Ecohydraulics

NHC's ecohydraulic services promote sound restoration of physical conditions in aquatic environments to achieve sustainable ecological objectives. Incorporating ecological restoration backed with sound hydrotechnical analysis into multi-objective projects provides clients and stakeholders with the information needed to effectively plan, permit, design, cost, and implement projects.

Services

- Designing and conducting field physical, biological, and environmental monitoring programs for environmental assessment and project design.
- Monitoring and modeling stream flows using numerical approaches that characterize habitat suitability and evolution.
- Designing constructed wetland and stormwater management systems to provide appropriate hydro-periods for establishment and maintenance of wetland ecosystems.
- Providing hydrologic and hydraulic design criteria for stream, wetland, estuarine, and coastal habitats to meet specific riparian and aquatic ecological objectives.
- Assessing aquatic organism passage and movement in complex hydrodynamic environments using multidimensional numerical or physical modeling.
- Assessing environmental effects, supporting formal review processes, and acquiring regulatory approvals and permits.

Approach and Capabilities

NHC provides ecohydraulic analysis and design by integrating hydraulic design, environmental engineering, geomorphology, and fisheries and biological sciences. This approach is applied as the basis for designing functional habitat restoration, as well as for assessing the effects of proposed or existing infrastructure such as dams and water control works, operations, and water use.

Our Expertise

Instream Flow Analysis: Comprehensive instream flow assessments and analyses using hydrological, hydraulic, and physical habitat simulation (PHABSIM) techniques supported by 1-, 2-, and 3-dimensional CFD numerical modeling. NHC has also developed hydrological, biological, and ecological criteria to assess instream flow regimes for aquatic and riparian ecosystems, and has interpreted biological data to develop hydraulic habitat use criteria and ecological metrics to assess spatial and temporal aspects of instream flow regimes.

Flow Ramping and Stranding Assessments: Development of highly specialized tools to assess the hydraulics and potential effects of unsteady flow effects in stream and river channels that may strand and/or otherwise impact fish and other aquatic species. These tools help assess the ecological aspects of flow regime changes, water quality impacts, and stream productivity.

Hydraulic Success Criteria: Hydrologic, hydraulic, and sedimentation analyses to establish indicators of ecological success such as wetland hydro-period characteristics, tidal marsh evolution, floodplain inundation for spawning, spawning gravel transport, egg detachment and transport, and fish passage.

Habitat Protection and Creation: Projects combining aquatic habitat restoration with flood management, recreation, channel stabilization, and infrastructure development. NHC has provided analyses and design services for salmonids, cyprinids, smelt, and other sensitive fish species, and to restore aquatic and riparian habitats for other imperiled species.

Fish Movement, Migration, and Exclusion: NHC has performed many high resolution ecohydraulic analyses to evaluate fish migration and exclusion systems, including analyses that incorporate fish behavior and physiological criteria.

Contact Us Today

For more details on our services and office locations, please visit: **www.nhcwater.com**