hydraulics of natural systems

nhc

northwest hydraulic consultants

water resource specialists

hydraulics
of natural systems

The management and protection of natural water resource systems, including rivers, wetlands, and coastal areas, is a crucial and complex process that is often complicated by the influence of human activity. Although distinct from the realm of man-made water resource systems, natural systems obey the same basic laws of nature; thus, our understanding of their behavior can be improved through the application of hydraulic engineering tools and analysis, and with the benefit of engineering experience. NHC's hydraulic engineering services, in concert with our hydrology services, provide fundamental information for a broad range of water resource-related applications, including: natural hazard assessment; land and natural resource development and restoration; and, the planning, design, and implementation of water resource projects. We have investigated natural watercourses ranging in size from urban streams to the world's largest rivers, situated in geomorphic settings ranging from alluvial fans to major river deltas. We have helped develop small-scale restoration projects in tidal wetlands, and flood protection guidelines for application to extensive coastal regions. Regardless of project scale or setting, in all our work we place a heavy emphasis on the value of basic data, a sound understanding of the principles of hydraulic engineering, and a problem-solving approach appropriate to project and client needs.

Services

Hydraulic engineering has been a core NHC service for more than 30 years. Our services in this area include:

- River engineering
- River, stream, and wetland restoration
- Fish passage and habitat restoration
- Fluvial geomorphology studies
- Sedimentation analysis and modeling
- Water quality and thermal hydraulics modeling
- Riverine and coastal flood risk analysis
- Cold regions hydraulic engineering
- Monitoring and surveying services

Resources

Our senior specialists have extensive experience in consulting on major water resource development projects, and have the practical experience essential for developing both classical and cutting-edge solutions to project challenges. NHC experts have made significant contributions to engineering research in the areas of river engineering, sediment transport, fish passage and habitat assessment, river-ice processes, and dispersion in rivers, lakes, and estuaries.

Our staff's extensive knowledge of the behavior of natural river systems gives us the ability to make the reasoned engineering judgments necessary to properly apply appropriate computer models, whether simple or state-of-the-art, and to provide meaningful interpretations of the results. For complex problems, NHC offers the unique in-house ability to apply both numerical and physical modeling to provide solutions for water resource projects.

In support of our water resource modeling activities, NHC professionals routinely conduct and supervise field monitoring and survey programs. We have developed in-house capabilities that include GPS-integrated surveys, LiDAR techniques, Acoustic Doppler Current Profiling, and side-scan sonar. Data management, analysis, and presentation activities are supported by state-of-the-art GIS and database capabilities.

Project Experience

Descriptions of representative NHC projects are available on our website at www.nhcweb.com. Additional project descriptions and client references can be provided upon request.

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