

ECOSYSTEM RESTORATION

Ecosystem Restoration projects benefit the environment through restoring, improving or protecting aquatic habitat for plants, fish and wildlife. Additional opportunities for ecosystem restoration and protection may also be pursued through existing project authorities for the management of operating projects; e.g., through water control changes, or as part of natural resources management.

Protection measures may be included as part of Civil Works ecosystem restoration initiatives, when such measures involve efforts to prevent future degradation of an ecosystem's structure and functions. Such measures are most appropriate if they require Corps engineering expertise in accomplishing the protection measure however, they can also be undertaken as part of natural resources management, water control management and environmental dredging activities.

Requests for modifications to these projects shall demonstrate the original projects objectives are maintained as well as showing it is technically feasible, environmentally acceptable and provides cost-effective environmental benefits.

References:

Engineering Regulations

- ER 1105-2-101 Planning - Risk Analysis for Flood Damage Reduction Studies
- ER 1110-2-1150 Engineering and Design for Civil Works Projects
- ER 1110-2-1806 Earthquake Design and Evaluation for Civil Works Projects
- ER 1165-2-28 Corps of Engineers Participation in Improvements for Environmental Quality
- ER 1165-2-119 Modifications to Completed Projects

Engineering Manuals

- EM 1110-1-1802 Geophysical Exploration for Engineering and Environmental Investigations
- EM 1110-1-1804 Geotechnical Investigations
- EM 1110-1-1904 Settlement Analysis
- EM 1110-1-1905 Bearing Capacity of Soils
- EM 1110-2-301 Guidelines for Landscape Planting at Floodwalls, Levees & Embankment Dams
- EM 1110-2-1202 Environmental Engineering for Deep-Draft Navigation Projects
- EM 1110-2-1204 Environmental Engineering for Coastal Shore Protection
- EM 1110-2-1205 Environmental Engineering and Local Flood Control Channels
- EM 1110-2-1416 River Hydraulics
- EM 1110-2-1417 Flood Run-off Analysis
- EM 1110-2-1420 Hydrologic Engineering Requirements for Reservoirs
- EM 1110-2-1421 Groundwater Hydrology
- EM 1110-2-1619 Risk-Based Analysis for Flood Damage Reduction Studies
- EM 1110-2-1902 Slope Stability
- EM 1110-2-1913 Design & Construction of Levees

- EM 1110-2-2000 Standard Practice for Concrete for Civil Works Structures
- EM 1110-2-2002 Evaluation and Repair of Concrete Structures
- EM 1110-2-2102 Waterstops and Other Preformed Joint Materials for Civil Works Structures
- EM 1110-2-2104 Strength Design for Reinforced - Concrete Hydraulic Structures
- EM 1110-2-2705 Structural Design of Closure Structures for Local Flood Protection Projects
- EM 1110-2-2902 Conduits, Culverts and Pipes
- EM 1110-2-4000 Sedimentation Investigations of Rivers and Reservoirs
- EM 1110-2-5025 Dredging & Dredged Material Disposal

Additional Guidance

- "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies," (P&G), U.S. Water Resources Council, 1983
- EP 1165-2-502 Ecosystem Restoration - Supporting Policy Information

Please note that some Engineering Manuals supersede each other, hence care must be used applying requirements of the Engineering Manuals. In addition, engineering judgment is required in the application of these manuals to certain structures. The manuals listed above can be obtained at <http://publications.usace.army.mil/publications/eng-manuals/>