Lake Carmi Phosphorus Reduction Action Plan.

Once the target phosphorus concentration and needed loading reduction are identified, nonpoint source control (land-use based) projects need to be identified that will accomplish these goals. The watershed of Lake Carmi contains a wide variety of land uses, including residential development (year-round and seasonal), agriculture, roads, and forestry. This Action Plan is written to encompass improvements needed in all land use types since all are sources of phosphorus. The Franklin Watershed Committee and the Vermont Agency of natural Resources promotes the view that phosphorus reductions are needed across the board to both address all possible sources as well as encourage the responsibility and involvement of all land owners and users.

Some of the following Action Items are ones which can be undertaken by the existing structure of the Franklin Watershed Committee with its existing annual budget, while others will necessitate significant additional funds. Additionally, these latter Action Items may require the hiring of a Lake Carmi "watershed technician" in order to undertake the time-consuming work involved in these actions; this will also require more funding. The Actions Items that fall into this category are so indicated in the "Schedule and Cost" column by the term "Additional funding needed."

Outlet and In-Lake *(note "Priority" refers to how soon the activity should be done)*

Action Item #1A: Investigate Outlet Structure		
Activity: Investigate the benefits of replacing the culvert under Dewing Shore Road, which conveys the lake to the outlet dam, with a structure of flow capacity equal to that of the dam itself. **Priority: low**	Participants: FWC, VTANR (initial estimates)	Schedule and Cost: 2009 Initial estimates would incur no significant costs
Action Item #1B: Investigate potential value of in-lake "alum" treatment		
Activity: Consider potential for alum treatment (sediment phosphorus inactivation), including if would be feasible to apply it in section(s) of the lake vs. a lake wide treatment **Priority: low**	Participants: FWC, VTANR	Schedule and Cost: 2009 Initial estimates would incur no significant costs

Shoreland

While overall the phosphorus contribution from the shoreland is less than the watershed as a whole, it is still a critical area to focus on. While the impact from one shoreland property on the lake-wide quality cannot usually be observed, it can have a significant impact on the immediate nearshore, shallow water area. Camp owners might experience increased attached algae growth, reduced water clarity, or increased plant growth as a result of runoff from nearby shoreland land uses. Therefore, addressing shoreland issues both increases the likely success of overall phosphorus reduction efforts as well as potentially improving the conditions that lake users experience most often. In addition, on Lake Carmi as on the rest of Vermont lakes, there is a trend toward "redevelopment" of the shoreline whereby small camps are replaced by much larger camps or even year-round homes, thus increasing their potential phosphorus impact on the lake.

The goals for the shoreland of Lake Carmi, in terms of reducing phosphorus runoff, are:

1. All camps minimize or eliminate runoff from developed areas (lawn, driveway, buildings etc) to the lake.
2. All camps maximize the amount of native trees and shrubs along the shoreline.
3. All camps have well-maintained septic systems suitable for the site and amount of use.
4. No camp owners fertilize shoreland lawns.
5. All newly developed camps or re-developed camps are designed and built to meet the above goals.

(Note: "Priority" refers to how soon the activity should be done)

Action Item #2: Assessment of shoreline septic systems		
Activity: Phase 1: Complete a survey of the shoreland septic systems to determine areas that might benefit from combined or neighborhood septic systems or leachfields Phase 2: Provide technical assistance on alternative systems that would function in site limitations present at Carmi. **Priority: medium**	Participants: Phase 1: FWC, VTANR, Town of Franklin Phase 2: TBD	Schedule and Cost: Phase 1: 2009 Could be done by volunteers or summer employees, **additional funding needed** Phase 2: TBD

Action Item #3: Septic system maintenance and outreach		
Activity: Continue septic pump-out program. Provide outreach info on septic system maintenance and conduct outreach to camp owners (e.g. regular tank pumping, rental of portable outhouses for large events, water conservation, etc.) **Priority:** High	Participants: FWC, VTANR, others?	Schedule and Cost: 2008 and on-going Approx $1000 per summer at current rate. Materials already available.
Action Item #4: Erosion and runoff survey of shoreland properties		
Activity: Conduct runoff and erosion surveys of shoreland Spring '08. Provide on-site property runoff and erosion surveys and recommendations to interested camp owners. Includes such issues as shoreline erosion, camp road and driveway erosion and roof runoff. **Priority:** High	Participants: FWC, Town of Franklin, VTANR	Schedule and Cost: 2008-2009: Spring survey, FWC and VTANR Survey of shoreland properties could be conducted by a summer employee, $7000/yr, **additional funding needed**
Action Item #5: Shoreland management outreach		
Activity: Conduct workshops and outreach about management tips for living on the lakeshore to minimize phosphorus loading to the lake. Includes such issues as lawn fertilizers and shoreland vegetation. **Priority:** High	Participants: FWC, VTANR, others?	Schedule and Cost: 2008 and on-going Materials already available, some printing costs: $1000

Action Item #6: Review Shoreland Zoning for potential improvements		
Activity: Work with the Town of Franklin to evaluate current shoreland zoning and potentially recommend improvements that would result in better oversight of shoreland use. For instance, as camps are enlarged or converted to year-round use, what additional measures could reduce their impact on the lake? **Priority:** medium	Participants: VT League of Cities and Towns, VTANR, FWC	Schedule and Cost: 2009 No additional costs identified at this time.

Watershed

The Franklin Watershed Committee recognizes that addressing watershed sources of phosphorus will involve forming cooperative partnerships with many different landowners and the Town of Franklin. As in most watersheds, it is not possible to point to one source of phosphorus, fix that and be done. Rather, it will involve encouraging and implementing many different measures with many different landowners.

The goals for the watershed of Lake Carmi, in terms of reducing phosphorus runoff, are:

1. Work with the Town of Franklin to ensure town road maintenance and improvements are conducted so as to minimize erosion of road surface, ditches/culverts and banks, and to cause the infiltration of a maximum amount of road runoff.
2. Work with watershed farmland owners to ensure minimization of sediment and phosphorus runoff.
3. Work with forestland owners to ensure minimization of sediment runoff during forestry operations.
4. Work with residential owners to ensure minimization of sediment and phosphorus runoff from properties.

(Note: "Priority" refers to how soon the activity should be done)

Action Item #7: Complete initial stream surveys		
Activity: Complete initial stream surveys (north, west and southwest sides of lake) to identify phosphorus sources and prioritize projects for action or further investigation. These surveys will be needed to determine the need and specifics for many of the Action Items listed below. **Priority:** High	Participants: FWC, VTANR, others?	Schedule and Cost: 2008 Volunteers, summer 2008
Action Item #8: Conduct Stream Geomorphic Assessments		
Activity: Continue with Phase 1 and Phase 2 assessments of streams based on priorities established under Action Item #7. **Priority:** Medium	Participants: FWC, VTANR, others?	Schedule and Cost: 2009 Watershed Technician pay. **Additional funding needed.**

Action Item #9: Establish native vegetation along streambanks.		
Activity: Reestablish woody vegetation along prioritized sections of Marsh Brook and other streams as determined by stream assessments under Action Item #8. **Priority:** Medium	Participants: FWC, VTANR, others?	Schedule and Cost: 2009 Watershed Technician pay. **Additional funding needed.**
Action Item #10: Conduct Stream restoration or conservation projects		
Activity: Conduct stream restoration or conservation and projects as identified under Action Item #8. **Priority: Medium**	Participants: FWC, VTANR, others	Schedule and Cost: 2010 Unknown cost at this time but likely **additional funding will be needed**.
Action Item #11: Wagner farm stream fencing		
Activity: Assist with the installation of lane and stream fencing on Chris Wagner's farm. **Priority: High**	Participants: FWC, DAFM	Schedule and Cost: 2008 (probably going to be done with CREP funds)
Action Item #12: Work one-on-one with farmers to identify and enable additional phosphorus control measures for their farms		
Activity: Identify additional BMP measures that could be adopted by watershed farms. Identify funding sources to reduce or eliminate the farmers' cost share. (This item would likely necessitate hiring an environmental technician.) **Priority: High**	Participants: FWC, Natural Resources Conservation Service and District, Vt Agency of Agriculture, Food and Markets, Missisquoi River Basin Association, VTANR, VTANR Center for Clean and Clear	Schedule and Cost: 2009-2014 **Additional funds needed,** $75,000-100,000 per year

Action Item #13: Investigate emerging phosphorus reduction technologies		
Activity: Keep abreast of new phosphorus reduction technologies such as regional methane generators **Priority: Low**	Participants: FWC, Natural Resources Conservation Service and District, Vt Agency of Agriculture, Food and Markets	Schedule and Cost: On-going No direct cost
Action Item #14: Town road erosion inventory		
Activity: Conduct a watershed road erosion inventory and prioritize problems for correction. **Priority: High**	Participants: FWC, Town of Franklin, VTANR, VT Better Backroads Program	Schedule and Cost: 2008 or 2009 $3000, grants available through Better Backroads Program
Action Item #15: Outreach on Private Road and Driveway erosion prevention		
Activity: Conduct workshops and inventories on private roads and driveways to identify problems and correction measures. **Priority: Medium**	Participants: FWC, VTANR	Schedule and Cost: 2009 and on-going $2000/year **Additional funding needed**.
Action Item #16: Review Town Road Maintenance Practices		
Activity: Work with the Town of Franklin to review road maintenance practices and incorporate ones that reduce erosion. **Priority: Medium**	Participants: FWC, Town of Franklin, VTANR, VT Better Backroads Program	Schedule and Cost: 2009 No additional cost

Action Item #17: Outreach to watershed residents about Carmi Project and Phosphorus reduction		
Activity: Conduct watershed-wide (possibly town-wide) public education campaigns to inform landowners/citizens about the Carmi watershed project, and what they can do to reduce phosphorus loading to waters. Also, describe measures farmers and loggers use e.g. AAPs and AMPs. **Priority: Medium**	Participants: FWC, Town of Franklin, VTANR, Vt Agency of Agriculture, Food and Markets	Schedule and Cost: 2009 $4000 for printing and mailing **Additional funds needed.**
Action Item #18: Conduct additional sampling as needed		
Activity: As stream and tributary surveys occur, additional data needs may be identified, such as soil phosphorus and runoff phosphorus sampling in order to be better able to target remedial projects. **Priority: Medium**	Participants: FWC, VTANR	Schedule and Cost: TBD
Action Item #19: Land Conservation Measures		
Activity: Look for opportunities to adopt land conservation measures (purchase of easements, etc) to conserve undeveloped lakeshores and streambanks. **Priority: Medium**	Participants: FWC, VTANR, Vt Housing and Conservation Board, land trusts	Schedule and Cost: unknown

High Priority Actions

Action Item #3: Septic system maintenance and outreach. Continue septic pump-out program. Provide outreach information on septic system maintenance and conduct outreach to camp owners (e.g. regular tank pumping, rental of portable outhouses for large events, water conservation, etc.)

Action Item #4: Erosion and runoff survey of shoreland properties. Conduct runoff and erosion surveys of shoreland Spring '08. Provide on-site property runoff and erosion surveys and recommendations to interested camp owners. Includes such issues as shoreline erosion, camp road and driveway erosion and roof runoff.

Action Item #5: Shoreland management outreach. Conduct workshops and outreach about management tips for living on the lakeshore to minimize phosphorus loading to the lake. Includes such issues as lawn fertilizers, and shoreland vegetation.

Action Item #7: Complete initial stream surveys. Complete initial stream surveys (north, west and southwest sides of lake) to identify phosphorus sources and prioritize projects for action or further investigation. These surveys will be needed to determine the need and specifics for many of the Action Items listed below.

Action Item #11: Wagner farm stream fencing. Assist with the installation of lane and stream fencing on Chris Wagner's farm.

Action Item #12: Work one-on-one with farmers to identify and enable additional phosphorus control measures for their farms. Identify additional BMP measures that could be adopted by watershed farms. Identify funding sources to reduce or eliminate the farmers cost share. (This item would likely necessitate hiring an environmental technician.)

Action Item #14: Town road erosion inventory. Conduct a watershed road erosion inventory and prioritize problems for correction.

Appendix A – 2007 Franklin Watershed Committee Project Descriptions

These projects were carried out by the Franklin Watershed Committee. These descriptions are provided verbatim, and with permission, by Carmi Consulting; Environmental Research and Design.

This report is a draft and is currently being used by the Franklin Watershed Committee to generate support and technical assistance regarding projects that will improve water quality in and around Lake Carmi and the Pike River watershed.

1.0 Summary

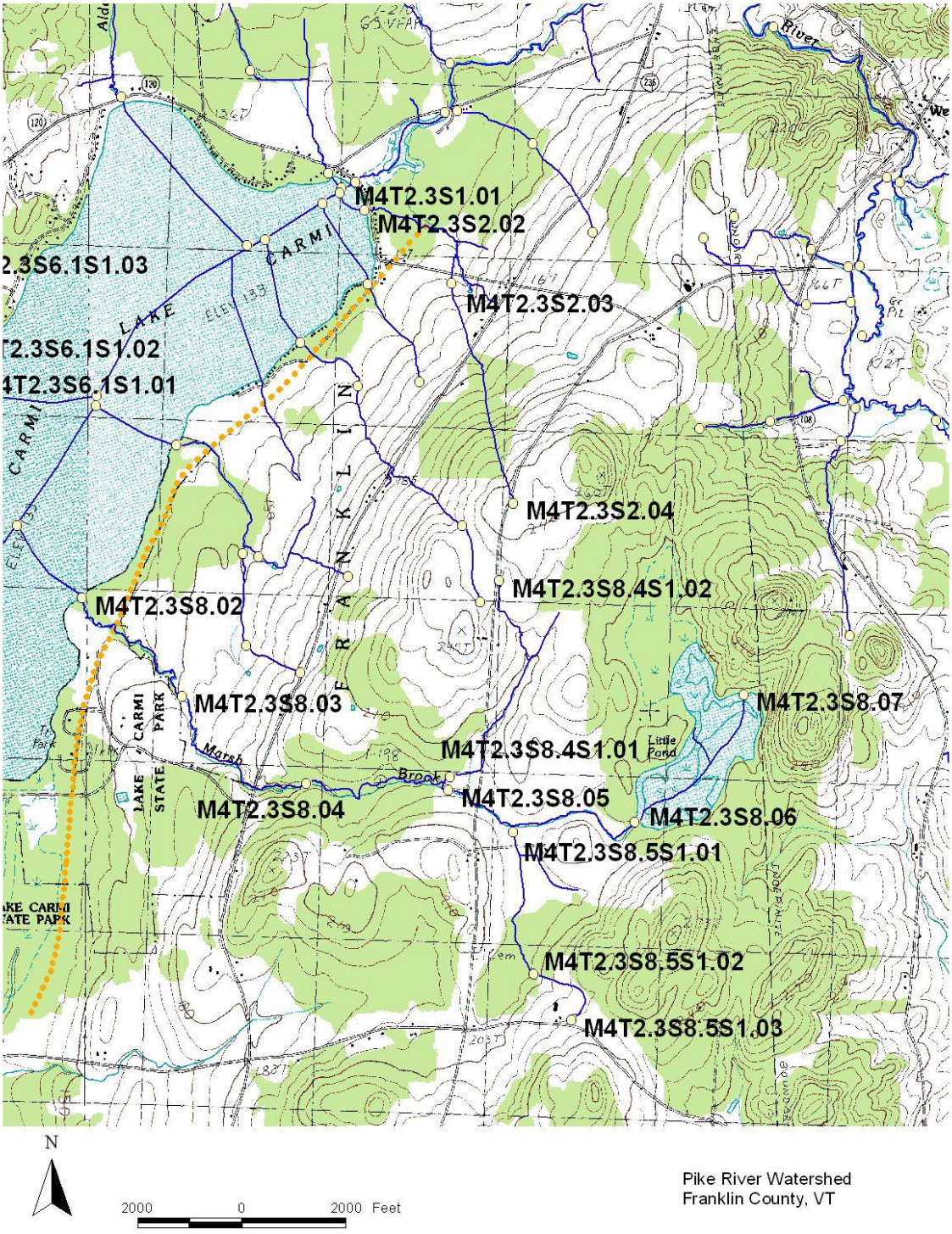
In 2006 a Phase 2 Geomorphic Assessment was completed in the Pike River Watershed, in the town of Franklin, Vermont. The study of the Marsh and Dewing Brooks was possible because of a grant from the Vermont Agency of Natural Resources (VTANR) Water Quality Division. The grant was administered by the Frankiln Watershed Committee. Brendan O'Shea of Carmi Consulting was the project lead and worked closely with Thomas Baines of North Country Consulting to complete this report and assessment.

The goal of this study was to assess the geomorphic condition of Marsh and Dewing Brooks and identify stream potential stressors to stream condition, including sediment and nutrient inputs, channel constrictions and other features. Other objectives of the study included the determination of the geomorphic condition of targeted reaches, identification of adjustment processes, identification of current and historic watershed stressors, evaluation of the sensitivity of the reaches, and to support selection, prioritization and design of riparian projects that are compatible and sustainable. Projects meeting those criteria are intended to improve water quality, wildlife habitat and reduce flood and erosion hazard risks to infrastructure, property and the public.

Geomorphic and habitat assessments were completed for four reaches in the Pike Watershed. A geomorphic assessment looks at four major stream channel processes, aggredation, widening, degradation, and change in plan form. A habitat assessment has more criteria such as bank canopy and vegetative buffer. The assessment of the Pike River Watershed followed protocols specified by the Vermont Agency of Natural Resources (ANR) Stream Geomorphic Assessment Phase 2 Handbook

Common stressors found in the watershed were lack of woody buffer, accelerated erosion due to increased hydrologic pressure, undersized culverts, straightened channels and hydraulic alteration (drainage or fill) of wetlands.

The phase 2 assessment of the Pike River and its tributaries will help the town, state and the landowners identify areas of erosion hazard risks, sediment production and nutrient inputs in the brooks corridor. The study also will help identify potential floodplain and channel projects that will increase the capacity for stream corridor capture and storage of sediment and nutrients. Conservation partners will be able to use this information to the use of technical and financial assistance for the implementation of conservation, restoration, and protection projects.



Map of Study Reaches (M4T2.3S8.02, M4T2.3S8.03, M4T2.3S2.02, M4T2.3S2.03) ****Prepared by South Mountain Research and Consulting*

2.0 Background

Water quality and aesthetic impairments consisting of large blooms of Blue-Green Algae have been occurring on an annual basis in Lake Carmi and the Missisquoi Bay of Lake Champlain. The Missisquoi Bay watershed, including Lake Carmi and the Pike River, is a focus region for major reductions in phosphorus (P) loads through a Total Maximum Daily Load (TMDL) plan for Lake Champlain. The TMDL plan is a product of an agreement between the state of Vermont and the US Environmental Protection Agency (EPA). Additionally, a TMDL for Lake Carmi is under development and will be in place later in the year. The Phase 2 Geomorphic Assessment of The Marsh and Dewing Brooks was undertaken to assess the geomorphic condition of the stream channels and identify potential stressors to the stream channel. Areas of streambank erosion and minimal or no riparian buffer were identified as potential sources of nutrients and sediments. This project supports the State of Vermont's Clean and Clear Action Plan. .

3.0 Assessment Methodology

Phase 2 data is used to document natural and human disturbances to the watershed and the response and adjustment of the channel to these disturbances. The information gathered during this Phase 2 Assessment will also aid in the understanding of the geomorphic condition of each reach assessed.

Segmentation of some stream reaches occurred based on the protocols. Field data was collected using a Garmin© eTrex VISTA GPS, digital camera, and various survey equipment and techniques. Certain features such as grade controls, cross sections, bridges and culverts were then digitized using *ArcView 3x*. All of this data was then uploaded into the states Data Management System.

4.0 Phase 2 Assessment Results

The following is a brief summary of each reach, highlighting the stream channel and riparian corridor condition and potential areas for remediation.

4.1 Marsh Brook

Phase 2 assessments were completed for two reaches along the Marsh Brook Some common problems (stressors) contributing to the impairment/departure of reference stream channel condition on the main stem of Marsh Brook were lack of buffer, bank erosion, and undersized culverts.

Near reference conditions can be found in many locations along the Marsh Brook. These areas offer woody buffer and an infrastructure free corridor. These areas provide potential

for conservation and protection of reference channel conditions in the Marsh Brook watershed.. These areas also offer habitat for wildlife and an opportunity for the brook to deposit sediment and nutrients in the floodplain corridor.

The following table (Table 1) is a brief overview of the information collected for each reach. A more detailed description follows for each reach discussing stressors, impacts, and possible projects.

Marsh Brook

Table 1 Results of Phase 2 Assessment, Marsh Brook Main Stem

Reach	Channel Length	Stream Type	RGA Score	Adjust.	Stream Type Departure	Sensitivity	CEM
M4T2.3S 8.03	3,568	B3	.76	Stable	None	Moderate	F I
M4T2.3S 8.02	2,679	B3	.81	Stable	None	Moderate	F I

Abbreviations RHA=Rapid Habitat Assessment; RGA=Rapid Geomorphic Assessment, CEM=Channel Evolution Model (VT DEC)

Scour Pool, State Park Road

Table 2 RGA and RHA Score Ranges

0.85 – 1.0	Reference Condition
0.65 – 0.84	Good Condition
0.35 – 0.64	Fair Condition
0.00 – 0.34	Poor Condition

The following information will read from upstream to downstream.

M4T2.3S8.03

Segment M4T2.3S8.03 is a “B” type stream in stable condition and it begins just above the State Park Road. A long culvert crosses under this road and where it empties, a large scour pool has developed.

Reference Condition of M4T2.3S8.02

Downstream of the scour pool near reference to reference conditions can be observed. Excellent corridor as well as buffer exists for almost the entire reach. Reference stream type

was observed as well as bed strata and meanders.

The next crossing downstream of State Park road is used as a VAST trail and features a berm with two culverts. (see project #1)

M4T2.3S8.02

Segment M4T2.3S8.02 is a "B" type channel in stable condition. This reach has an excellent corridor and excellent buffer. Alder can be found along much of its banks. Excellent wildlife habitat exists in this area offering potential homes to such species as Bald Eagle and Whitetail Deer.

4.2 Dewing Brook

Table 3 Results of Phase 2 Assessment, Pike River Tributaries

Reach	Channel Length	Stream Type	RGA Score	Adjust.	Stream Type Departure	Sensitivity	CEM
M4T2.3S 2.03	3,568	F4	.44	Incision	Yes	Extreme	F II
M4T2.3S 2.02	2,679	E4	.43	Incision	Yes	Extreme	F II

Abbreviations RHA=Rapid Habitat Assessment; RGA=Rapid Geomorphic Assessment (see Table 2 RGA score ranges), CEM= Channel Evolution Model (VT DEC) N/A= Not Assessed

Near Reference Condition of Dewing Brook Segment M4T2.3S2.03

M4T2.3S2.03

Segment M4T2.3S2.03 is an "F" type channel and begins on a hillside in pasture land with the lake in the distance. The upper portion of 2.03 is in near reference condition, but is only a small trickle. It remains this way until meets up with the State Park Road. Once it meets the road it flows along a berm for a short distance and then into a culvert. On the other end of the culvert it looks much like the scour pool seen downstream of the State Park Road on the Marsh Brook.

Headcut Segment M4T2.3S2.03

Below the culvert a series of smaller nickpoints and large headcuts begin. The

nickpoints range in size anywhere from 3 to 8 inches. The 3 larger headcuts are around 6-8' drops and require active management stream management techniques (see Project #2). These headcuts are accelerating the erosion of sediment/ nutrients and causing large paths of scour in their wake. The buffer consists of grasses and forbs.

M4T2.3S2.02

Segment M4T2.3S2.02 is an "E" type channel and begins just upstream of the Dewing Shore Road. Large in stream bars were observed upstream of the culvert crossing underneath the Dewing Shore Road. Downstream the channel has been dredged and straightened. There is no buffer in this area and stream has undergone departure from reference.

Straightened/ Managed Channel

After the brook leaves the pasture with the straightened channel, it flows through a small wooded area, where it briefly regains access to its floodplain, and then under a small bridge and out into the lake.

5.0 Preliminary Project Identification

Using the information from these geomorphic condition studies of the Pike River Watershed we have helped to identify sediment and nutrient production zones, transfer zones and attenuation zones. The main goal of these assessments is to improve water quality and habitat, to reduce risks to infrastructure and minimize production of sediments and nutrients. This information can also now be used for development of projects and future management of the rivers corridor.

Project #1

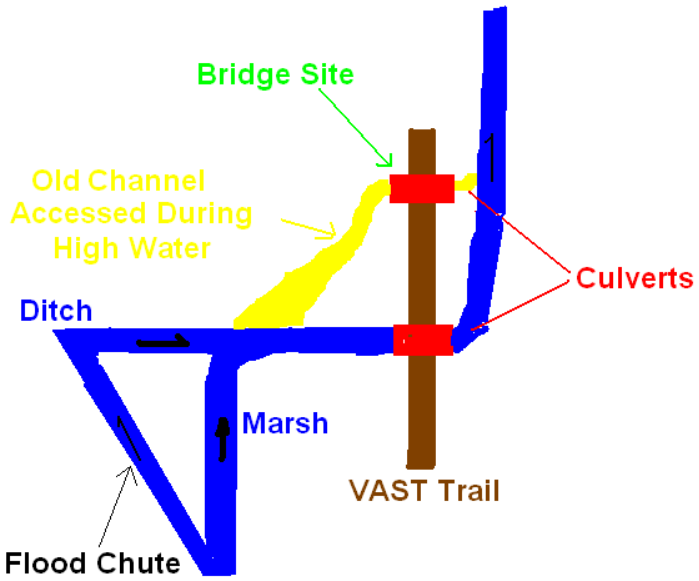
Marsh Brook Culvert Improvement Project 2007

Project Partners: Franklin Watershed Committee, Missisquoi River Basin Association, VT State Park, VT DEC, Larose Family

Description:

The project site is just east of the Lake Carmi fee station. An old class four road crosses over the stream corridor and runs parallel with the brook for around 200'. There are two culverts at this site, one downstream, to help accommodate higher flows and one upstream, where the brook flows during most flows. Originally, there was a bridge at this site where the downstream culvert is. Sometime during the last 50 years, the channel was

moved, the corridor filled in and the channel moved to its current location. A culvert was later added after the road berm "blew out." The downstream culvert is at a lower elevation and is also downstream of a 90 degree bend in the river. Due to these factors it is believed this lower culvert will eventually reclaim/ pirate the stream channel if left alone. Because of all these factors, the lower culvert will be the one replaced with the bridge.



Site Map

Remediation:

Trees will be planted in the small project area to soak up high flows and stabilize the soil. A bridge will replace the lower culvert to accommodate high/ flashy flows and to allow access for snowmobiles and tractors. Under these conditions, the channel will have more room to accommodate large flows and have a better chance at achieving equilibrium conditions. The upstream culvert will remain in place and still function as the main channel for the stream during most low flows. All remediation must be the best possible solution for all parties.

Project Support/ Progress/ Next Steps:

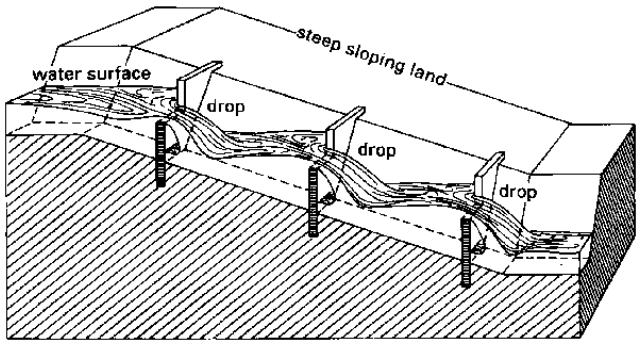
In the summer of 2007 VYCC staff transplanted roughly 60 live trees of various heights in the project area. This site still needs additional plantings. In the fall of 2007 a grant from the VT DEC was granted to the Cold Hollow Career Center for their involvement in the process of constructing the bridge. Construction of the bridge is scheduled for spring 2008.

Franklin Watershed Committee has committed to covering the remainder of the costs for the bridge.

River Management Project Review Criteria Table #1

Does the overall project or activity contribute to and accommodate the stream equilibrium conditions?	Yes, by building a bridge more floodplain will be accessible bringing the stream closer to equilibrium.
Will the project result in an overall reduction of sediment/nutrient production and an increase in sediment/nutrient storage in the watershed?	Production of sediment and nutrients will by reduced by eliminating a build up of hydraulic pressure above the culverts.
If the project is completed, is there likelihood that it will fail because of unmitigated constraints or anticipated channel adjustment processes in the river reach or in the watershed?	No, the project would not fail due to unmitigated constraints.
Will the project or management activity lead or contribute to instability in upstream or downstream reaches?	No, this project will hopefully not send headcuts migrating upstream causing instability in upstream and downstream reaches.
What is the cost and feasibility of the recommended set of practices?	The cost of the bridge is going to be around 2800 dollars. Building a bridge is very feasible.
What level of landowner participation has been obtained and what level of land use conversion would be necessary?	The Landowners are on board. No land use conversion is necessary.
How will the practices maximize the restoration and protection of the river equilibrium and minimize fluvial erosion hazards within the river corridor?	By removing culverts the river has a better chance of achieving equilibrium. There are no FEH's in this reach at this time.
What are the potential costs and feasibility of design and permitting?	The design was provided by VAST and the necessary permits will be acquired from the State and EPA.
Are partners available to share in achieving the project objective?	Yes, partners like FWS, Cold Hollow Career Center and the Franklin Watershed Committee.

Project #2



Arrest Gullies/ Headcut using Grade Control

Project Partners: Franklin Watershed Committee

Example of a Drop Structure/ Grade Control[1]

Description:

This project focuses on headcuts/gullies existing two between the Dewing Shore Road and State Park Road. These headcuts/gullies will be arrested using drop structures and/ or

grade control. Possible construction material includes pressure treated wood, natural stone or concrete. Further site inspection will be needed to determine exact site specifications.

Gullies/ Headcuts are caused when water runs down a trench/ ditch/ stream and scours a deep V-shaped channel where the slope reaches the bottom of the slope. The deep trough that occurs as a result of this process, continues to deepen and moves up-stream, sometimes at an alarming rate, say 6 feet a year for gullies like these (estimate.) It is a good idea to act fast when these gullies are observed because they can be remarkably destructive and difficult to stop.

There are two major classes of gullies/ headcuts, downhill-runoff type gully or the uphill-erosion type. The headcuts/ gullies for this project are both types. For this reach, downhill runoff has been concentrated by grazing, compacted soils and removal of vegetation. Up-hill erosion has been concentrated by straightened channels and culverts that have lowered the grade of the streambed.

Benefits:

A decrease in erosion will cause less sedimentation downstream in channel and in delta (lake), requiring less ditch maintenance and improved water quality.

Project Support/ Progress/ Next Steps:

The landowner has been contacted and an initial meeting was held to discuss the information in this report. The landowner seemed receptive to remediation of the excess sediment loss. In the next stages, if the project still meets their needs, the next step will be to survey the property and develop site specific plans. A rough cost estimate will also have to be developed in the next steps of this project. This project will should be funded entirely by the Franklin Watershed Committee with possible matches from other sources. The landowner will not be required to provide any funding. However, labor may be donated if desired.

[1] http://www.fao.org/docrep/R4082E/r4082e3d.gif

River Management Project Review Criteria Table #2

Does the overall project or activity contribute to and accommodate the stream equilibrium conditions?	Yes, The project will help work towards equilibrium conditions for the reach. However by itself, this project will not result in equilibrium condition.
Will the project result in an overall reduction of sediment/nutrient production and an increase in sediment/nutrient storage in the watershed?	Yes, this project will help reduce sediment and nutrient production but will not increase sediment and nutrient storage in the watershed.

If the project is completed, is there likelihood that it will fail because of unmitigated constraints or anticipated channel adjustment processes in the river reach or in the watershed?	Yes, there is a chance the project may fail. If all precautions are taken however, the structure(s) could last a long time.
Will the project or management activity lead or contribute to instability in upstream or downstream reaches?	No, the project will add to stability rather than instability.
What is the cost and feasibility of the recommended set of practices?	The cost at this point is still to be determined. Depending on what type of materials are used and other factors such as labor and fuel. The set of practices is very feasible and has been used other places around the state and country to improve water quality.
What level of landowner participation has been obtained and what level of land use conversion would be necessary?	No landowner participation has been obtained at this point. No land use conversion would be necessary.
How will the practices maximize the restoration and protection of the river equilibrium and minimize fluvial erosion hazards within the river corridor?	The practice will not effect FEH's. This project will help move the stream back to an equilibrium condition.
Are partners available to share in achieving the project objective?	Yes, partners such as the State of Vermont Agency of Ag, DEC, FWS, and the Franklin Watershed Committee.

What are the potential costs and feasibility of design and permitting?

Permitting

Army Corps Jurisdictional?	tile drains?
No Fish Issues	future maintenance?
Water Quality Requirements	CREP Buffer?
No Stream Alt. Permit	Bank Stability

Design

	Survey
Drop Structure/ Grade Control	tile drain locations
Potentially more than 3 structures?	watershed size