

New Hampshire's Innovative Approach to Dam Removals



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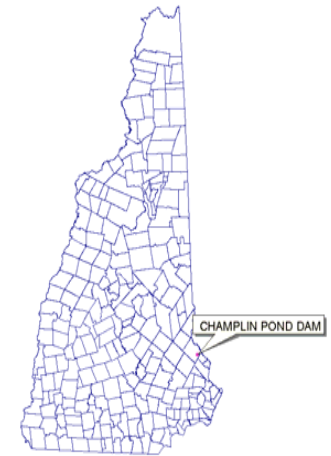
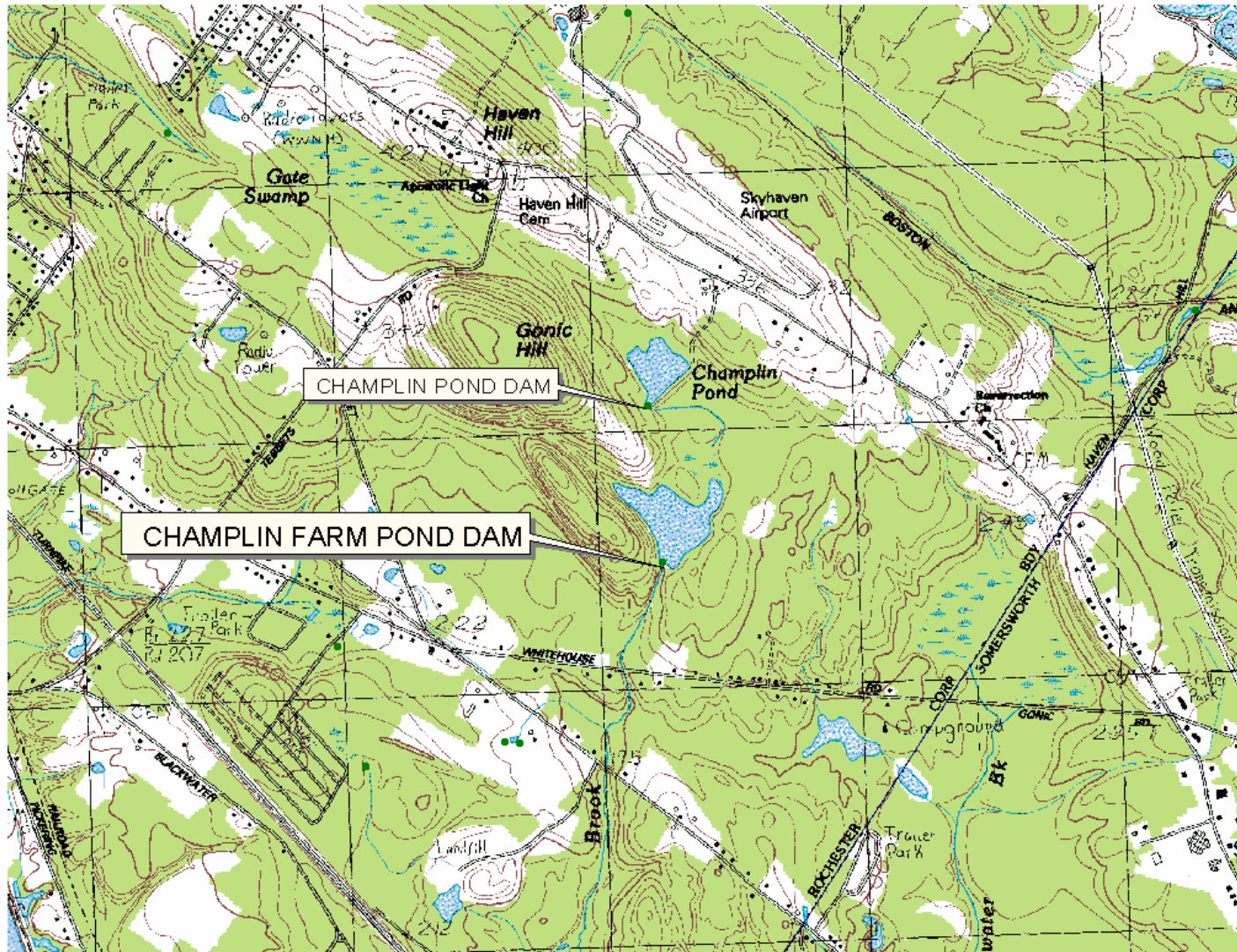
Champlin Pond and Champlin Farm Pond Dams Removed, Fall 2005



Private owner donated 184 acres including 2 dams to the Society for Protection of NH Forests (SPNF).

SPNF did not want the liability of the dams.

Location Rochester, NH



**Drainage
Area
282 acres**



Champlin Pond Dam

Height –20 feet

Length –800 feet

Pond - 9 acres



Champlin Farm Pond Dam



Height –15 feet

Length –150 feet

Pond - 17 acres

Compensatory Mitigation

- NHDES Wetland rules allow for impacts to wetlands in exchange for restoration in the vicinity of the impacts.
- NHDES Rules specify 2:1 ratio restoration to impacts for bog restoration.
- Expansion of the nearby Sky Haven Airport impacted 11.8 acres of wetlands.
- Dam removals provided the necessary restoration of 26 acres.

Funding Opportunity Challenged Project Schedule

- Bids from at least 3 contractors were required in order to file for FAA grant with a deadline of May 1, 2005.
- The GZA Design Team began investigations the first week of March 2005 leaving a 6-week window to complete investigations, perform engineering analysis, complete permitting and develop contract documents.
- Construction occurred during the Fall of 2005.

Estimated Costs

Proposed Work	Cost
Reconstruction of the upper dam – removal of lower dam	\$600,000
Removal Construction costs Including engineering for both dams	\$250,000
Culvert replacement costs	\$240,000

*GZA GeoEnvironmental, Inc 2005 costs

Collaborative Effort



NHDES, NH Fish & Game
NHSPNF
City of Rochester
NHDOT- Aeronautics
Edwards & Kelcey, Inc.
GZA GeoEnvironmental
Piscopo Contractors



11.10.2005

Field Investigations

- **Bathymetry**
- **Subsurface Investigations**
- **Topographic Survey**
- **Wetlands Delineation**



Engineering and Permitting

- H&H - Downstream culverts inadequate
- Stability – Slope Stabilization required
- Seepage – Toe Drain required
- Sediment and Stream Bank Stabilization Required
- NHDES Standard Dredge & Fill with Attachment for Dam Removal Project and:
 - USACE Section 401&404, Cat II Programatic
 - NH Div of Historical Resources check
 - NH Natural Heritage Bureau/Endangered Species check
 - City of Rochester Conservation Commission Review

Design Highlights

- Replace downstream culverts
- Design of Repairs to Upper Dam shifted to Partial Breach
- Engineered main channel for up to 2-yr flow and shallow overbanks to contain 100-yr flow
- Wetlands seeding (for invasives) included
- Stabilization of sediment and channel through use of bioengineering and conventional techniques
- “Flush” Aquatic Species downstream

“BioEngineering

- Natural Gravel channel clusters, coir logs, willow



Culvert Replacements



Whitehouse Road Culvert



Old Dover Road Culvert

Upper Pond Partial Breach Construction



From Right Abutment – April, 2005



From Right Abutment – September, 2005



From Right Abutment – November, 2005



From Right Abutment – August, 2006



Mouth of Channel – November, 2005



Mouth of Channel – November, 2005



Mouth of Channel – June, 2006



Mouth of Channel – August, 2006



Downstream Channel – November, 2005



Downstream Channel – November, 2005



Downstream Channel – December, 2005



Downstream Channel – June, 2006



Downstream Channel – July, 2006



Downstream Channel – August, 2006



Upstream Channel – April, 2005



Upstream Channel - November 3, 2005



Upstream Channel - November 10, 2005



Upstream Channel - November 15, 2005



Upstream Channel - December, 2005



Upstream Channel - June, 2006



Upstream Channel - August, 2006



Lower Pond Partial Breach Construction



Fish Pass Through Temporary Culvert



Most are Bluegill also Bass and Hornpout



Made it easy for the Local Osprey



Made it easy for the Local Osprey



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Mouth of Channel - October, 2005



10. 28. 2005

Mouth of Channel -October, 2005



Mouth of Channel - November, 2005



Mouth of Channel - June, 2006



Mouth of Channel - July, 2006



From Downstream - April, 2005



From Downstream - September, 2005



From Downstream - November, 2005



From Downstream - November, 2005



From Downstream - December, 2005



From Downstream - June, 2006



From Downstream - July, 2006



From Downstream - August, 2006



From Upstream - April, 2005



From Upstream - September, 2005



From Upstream - October, 2005



From Upstream - November, 2005



11/08/2005

From Upstream - November, 2005



From Upstream - November, 2005



From Upstream - November, 2005



From Upstream - December, 2005



From Upstream - July, 2006



From Upstream - July, 2006



From Upstream - August, 2006



From Pond Floor - September, 2005



From Pond Floor - October, 2005



From Pond Floor - November, 2005



From Pond Floor - November, 2005



From Pond Floor - December, 2005



From From Pond Floor - June, 2006



From Pond Floor - August, 2006



Pond Floor - October, 2005



Pond Floor - June, 2006



Pond Floor - August, 2006



Lessons Learned

- More Collaboration and Public Outreach can be beneficial
- Breach Design should take inspiration from conditions upstream and downstream, maximize on site and natural materials and avoid straight lines and symmetry
- Contract should allow design to be adjusted during construction...work with Mother Nature
- Since dam breaching typically occurs in late summer/fall, special consideration should be given to seeding and measures to control erosion until vegetation is established
- Some sediment release will occur, however must minimize using check dams and other measures
- Fisheries, even if not a desirable species, can have a negative impact on project
- Car pe diem!

Thank You !



A photograph of a natural landscape. In the foreground, a bright yellow flower with five petals and a green stem with pinnate leaves is in focus. The background features a small pond surrounded by logs and green vegetation, with a dense forest of tall trees in the distance under a clear blue sky.

Questions ?