

# Exeter River Geomorphic Assessment and Watershed-based Plan

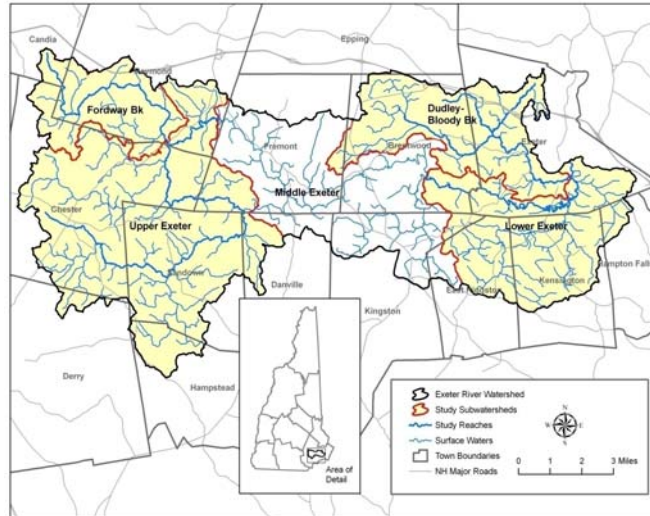
## Tools for River Restoration and Protection

### PROJECT SUMMARY

June 2009

#### Rivers are Dynamic

The Exeter River continually adjusts in response to a variety of natural and human-built features as it flows over the land. Stable river channels move in their landscapes over time without causing serious damage to nearby property and infrastructure. Traditional river management and development practices such as channel straightening, floodplain encroachment, bank armoring, and other modifications can shift a river's natural balance resulting in damaging channel adjustment events including erosion and flooding. River equilibrium is a delicate balance, and resource managers increasingly seek tools for restoring and maintaining natural river stability.

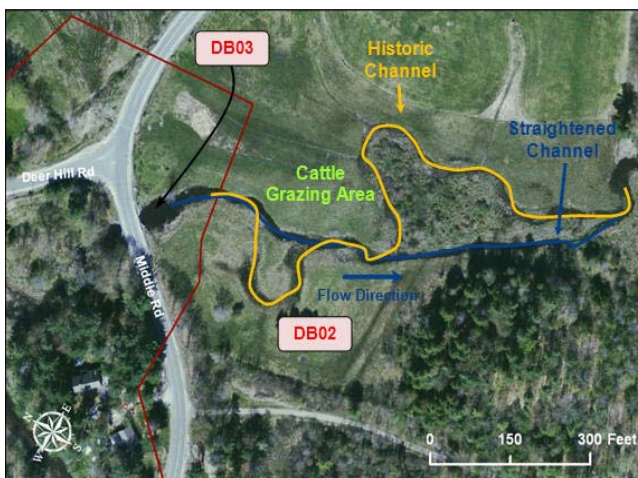


ERWP study area. BCE/FEA

#### Planning for Stable River Channels

The Exeter River Watershed-based Plan (ERWP) provides information to help watershed managers understand how the river responds to the land over which it flows. The plan is based in the science of *fluvial geomorphology*, the study of how rivers and landforms interact over time through different climatic conditions. This method provides a holistic, watershed-scale approach to understanding stressors on river health. The science also helps resource managers identify stable and unstable river reaches, and provides site-specific recommendations for avoiding damage caused by flooding, erosion or river channel adjustment.

The Exeter River Geomorphic Assessment and Watershed-based Plan: 1) provides information relative to fluvial geomorphic and biotic habitat conditions; 2) identifies projects that will protect or restore important river reaches; 3) offers recommendations to address and mitigate stressors leading to impairments; and 4) assists towns in the development of fluvial erosion hazard zones and planning tools.



Historic channel straightening in Dudley Brook. BCE/FEA

#### Working Together

The Exeter River watershed contains some of the fastest growing towns in New Hampshire, which has led to pressure from development on the health of the river. Increases in impervious cover, forest fragmentation, and ground water withdrawals have led to efforts to protect water quality and quantity in the watershed. A 2008 watershed analysis indicates that several Exeter River subwatersheds are vulnerable to water quality impacts from land use activities. Additionally, towns are concerned about flooding, erosion, and loss of infrastructure during high river flow events.

In response to local concerns, the Exeter River Local Advisory Committee (ERLAC), the New Hampshire Department of Environmental Services (NHDES), and other project partners initiated a comprehensive watershed-wide assessment and planning effort to gather scientific information about river functions. The project partners hired Bear Creek Environmental (BCE) and Fitzgerald Environmental Associates (FEA) to conduct the assessment and develop the plan.

**The Geomorphic Assessment Process**

The project team assessed forty-eight river and tributary miles to characterize the current physical condition of the river and identify stressors on the river in order to develop regional and local recommendations for projects to restore and protect river equilibrium. During the first phase of the assessment process, New Hampshire Geological Survey (NHGS) conducted a desktop analysis to provide the geomorphic context for the plan. Topography, soils, surficial geology, land use patterns, and natural resource features were evaluated. During phase two of the assessment, BCE & FEA field evaluated river features including:

- Stream crossings: size/aquatic organism passage
- Channel width, depth, slope and type
- Substrate composition and instream habitat
- Floodplain, river bank and riparian buffer conditions



Local project partners are critical to success. BCE/FEA



**The Exeter River Watershed-based Plan**

The assessment data were used to develop recommendations to identify and guide local and watershed-wide protection and restoration projects. Types of projects identified in the ERWP include river corridor protection, riparian buffer restoration, channel restoration, stream crossing improvements, aquatic organism barrier removal, and stormwater runoff mitigation. Projects were prioritized using a combination of factors including hazard mitigation potential, ecological benefits, costs, and local interest and priorities. Twenty-one high-priority projects were identified within the study area. At the watershed scale, fluvial erosion hazard (FEH) zones were delineated and mapped. An FEH model ordinance was developed to help communities minimize human/river conflicts in the FEH zone.

**Next Steps**

ERLAC and NHDES will use the ERWP to guide future efforts to restore and protect the river. The Plan will also be used to educate watershed communities and residents about the importance and benefits of maintaining and restoring stable river channels.

**For More Information**

To download the Plan and its appendices go to:

[http://des.nh.gov/organization/divisions/water/wmb/was/watershed\\_based\\_plans.htm](http://des.nh.gov/organization/divisions/water/wmb/was/watershed_based_plans.htm)

**For questions and more information about the Plan, please contact:**

Sally Soule, NHDES—Watershed Assistance Section: (603)559-0032 or [ssoule@des.state.nh.us](mailto:ssoule@des.state.nh.us)

*Funding for this project was provided in part by grants from NHDES with funding from the US EPA under section 319 of the Clean Water Act and through the New Hampshire Coastal Program pursuant to an award from NOAA. Additional funding provided from the Town of Exeter and the Federal Emergency Management Agency. Assistance provided by Rockingham Planning Commission and the Exeter River Advisory Committee. Consulting services provided by Bear Creek Environmental and Fitzgerald Environmental Associates. Technical assistance provided by New Hampshire Geological Survey.*