

Aquatic and Watershed Restoration



Areas of Expertise

- Habitat Restoration
- Water Quality Pollution Control
- Exotic and Invasive Species Control
- Contaminated Sediment Remediation
- Fish Passage Enhancement

Key AECOM Attributes

AECOM's staff includes fisheries scientists, benthic macroinvertebrate specialists, limnologists, geomorphologists, riparian community experts, wetland ecologists, civil and environmental engineers, water chemists, and environmental regulatory specialists. Our extensive experience and multidisciplinary expertise in aquatic restoration allows us to design and implement successful restoration programs that address existing challenges, while also minimizing future threats to watershed areas.

Overview

Freshwater aquatic systems such as rivers, streams, lakes, ponds, wetlands, and watersheds have been impacted by numerous stressors, including pollution of water and sediments, habitat and hydrologic modification, and invasive and exotic species. Yet freshwater is critical to the survival of both aquatic ecosystems and human communities. In addition to the intrinsic value of a more robust ecosystem, restoration of aquatic systems provides numerous societal benefits, including increased recreational opportunities, quality of drinking water resource areas, opportunities for the creation of parks, and overall quality of life.

AECOM is a global leader in the assessment and restoration of freshwater aquatic systems, for both private and public sector clients.

Our Approach

AECOM places emphasis on the complete physical, chemical and biological evaluation of the waterbodies and watersheds, facilitating informed management decisions based on sound science and engineering practices. AECOM professionals know the environmental rules and regulations that govern restoration projects, as well as the physical and ecological principles that drive the systems we restore. We combine this knowledge with adaptive management methods to prioritize and implement solutions to aquatic ecosystem and watershed problems according to cost, probability of success, and ecosystem benefit.

AECOM's approach to aquatic restoration projects includes the following:

SAMPLING AND ECOSYSTEM CHARACTERIZATION. AECOM typically begins restoration projects by developing a comprehensive understanding of the physical/ hydrological, chemical, and biological characteristics of the aquatic system and watershed. We have implemented field programs that vary in size from relatively short, focused sampling efforts to extensive multi-year programs that cover large geographic areas.

PROBLEM IDENTIFICATION. AECOM assesses multiple aspects of watershed impairments, such as nutrient impairment/ eutrophication, sediment contamination, loss of biological diversity, and population decline. We also identify the causes and sources of impairment including point source discharges, non-point source runoff, habitat loss, invasive and exotic species, and hydrologic modification.

DEVELOPMENT OF RESTORATION GOALS. AECOM develops watershed restoration goals that provide ecological and public benefits, while considering costs and the practicality of complete restoration. Goals may include balanced biological populations and community, increased biodiversity, protection of selected species, buffer against system stressors, increased recreational opportunities, protection of drinking water source areas, flood protection, and reduced health risks from exposure to contaminants.

DESIGN AND IMPLEMENTATION OF RESTORATION SOLUTIONS. Our engineers and environmental scientists design and implement effective restoration programs using a wide array of aquatic restoration measures that respect economic, social, and regulatory constraints. To develop our designs, we use state-of-the-science ecological systems analysis, geomorphologic assessment, hydrologic modeling, and GIS-based tools.

POST-CONSTRUCTION MONITORING AND MAINTENANCE. AECOM provides monitoring services to ensure that the desired response of restoration measures is being achieved and to assess whether modification of the restoration measures are required as part of overall adaptive management of the restoration program. We also perform ongoing maintenance to address unexpected and undesired changes in the system such as removal of invasive species.

PUBLIC/STAKEHOLDER INVOLVEMENT. Stakeholder involvement is essential for successful aquatic restoration programs. AECOM teams conduct public meetings, coordinate technical advisory committees, develop and distribute public information documents, and work collaboratively with federal and state agencies, watershed groups, environmental groups, municipalities, the regulated community, and other stakeholders.



Aquatic and Watershed Restoration *(continued)*



Areas of Expertise

AECOM combines the qualifications of engineers, environmental scientists, and regulatory specialists to develop and implement aquatic and watershed restoration programs that accomplish desirable goals within the context of economic, social, and regulatory constraints. We have experience with hundreds of projects involving a wide range of freshwater aquatic systems.

HABITAT RESTORATION. AECOM's wide range of experience in restoring and enhancing in-water and riparian habitat includes: streambank/shoreline stabilization using bioengineering methods to enhance wildlife value; planting native vegetation that provides a wide range of ecosystem functions; stream channel modification to enhance stability; and habitat modification to provide diverse features such as boulders, shading, plunge pools, riffles and runs.

WATER QUALITY POLLUTION CONTROL. AECOM provides services to assess and mitigate water quality and ecological impacts associated with point and non-point pollutant sources. Our experience includes nutrient and eutrophication assessment, wastewater and stormwater treatment, agricultural and industrial land use planning and management for pollutant source reduction, riparian buffer zone design to reduce pollutant runoff, and design and installation of aeration systems.

EXOTIC AND INVASIVE SPECIES CONTROL. To combat the growing problem of aquatic exotic and invasive species, AECOM teams perform assessment studies and routinely use mechanical weed harvesting, chemical applications, and bottom weed barriers to minimize the presence of harmful, non-native species. Additionally, we have performed projects that involved the removal of exotic vegetation and replacement with native, indigenous species that provide a range of ecosystem functions.

CONTAMINATED SEDIMENT REMEDIATION. Achieving environmentally protective cleanup of contaminated sediments for the lowest possible cost is our goal. To these ends, AECOM evaluates and applies a range of technologies including natural recovery, enhanced natural recovery, sediment capping, thin layer capping, reactive barriers, *in situ* treatment and stabilization, and various methods of dredging and dredged material disposal.

FISH PASSAGE ENHANCEMENT. To offset impacts to fish passage caused by dams, and roadways with undersized culverts, AECOM creates and improves fish passageways. We design fish ladders and other passage systems; improve hydraulic control structures and screens that protect fish at hydropower and other water diversions; and perform studies of complete or partial dam removal. We also apply specialized hydraulic modeling methods to improve fish migration at dams. Our approach to improve fish migration at dams involves the use of acoustic doppler current profilers for detailed flow measurements near dams, hydraulic modeling, and knowledge and assessment of fish migration behavior.

UPLAND AND WILDLIFE RESTORATION. Our experience includes terrestrial habitat evaluations, habitat enhancement design, and wildlife/threatened and endangered species protection and mitigation in support of environmental impact studies, facility siting and permitting, and master planning projects. AECOM biologists also specialize in the study of vernal pools and the development of mitigation and protection efforts in support of our client's projects.