, and extending mission capability.
3. Addressing the complexities of natural resources systems and management.
4. Seeking opportunities to innovate and improve quality.
5. Partnering and collaborating to maximize value.

Descriptions of each category are provided below.

1. Taking a life cycle view and recognizing risks.

Built infrastructure such as hospitals, barracks, locks, dams, levees, and associated operational requirements generally persist for long periods. Certain types of infrastructure can have a very long service life, requiring several cycles of rehabilitation and replacement. Mission and societal priorities also change over time and can result in a desire to change project purposes in some places. Similarly, environmental conditions and ecosystem goods and services may change over time, providing new opportunities and constraints to USACE missions and operations. Actively managing the life cycle under these dynamic circumstances requires strategic investment of limited resources to support both current and potential future delivery of project benefits. This long-term perspective informs the agency's approach to project planning, risk management, disaster response, and asset management.

When considering the life cycle view, we attempt to understand the history of a particular project or program in the local, regional, and national context. This type of review sheds light on past response in the face of disturbances and the life cycle of the materials, components, infrastructure, human resources, and ecosystems involved. It helps identify actions that address current challenges and improve future outcomes, taking into account uncertainties and risks. Some questions to ask include: What are the life cycles of materials, infrastructure, or ecosystems utilized by the project? Are projects resilient to disturbance? Are options preserved for future decision-makers?

2. Conserving resources, promoting efficiency, and extending mission capability

USACE is committed to conserving resources, increasing efficiency and productivity, extending mission capability, and expanding infrastructure lifespan as needed. The organization's approach is very well aligned with a commitment to sustainability that includes conservation of resources (e.g., water, energy, sediment, money, time, and habitat) and use of resources as efficiently as possible.

We seek to understand conservation measures that we encounter in our daily activities. We explore how to conserve resources while meeting, and ideally improving upon, the success of our missions. We accomplish this by asking ourselves whether resources are used as efficiently as possible, how the same tasks or functions can be performed with fewer resources, and what efforts we can take to improve. Some questions to ask include: What actions can be taken to conserve resources? Can materials be reduced, reused, or recycled? Can the same functions be performed with fewer resources?

3. Addressing the complexities of natural resources systems and management.

Natural resources are made up of a wide range of dynamic components and fundamentally connected systems. Water resources in particular require recognition of multiple conditions, relationships, interactions, constraints, and feedbacks that influence and are influenced by our activities. USACE uses its understanding of these interconnected systems to create a range of desired services or benefits through our projects and programs.

As we conduct our daily activities, we consider our role in relation to natural resources management. We recognize the complex nature of these systems and implement actions that support current and future missions and operations in a more sustainable manner. We consider means by which we can collaborate to improve solutions and learn about new ideas that can be useful for the organization in dealing with complex and changing environments. Some questions to ask include: What are the components of the system and how do they function? What conditions are changing in the system over long time scales? How do agency actions integrate long-term planning, design, management, operations and decision-making?

4. Seeking opportunities to innovate and improve quality.

USACE continues to demonstrate organizational capability to prepare for and respond to changes in ways that support economic, environmental, and social sustainability. New challenges often require new solutions. USACE continually seeks ways to innovate and improve the quality of the services and products we deliver. Staff are empowered and accountable for actively pursuing improvement through their individual roles and responsibilities.

In striving to provide innovative and high-quality solutions, we work to better understand our current condition and identify ways to improve. Innovation requires creativity, technical competence, and being well-informed. Staff are continually engaged to suggest and test new ideas and subsequently take action to improve long-term performance. Quality is a distinctive trait that we live-by in our daily lives and in the solutions we deliver. Some questions to ask include: How do proposed actions or new technologies increase productivity? How are innovation and improvements encouraged and facilitated in a project? Are efforts monitored and how can monitoring data be used to drive improvement?

5. Partnering and collaborating to maximize value.

Agency actions are more effective when parties and individuals have the opportunity to share their perspectives, ideas, and resources. Proactive collaboration and partnership helps us to more comprehensively define problems and opportunities, reduce redundancy, effectively use resources, and reveal opportunities for increasing the overall value of our work.

In identifying collaborative opportunities, each of us reflects on our capabilities, needs, and challenges, as well as those of potential partners. We identify and seek to understand all the stakeholders, including those with conflicting interests. We accomplish our missions while identifying opportunities to resolve conflicts, communicating effectively, and building trust. Some questions to ask include: Who are the stakeholders and what are their specific interests and priorities? What opportunities exist to resolve conflict? Are we communicating appropriately about our activities and transparent about the process?

Sustainable Solutions in Practice

Solutions become more sustainable as individuals and teams develop and share lessons across the organization and with our partners. Examples of practices that promote sustainable solutions are provided on the following table. The examples span different functions and levels of the organization, from individual team members and projects to senior leaders and major programs. The effectiveness of each practice depends on activity-specific variables; however, the examples illustrate the diversity of actions that may be viewed in the context of sustainability.

Table A-1 – Examples of Practices that Support Sustainable Solutions

1. Taking a Life Cycle View and Recognizing Risks	
Individual	An engineer evaluates the sustainable yield of a reservoir where drought may impact water supply storage in the future. A cost engineer prepares estimates considering life cycle costs and contingencies to account for unknown factors.
Project	A planning study team identifies triggers for when a coastal project becomes obsolete or a new method of reducing storm risk is necessary. A project delivery team maintains a risk register to track uncertainties and systematically identify means for managing performance risks. Total Cost of Ownership is considered in the selection of equipment and alternatives. Natural resource managers working on a project meet with local forestry officials to better understand and improve the management and long-term health of a forest. A planning team considers multiple end-of-life options for alternatives in order to factor in triggers and costs.
Program	A value model is considered for managing assets, determining when to engage in planning, engineering, operational, and maintenance actions. The cost for the eventual rehabilitation or replacement of a major asset is included in the budgeting and cost recovery model for a program. An asset program manager considers risks of system failure and tolerable operational risk levels in developing and prioritizing maintenance schedules.
Senior Leader	A Deputy District Engineer for Programs and Project Management convenes planning, engineering, and operations staff to solicit input on life cycle challenges and opportunities. Headquarters reviewers stress consideration of risk levels, risk reduction measures, and infrastructure resilience during project reviews.

Table A-1 – Examples of Practices that Support Sustainable Solutions (Cont'd)

2. Conserving resources, promoting efficiency, and extending mission capability	
Individual	<p>A meeting organizer provides electronic versions of agenda and read-ahead material, and presents material on a large screen to reduce paper use.</p> <p>A hydropower engineer suggests laser pump alignment during preventative maintenance to improve efficiency and reduce operations and maintenance costs.</p> <p>An engineer explores the use of ground source heat pumps to narrow the operating range of equipment and reduce energy demand.</p> <p>A recreation staffer solicits feedback to improve the visitor experience.</p>
Project	<p>A design or construction manager identifies dredge materials that can be diverted for beneficial reuse.</p> <p>Waste material from concrete demolition is crushed on-site and reused for paving base material during construction.</p> <p>New methods for transferring property are evaluated and implemented.</p> <p>A project delivery team leverages modern technologies for communicating with remote coworkers, including virtual meetings to reduce travel.</p> <p>A fitness facility is designed using exposed cross laminated timber as both a structural system and interior finish material, greatly reducing their atmospheric carbon impact.</p>
Program	<p>An operations team incorporates an automated data collection system to track unit performance and help identify opportunities for improvement.</p> <p>A contracting officer includes standard clauses in construction contracts promoting the use of recycled materials, biobased products, and/or energy-efficient products.</p> <p>IT staff set printer defaults to double-sided printing to reduce paper use.</p>
Senior Leader	<p>An operations chief communicates the importance of resource conservation and implements initiative to promote the development and adoption of new approaches.</p> <p>Senior headquarters staff convene a cross-functional team to improve efficiencies in program development.</p>

Table A-1 – Examples of Practices that Support Sustainable Solutions (Cont'd)

3. Addressing the complexities of natural resources systems and management	
Individual	A local operations manager creates public exhibit materials that illustrate intricacies of the local hydrology. A program analyst works across his/her division to prepare budgets, allowing investments to be prioritized while tradeoffs between competing needs are recognized.
Project	A public affairs official develops communications materials illustrating the complexity introduced by multiple water agencies with responsibilities within a watershed. A planning study team investigating methods to reduce saltwater intrusion into coastal wetlands induced by harbor expansion considers upstream reservoir operations. A project delivery team conducts an environmental assessment to identify and better understand impacts to surface water, wetlands, and other natural resources.
Program	Activities conducted in snowmelt-dominated watersheds consider current and future impacts of snowmelt timing and volume. Dam and levee safety programs consider benefits and impacts to communities, economy, and environment when making prioritization decisions. A demonstration program for regional sediment management is established for a channel deepening project to identify locations for placing sediment to keep within the system. As part of the Sustainable Rivers Project, modifications to reservoir operations are sought to satisfy environmental needs with authorized project purposes as an effective means to restore, protect, and sustain river habitats.
Senior Leader	District leadership team meets with county, state, and local agencies, utilities, and other authorities to initiate and coordinate integrated water resources management activities. Executive Governance Meetings share information on successes dealing with complex projects involving multiple stakeholders and competing interests.

Table A-1 – Examples of Practices that Support Sustainable Solutions (Cont'd)

4. Seeking opportunities to innovate and improve quality	
Individual	<p>Staff identify ways to more holistically incorporate social and environmental issues into plan formulation and evaluation.</p> <p>An inspection crew member identifies a new practice or product that significantly improves the effectiveness and/or efficiency of inspection process.</p> <p>A Community of Practice leader schedules an annual meeting the day before a commonly attended industry event at a nearby facility to reduce costs and greenhouse gas emissions from travel.</p>
Project	<p>A building information model is developed by a design team and provided to the construction contractor to improve scheduling and coordination.</p> <p>A project delivery team identifies and evaluates alternative new materials that decrease costs while improving resilience.</p> <p>A new technology is tested at a pilot site to evaluate performance.</p>
Program	<p>A guidance development team institutes a new business process to improve the timeliness and quality of technical reviews.</p> <p>An invasive species control program collaborates with industry partners to identify alternative species management methods.</p>
Senior Leader	<p>Headquarters division chiefs establish goals and objectives for improving team performance and empower staff to pursue innovative solutions to meet requirements.</p> <p>A functional area leader creates an awards incentive program to encourage and recognize individuals, projects, and programs for their leadership in innovation and quality.</p> <p>Senior leaders in a district present and showcase their sustainable best practices.</p>

Table A-1 – Examples of Practices that Support Sustainable Solutions (Cont'd)

5. Partnering and collaborating to maximize value	
Individual	A scientist actively participates in the local chapter of a professional or industry association to build external relationships, better understand the perspectives and challenges of others, and identify areas of potential collaboration. Project delivery team staff reach out to subject matter experts from other agencies and districts to help develop solutions.
Project	A lock and dam project team hosts an open house for local leaders and citizens to provide the community with an improved understanding of operations. A project delivery team reaches out to local environmental agencies to identify common issues and help formulate complementary projects. A District Project Team holds an Industry Day with local contractors to assess market conditions before developing an acquisition strategy.
Program	The Silver Jackets program brings together state, federal, tribal, and local officials to share lessons learned in reducing flood risks and managing the impacts of natural disasters in a watershed. A district considers a public-private partnership to help finance a Combined Heat and Power Plant or flood diversion program. Ecological knowledge is shared with tribal communities to encourage sustainable projects, programs, and practices.
Senior Leader	Division senior staff present at regional, national, and international association meetings, providing potential future partners an understanding of agency operations and challenges. Headquarters organizes a cross-functional team to resolve complex challenge involving planning, engineering, operations, and regulatory considerations.

Sustain the Mission – Secure the Future

It is incumbent on all USACE employees to understand and consider what it means to be sustainable and to continually seek ways to improve practices. By applying the concepts contained in this guide and considering sustainability principles in everyday actions, each USACE employee helps deliver solutions that are sustainable and contribute to the strength of the Nation. **Essayons!**