US Army Corps of Engineers®

Flood and Coastal Storm Damage Reduction R&D Program

Description

The Flood and Coastal Storm Damage Reduction (FCSDR) R&D Program is a General Investigation (GI) funded program under the Flood Risk Management Research Area of the U.S. Army Corps of Engineers' Directorate of Research and Development. Objectives of the R&D Program are to provide capabilities to sustain multipurpose water resources projects; provide capabilities for efficient and effective emergency management; and ensure product consistency with other USACE business lines and research areas. FCSDR R&D Program provides advancements in hydrologic and hydraulic simulation, water resources project optimization, tools for effective alternative analyses for solutions, infrastructure safety, structural design, and performance, and assessment of the risk and uncertainty associated with project designs. The program also improves the technology available to emergency managers for emergency planning, preparedness, response, recovery, and assessment. Structured to support the Corps' water resources mission areas, the program contains six primary focus areas including Alternatives Analysis and Decision Making, Coastal Storm Modeling, Emergency Management Technology, Functional Design and Performance of Structures, Hydraulics and Hydrology, Water Supply Technology.

Houston skyline after Tropical Storm Allison, 2001

Issue

The Corps was first called upon to address flood problems along the Mississippi River in the mid- 1800's. Work on the Mississippi River and Tributaries Flood Control Project began in 1928, and the Flood Control Act of 1936 gave the Corps the mission to provide flood protection to the entire country for the public's welfare. With management of the Nation's flood-control infrastructure, the Corps balances requirements for hydropower, water supply, environmental stewardship, and recreation. The Corps owns and operates 608 dams, operates 383 major lakes and reservoirs, maintains 8,500 miles of levees, and has constructed 87 major shore protection projects over 350 miles of shoreline associated with its water resources management mission. Flood Risk Management expenditures between 1928 and 2003 total and estimated $125.73 billion (adjusted for inflation). Cumulative damages prevented for that period amounts to $801 billion (adjusted for inflation), resulting in $6.37 of damages prevented per dollar expended. Despite the Nation's efforts to manage flood risk, annual damages in flood plains continue to rise due to changes in land use, urban development, and variations in physical processes. Challenges in providing an increasing level of sustainable water resource management, including flood risk management, necessitate continued technological advancement through research and development.

Potential Users USACE Division and Districts, Corps partners and stakeholders, practitioners and project managers world-wide.

Products Integrated across disciplines, a variety of products are developed or advanced by the FCSDR R&D Program, providing efficient and effective capabilities to plan, design, construct, operate, maintain, and improve water resource projects in all climates and settings, from warm to ice-affected, and from inland to coastal. Beach-*fx* and Hydrologic Engineering Center-Flood Damage Analysis (HEC-FDA) and Hydrologic Engineering Center-Flood Impact Analysis (HEC–FIA) are examples of advanced processes and design models for improved flood risk management measures. Economic models and decision support software such as Institute for Water Resources-Planning Suite (IWR-PLAN) are extended to increase efficiencies in project planning. Infrastructure condition and risk assessment requirements are achieved through continued development and application of Dam Safety Portfolio Risk Assessment (PRA) toolbox modules and guidance. Products such as flood-alert systems and rapidly deployable real-time monitoring instrumentation increase public safety and the capability to collect and analyze real-time data to accurately characterize project design and operational parameters. Products of the R&D program including tools, methods, and documentation will be accessible through the Water Resources Depot at https://swwrp.usace.army.mil/.

Benefits Major benefits to the Nation from the FCSDR R&D Program include:

- More efficient, safer, better performing, and more environmentally sustainable multi-purpose Flood Risk Management projects.
- Increased public safety through improved emergency management and decision-making during floods.
- Improved efficiencies in project planning and design.
- Reduced life-cycle costs through development of new construction and design methods.
- Extending service life of structures, and decrease of maintenance requirements.

Corps Program Civil Works, Direct Allotted, General Investigation

Sponsors Director of Civil Works, U.S. Army Corps of Engineers

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Partners FCSDR R&D activities are conducted collaboratively between the Corps' Institute for Water Resources (www.iwr.usace.army.mil/), and Hydrologic Engineering Center (www.hec.usace.army.mil/) and laboratories of the U.S. Army Engineer Research and Development Center (www.erdc.usace.army.mil/). Other USACE, Federal and non-Federal organization participate, including industry and academia.