Hydrologic and Habitat Modification

Background

Many programs exist in New Hampshire to protect, restore, and understand the impacts of activities that alter hydrology and habitat. The New Hampshire Rivers Management and Protection Program (RMPP) was established in 1988 with the passage of RSA 483 to protect certain rivers, called Designated Rivers, for their outstanding natural and cultural resources. Currently, there are over 1,000 miles of river designated, spanning over 120 communities. Twenty-three Local Advisory Committees (LAC), made up of over 250 volunteers are charged with developing local river corridor management plans and reviewing and commenting on activities affecting the river, including permit applications.

The Shoreland Water Quality Protection Act, originally named the Comprehensive Shoreland Protection Act (CSPA), was enacted in 1991 and establishes minimum standards for the subdivision, use, and development of shorelands adjacent to the state's public water bodies. On July 1, 2005, Senate Bill 83 established a commission to study the effectiveness of the CSPA. In 2008, as a result of the commission's recommendations, several changes were made including limits on impervious surfaces, limitations on the removal of vegetation in water front buffers, shoreland protection along rivers designated under RSA 483 (Designated Rivers), and the establishment of a permit requirement for many new construction, excavation and filling activities within the Protected Shoreland. During the 2011 legislative session, the CSPA was renamed to the Shoreland Water Quality Protection Act and included changes to vegetation requirements within the natural woodland and waterfront buffers, the impervious surface limitations and included a new shoreland permit by notification process.

Photo caption: River restoration project on Black Brook, Manchester, NH.

In March 2004, the NH Department of Environmental Services Wetlands Bureau adopted a set of mitigation rules that establish what is necessary for an applicant to provide for wetland compensation. The rules spell out ratios for wetland creation, restoration and upland preservation relative to the type of wetland lost through the proposed development. During the 2006 legislative session, the General Court enacted Senate Bill 140, known as Aquatic Resource Compensatory Mitigation. The law became effective

on August 18, 2006 and NHDES adopted rules for operation of a wetland mitigation fund on June 20, 2007.

The Aquatic Resource Mitigation (ARM) Fund was created as an additional compensatory mitigation option available to applicants for impacts to wetlands and other aquatic resources. This mitigation option is available for use after avoidance and minimization of impacts to these aquatic resources has been achieved. The Department is authorized to collect mitigation funds in lieu of other forms of wetland mitigation as part of a wetlands application. DES holds and manages funds to be offered as grants for potential projects that consider the service area goals, and replaces or protects wetland and other aquatic resource functions and values that were impacted by development projects in the service area. ARM fund payments are collected according to nine service areas, which are generally the large watersheds in New Hampshire.

In 2008, the NH Geological Survey at DES initiated a Fluvial Erosion Hazard (FEH), using the Vermont Stream Geomorphic Assessment and Vermont FEH program as a model. Two key components of the program include:

1. River geomorphic assessments – Provide an understanding of the current physical condition of New Hampshire rivers and streams and establishes a baseline by which changes in the physical condition of the river can be tracked in the future. The data can be used to delineate FEH zones that identify the lands adjacent to river channels most at risk from flooding events, which provides a critical flood hazard planning tool and supports nonpoint source management goals. Between 2008 and 2014, fluvial geomorphology assessments were conducted in southeastern New Hampshire coastal watersheds as well as the Piscataquog and Souhegan River watersheds in the Lower Merrimack River basin, the Soucook River, Turkey River, and Sugar River watershed (Claremont-Newport area).

2. Bridge and culvert assessments - Stream crossing protocols were developed for New Hampshire by multiple federal and state partners. For each assessed crossing, final datasets are run through a geomorphic compatibility tool to provide guidance on crossings that are not fully compatible with river processes, and an aquatic organism passage tool to identify crossings partially or wholly incapable of adequately passing aquatic species. Crossings, typically culverts, that are not fully compatible geomorphologically are those that are undersized compared to the river or stream channel that enters them, or have an entry angle not aligned with the stream. These types of situations can cause water and sediment backup during high flow events, leading to culvert blowouts and downstream erosion hazards.

Along with site specific data, FEH data can be used to determine the feasibility of dam and other barrier removal for river restoration. There are more than 4,800 active and inactive dams and other barriers in the State of New Hampshire. Many of these dams were built during the Industrial Revolution in the 19th and early 20th centuries, and they played central roles in New Hampshire's economic and societal growth during that period. However, as technological and social needs have changed, so too has the need for some dams.

The New Hampshire River Restoration Task Force, formed in 2000, explores opportunities to selectively remove dams for a variety of reasons, most notably for the purposes of restoring rivers and eliminating public safety hazards. The NPS Program works directly with the DES Dam Bureau River Restoration Coordinator, consultants and river stakeholders to determine the feasibility of restoring priority river segments throughout the state by removing existing barriers. A list of priority river restoration and barrier removal sites and priority criteria are discussed in the Clean Watersheds section of this Plan beginning on page 18.

According to the preliminary 2014 DES Water Quality Assessment, impoundments caused 41 water quality impairments, including for dissolved oxygen and chlorophyll-a. Many of these dams no longer serve the purpose for which they were originally constructed. Often, dam regulations necessitate costly infrastructure repairs that dam owners weigh against the diminishing benefits of operating the dam. Dam removal often becomes an appealing option, accomplishing water quality restoration as well as improved economics for the dam owner.

It continues to be important to recognize and adapt to existing and anticipated climate change impacts from more intense precipitation on river, estuarine, and coastal habitats, including wetlands. Existing regulations in New Hampshire are likely inadequate to handle the increases in rainfall amounts and extreme precipitation events. It is necessary to begin thinking about how adaptation strategies, i.e., larger culverts, dam removals, increased buffer zones for flood protection, can be incorporated into state regulations, policies, and programs.

One of the groups working on developed adaptation strategies is the New Hampshire Coastal Risks and Hazard Commission (http://nhcrhc.stormsmart.org/). Established by legislation in 2013, the Commissions is currently helping coastal communities and the state prepare for projected sea level rise and other coastal watershed hazards. In addition, Sea Level Affecting Marsh Migration models are being run for the coastal watershed, which may provide additional information about how sea level rise may impact estuarine river systems and their marsh systems.

Measures to Control NPS Pollution

Regulatory

- New Hampshire Rivers Management and Protection Program (RSA 483)
- Designated River Nomination Rules (Env-Wq 1800)
- Shoreland Water Quality Protection Act (RSA 483-B)
- Shoreland Protection Administrative Rules (Env-Wq 1400)
- Aquatic Resource Compensatory Mitigation (RSA 482-A:29)

Guidance Documents

- *Innovative Land Use Planning Techniques: A Handbook for Sustainable Development* (WD-08-19). New Hampshire Department of Environmental Services, New Hampshire Association of Regional Planning Commissions, New Hampshire Office of Energy and Planning and New

Hampshire Municipal Association. 2008.
http://des.nh.gov/organization/divisions/water/wmb/repp/innovative_land_use.htm

- *Section 2.4 Wetland Protection*
- *Section 2.6 Shoreland Protection*
- *Section 2.7 Fluvial Erosion Hazard Area Planning*

- *A Guide to River Nominations* (WD-08-4). New Hampshire Department of Environmental Services. 2008.
  http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-08-4.pdf
- *Shoreland Water Quality Protection Act A Summary of the Standards*. New Hampshire Department of Environmental Services.
  http://des.nh.gov/organization/divisions/water/wetlands/cspa/documents/summary_standards.pdf
- *Generic Quality Assurance Project Plan for Fluvial Geomorphology Data Collection*. DRAFT. New Hampshire Department of Environmental Services, New Hampshire Geological Survey. 2013.

Table 13. Habitat and hydrologic modification Goals, Objectives, and Milestones

Hydrologic & Habitat Modification (H) Goal. Geomorphic, fluvial erosion hazard and bridge and culvert assessments inform decision makers and provide a critical planning tool for flood protection, hydraulic, hydrologic, and habitat connectivity and development activities.

Objective	Milestone	Measure of Success	Schedule				
			2015	2016	2017	2018	2019
Objective H-1 New fluvial erosion hazard (FEH) zones are identified in New Hampshire.	**Milestone H-1.1** Fluvial geomorphology assessments on rivers throughout the state collect information on the physical condition of New Hampshire's rivers and develop FEH zones. *Partners: NH Geological Survey*	**Measure H-1.1** One new fluvial geomorphology assessment per year.					
Objective H-2 NPS partners have an increased understanding of FEH and bridge and culvert assessment programs and resources.	**Milestone H-2.1** Common protocols for data collection regarding culverts and stream crossings are established. *Partners: UNH Technology Transfer Center, NH GIS Advisory Committee, NH Geological Survey, NH Fish and Game Dept., Trout Unlimited*	**Measure H-2.1** Protocol established					
Objective H-3 Fluvial Erosion Hazard data is fully integrated into NPS-related programs, projects, and assessments.	**Milestone H-3.1** Determine the appropriateness of including FEH program criteria and data into the DES Consolidated Assessment and Listing Methodology (CALM) to be used to make surface water quality assessments. *Partners: DES Water Quality Assessment, NH Geological Survey Fluvial erosion Hazard Program*	**Measure H-3.1** Determination made by 2018 assessment cycle.					
	Milestone H-3.2 FEH Program collaborates with 319 projects and DES River Restoration projects to provide input and design review. *Partners: NH Geological Survey Fluvial Erosion Hazard Program, DES River Restoration Program, DES Watershed Assistance Section*	**Measure H-3.2** Develop a formal process to incorporate FEH program input and review.					
	Milestone H-3.3 Incorporate FEH criteria into clean watershed prioritization analysis.	**Measure H-3.3** Criteria for FEH prioritization developed and incorporated.					