

APPENDIX K – Outreach / Project Development

Lewis Creek Watershed

Chittenden & Addison Counties, Vermont

April 2010

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
Starksboro D2257S – Reach M21, Segm B, A – Camp Common Ground	3
Starksboro C21167E – Reach M19, Segm B – Southern Riparian Parcel, Town of Starksboro lands.....	8
Starksboro C2394N – Reach M17, Segm C - Paskiewicz	11
Starksboro C131W – Reach M17, Segments C, B - Hanson	17
Starksboro – Reach M17, Segment B – Town of Starksboro lands	19
Starksboro C21163AW1 – Reach M17, Segment B – LaRue / Morgan.....	23
Starksboro B21166E – Reach M16 – Clifford	29
Starksboro B25L5S – Reach M15, Segment B – Padua	40
Monkton 219-1 – Reach M15, Segment B – Carrico	46
Monkton 219-3 – Reach M15, Segments B & A – Alves.....	50
Hinesburg 12-01-38.000 – Reach M15, Segment A – Lorange.....	52
Hinesburg (various parcels) – Segments M12-A, M11 – Baldwin.....	55
Charlotte (Various parcels) – Reach M08, vicinity Quinlan Covered Bridge –	58
Ferrisburg 050142001 – Reach M04 - Booth	59
Tax Parcel Maps	61

Landowner Contacts

Following sections summarize the status of landowner contacts for riverside parcels along the Lewis Creek main stem and tributary reaches as of February 2010. Entries are organized by Town, parcel number and reach number.

Landowner outreach was conducted by representatives of Lewis Creek Association, including Marty Illick (Executive Director), Andrea Morgante (President), Stevie Spencer and Alison Wagner (Board members), and Kristen Underwood (consulting geologist under contract to LCA) from 2007 through February 2010. Outreach was funded by grants from the VTDEC Water Quality Division. Contents of this appendix leverage work completed for the March 2008 River Corridor Plan for reaches M14 through M18 and the February 2006 River Corridor Plan for reaches M19 through M23.

Principal goals of landowner outreach were to:

- Promote an understanding of the dynamics, or “behavior”, of Lewis Creek and the influence of land use activities and channel management choices on these dynamics;
- Gather the river-side community to discuss issues affecting all;
- Encourage landowners to review their land use practices along the river in the context of an adjusting river and the river’s need to seek a more balanced condition;
- Identify where adjustment of land use practices or plans might be necessary to encourage a more balanced state of the Lewis Creek, thereby reducing flood erosion risks in the longterm and improving water quality; and
- Match willing landowners with technical and financial resources to support river restoration and conservation projects.

Specific projects identified in Section 6.1 of the Watershed Plan were also discussed with individual landowners, where appropriate.

Note:

Additional outreach, project development and project implementation have occurred in the Lewis Creek watershed dating back to the early 1990s. Some details of this work are discussed in previous watershed reports, including the February 2006 River Corridor Plan for reaches M19 through M23. The reader is encouraged to contact Lewis Creek Association for a history of these earlier watershed projects.

Starksboro D2257S – Reach M21, Segm B, A – Camp Common Ground

Contacts: Peg Kammans, Elin Melchior
Street Address: 473 Tatro Road, Starksboro
Mailing Address:

Description: Recreational and education camp comprised of lands including several acres along the west side of Lewis Creek in reaches M21-B, M21-A, and M20-B.

5/19/2006 Personal Visit – w/ Peg Kammans, Elin Melchior
Attending: Marty Illick, Kristen Underwood, Shannon Hill Pytlik

Background

Peg Kammans and Elin Melchior invited Lewis Creek Assoc and the Rivers Management Section to a site visit to review concerns about gully erosion at their property as well as increasing erosion along the left bank of the Lewis Creek near the southern boundary of their property (Figure 1).

Land uses and long-term commitments within the corridor:

Common Ground Center “is a cooperatively run non-profit arts, education, and outdoor recreation and retreat center....dedicated to bringing together and strengthening diverse families and communities through unique program offerings and facility rentals” ([www. cgcv.org](http://www.cgcv.org)).

River Corridor Constraints

Tatro Road bridge crosses the Lewis Creek channel – providing access to the camp (as well as other residential properties to the west). This bridge is somewhat undersized with respect to the bankfull width, but has relatively ample vertical clearance. Rip-rap armoring is present local to the bridge site.

Current Concerns of the Landowner

Camp Common Ground personnel are concerned about gully formation near the bridge crossing site, as well as left-bank erosion of the Lewis Creek near the southern end of the property.

River Corridor Alternatives Acceptable to Landowner

Peg Kammans and Elin Melchior were interested in learning more about possible corridor conservation options as well as stormwater management options. (See attached email documentation).

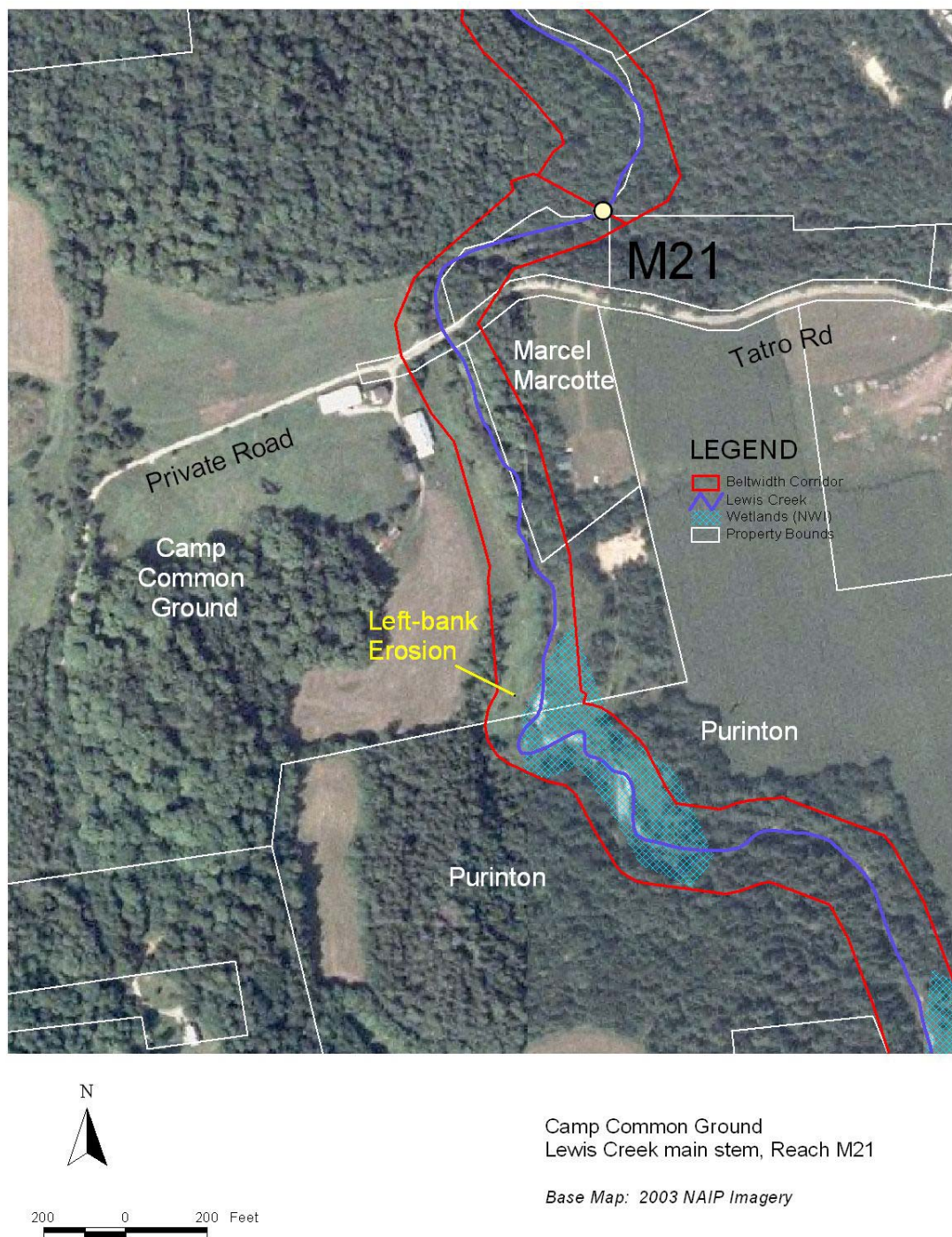


Figure 1. Vicinity Map, Camp Common Ground. River corridor (Phase 1) outlined in red. 2003 base photograph. Blue line represents surface waters digitized from 1995 orthophotographs. Turquoise hatched lines indicate NWI wetlands. Parcel owners current as of 2006.

Kristen L Underwood

From: Kristen L Underwood [southmountain@gmavt.net]
Sent: Monday, May 22, 2006 4:13 PM
To: Peg Kamens (peg@cgcvr.org); Elin Melchior (elin@cgcvr.org)
Cc: Marty Illick; 'Hill, Shannon'
Subject: CCG site visit on Friday 5/19/06
Attachments: ccg_stmwtr.jpg; ccg_corr_2003.jpg; ccg_corr_wetl.jpg

Hi Peg and Elin,

It was good to meet you both on Friday. The steady rain provided a great opportunity for us to see, in action, the erosion spots on your property that you've been concerned about. I've summarized some of our discussion topics below, and attached a couple of figures that may be helpful as you take next steps to address the concerns raised. I have cc'd Marty Illick and Shannon Hill above. Please feel free to email or call us with any questions / comments. We would be glad to work with you to facilitate next steps.

Thanks,
 Kristen

Kristen L. Underwood, PG
 South Mountain Research & Consulting
 2852 South 116 Rd
 Bristol, VT 05443
 802-453-3076 ph/fax
southmountain@gmavt.net

Re: the gully erosion on the south side of the private road leading uphill from Tatro Road bridge.
 (see "ccg_stmwtr.jpg")

Based on our brief site walk on Friday, it would appear that the gully is receiving drainage from a short, intermittent channel leading from what you noted has been identified by others as a Class 3 wetland just southwest of the barn which is situated parallel to the private road extension to Tatro Road. The channel leads from the vicinity of the wetland, through a culvert along the northwest side of the barn, to a short section of grass-lined swale, to a second culvert under a driveway leading from the farmhouse, and then downslope to join the Lewis Creek. In the last year to two years, erosion has increased downstream of the driveway and the channel has eroded downward and widened to create a gully on approach to the Lewis Creek. CCG is seeking guidance on how to stop this gully erosion and prevent damage to the private road that is the extension to Tatro Road.

As Shannon Hill recommended, it would be important to determine the cause of the gully erosion and the source of increased flows, before addressing the erosion with "spot fixes" in an attempt to stabilize the gully. As we walked the property, we identified several conditions which may be contributing to increased velocities and volumes of flow to the channel. Together these conditions may have resulted in flows in the channel that were of sufficient velocity to exceed thresholds for sediment erosion in the gully area. Further assessment would be required to determine which of these conditions may in fact be contributing to gully erosion. The list below is offered as a starting point, so that you can confer with your engineers on the construction project.

There have been several recent changes to the property which may have concentrated surface water flows to the channel.

1. The addition of impervious surfaces in the relatively small area draining to the gully (i.e., new guest houses, well house, addition to the barn) as well as the disturbance of the land surface (and removal of vegetation) to extend driveways, and accommodate construction activities.
2. The installation of a new larger septic system(s?), and a new well (flowing artesian?), combined with possibly greater site occupancy – the combination of which may have lead to increased shallow groundwater discharges at the site. If shallow soils are more saturated with grey water and/or septic

5/22/2006

discharges, the infiltrative capacity of these soils may have been reduced, and more stormwater runoff may be generated (for a given size rainfall event) than would have been prior to disturbance.

3. Apparent foundation drains around the barn (and possibly (?) the other new structures on the hill). The foundation drain was exposed along the west side of the barn, essentially coincident with the intake for the culvert-directed portion of the channel. Again, flows that would normally be allowed to infiltrate more diffusely, are instead being concentrated and delivered more quickly to the channel leading to the gully.
4. An apparent water line, excavated from the vicinity of the well house downhill to the barn, leading to the direct vicinity of the channel at the western end of the barn. This trench may serve as a preferential flow path for groundwater which may be discharging to the vicinity of the Class 3 wetland and ultimately draining to the gully. Flows may be more concentrated and delivered more quickly to the gully in a rainfall event, than prior to installation of the water line.
5. Stormwater runoff was observed flowing from the southwest along the private road and from the south along the farmhouse driveways and temporary construction road for the new cottages. Much of this runoff was directed to the gully. Improved drainage techniques implemented along these driveways and private road could reduce stormwater runoff to the gully and to Lewis Creek. The roadways could be crowned to shed water to the sides; turnouts could be installed every so often along the road to direct stormwater runoff (and sediment) to the shoulders of the road; ditches with check dams could be installed along the sides of the road; and other techniques could be considered.

Sometimes, "tributary rejuvenation" can be a cause for gully erosion near the confluence of a tributary stream with a larger stream, as suggested by Shannon. Tributary rejuvenation can occur when the larger stream is incising (eroding downward) into its bed. As the elevation drops where the tributary joins the larger stream, slopes in the tributary stream become steeper, the flow velocities higher, and the erosive energies greater, so that the tributary stream also begins to scour downward. However, the 2002 assessments along this reach of the Lewis Creek did not indicate signs of channel incision. The bankfull flows we saw on Friday, and the turbidity of the water, prevented us from taking a closer look at the Lewis Creek channel to see if there may be current signs of channel incision. As part of a separate Lewis Creek Association project, we will be back out to this section of the Lewis Creek in the next month or so (at lower flows) – with your permission – and we will re-evaluate this section at that time.

Re: the streambank erosion along the west side of Lewis Creek near the southeastern extent of the property.

(see "ccg_corr_2003.jpg")

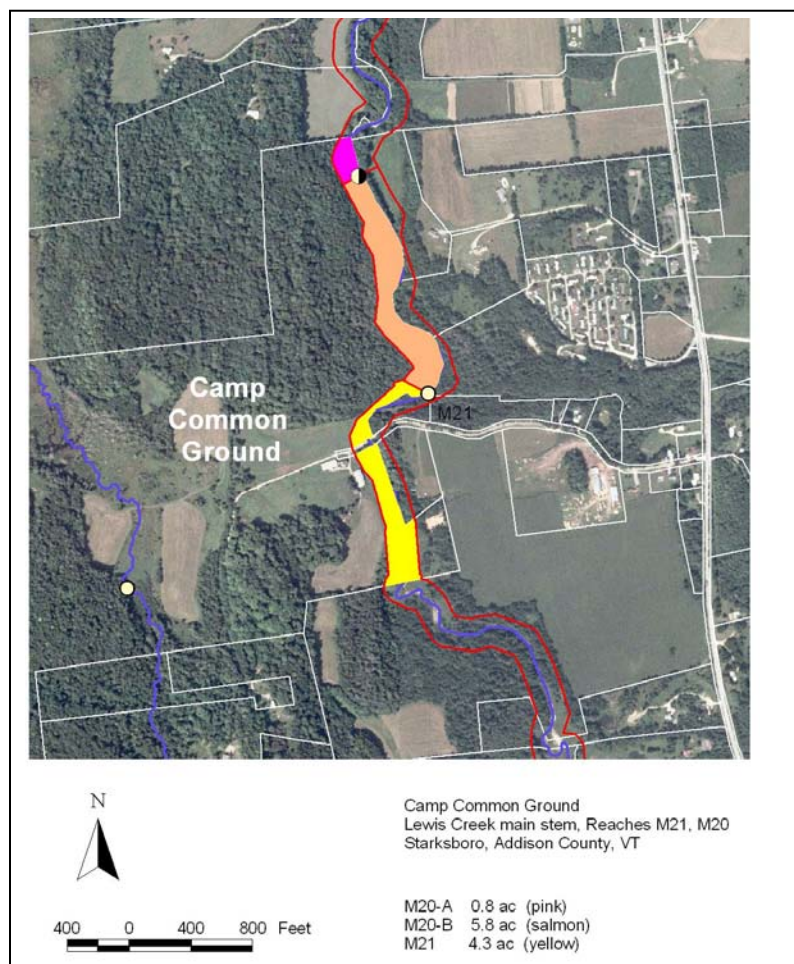
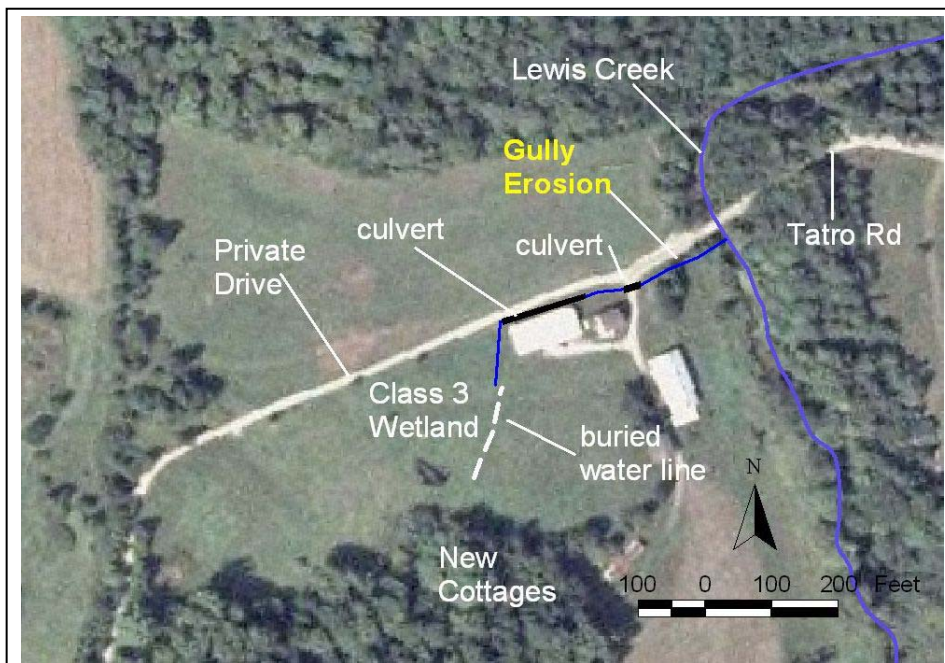
I have attached a figure showing the Lewis Creek streambank erosion area on a 2003 photo. This photo shows that the avulsion which cut off that tight meander bend had already occurred by 2003. The blue line on this figure, is the 1995 position of the Lewis Creek. The red line is the belt-width corridor we were discussing. (Shannon, this belt-width corridor is the one recently derived by Ty Mack for the Starksboro Valley – *feh03feh2zone.shp*).

I've attached another figure ("ccg_corr_wetl.jpg") which shows the wetlands layer – those Class I and II wetlands mapped by the National Wetlands Inventory.

The approximate acreage of CCG property within the belt-width-derived corridor (red line) in reach M21 is 4.3 acres. (Further downstream, in Reach M20, Segment B, CCG owns approximately 5.8 acres inside the corridor; in Segment A, 0.83 acre). These acreage estimates assume that the parcel boundary positions shown on the figure are accurate – but as you were telling us, Peg, they may be some inaccuracies in the southeast corner of the property (see paragraph re: property bounds).

Re: property bounds for the small trapezoid of land across Lewis Creek at the southeast corner of your property.

The parcel boundaries used in the Lewis Creek corridor report (and on the attached figure) came from Starksboro through Kevin Behm at ACRPC. They are somewhat dated (late 1990s, I believe) and many updates have occurred since then (though I am not aware of a more current digital version of the parcels). As part of the Starksboro Valley corridor planning project, Jen Turner did some checking of the tax maps at the Starksboro town clerks office in January-February of 2005; I checked her notes, and they do not indicate that a boundary change was recorded for that portion of your property. The neighboring property owners indicated on the attached map were current as of February 2005.



Starksboro C21167E – Reach M19, Segm B – Southern Riparian Parcel, Town of Starksboro lands

Contacts: Louis DuPont, Chair, Starksboro Conservation Commission
Street Address: off Route 116, north of Starksboro village, south of Starksboro Ball Fields
Mailing Address:

Description: Former Cota Farm parcel, conserved with VT Land Trust, for recreational use.

Background

See background and history of this parcel in 2006 River Corridor Management Plan for the Lewis Creek Starksboro Valley: Reaches M19 – M22 (Pages 37-38).

2009- 2010 Updates

Lewis Creek Association and its consultant South Mountain Research & Consulting met with the Starksboro Selectboard and members of the Conservation Commission on three separate occasions in 2009 to discuss a proposal for improved habitat and river restoration in the Southern Riparian parcel. The concept was first raised to Starksboro Conservation Commission members in a meeting on 11 February 2008 (see meeting notes under next section, page 15). Members of the Sports Committee that manages activities at the downstream Starksboro ball fields expressed concern about the project and potential for increased flooding at the ball fields. Certain members of the public expressed their disapproval of the project. In the end, permission was granted by the Selectboard to proceed with survey work and conceptual engineering design, with the option to review the design and later vote on whether or not to implement the design. Lewis Creek Association applied for VT Clean & Clear grant funds in September 2009 and the project was not able to be funded in that grant cycle. Lewis Creek Association continues to seek funding for the data collection, modeling, and conceptual design phases of the project. US Fish & Wildlife has potential for matching funds. A summary of the proposed project is attached.

In April 2010, various stakeholders involved in managing this parcel (and the other associated parcels conserved with VT Land Trust) attended a meeting hosted by the Starksboro Conservation Commission to keep lines of communication open concerning ongoing management of the parcels. Lewis Creek Association along with its consultant South Mountain R&CS attended.

Accelerated Passive Restoration of the Lewis Creek Channel & Floodplain to Increase Sediment Attenuation and Improve Habitat

Segment M19-B (Treatment, Control) / Segment M17-B (Reference), Starksboro, Addison County, VT

This project involves a controlled experiment in accelerated passive restoration to support natural fluvial processes in the recovery of quasi-equilibrium conditions in historically channelized, armored, and partly-incised channel segments of the Lewis Creek. At present, under VTANR guidelines, river protection and passive restoration is the preferred priority for reaches with high recovery potential, in mid-to-later stages of channel evolution, and which are not actively incising or excessively aggrading. Many Vermont channels have persisted for decades in a partially incised and channelized cross section, where sediment regimes have been converted from what VTANR classifies as a *Coarse Equilibrium & Fine Deposition* condition to a more *Transport*-dominated condition. Often buffers along these channels have been historically cleared, and it will take several decades for forests to regenerate to provide the degree of large woody debris recruitment and anchoring necessary for recovery of quasi-equilibrium conditions, morphological diversity, and refuge areas for fish and aquatic species. This project evaluates the feasibility of accelerating passive recovery through the removal of residual streambank armoring and the introduction of large woody debris.

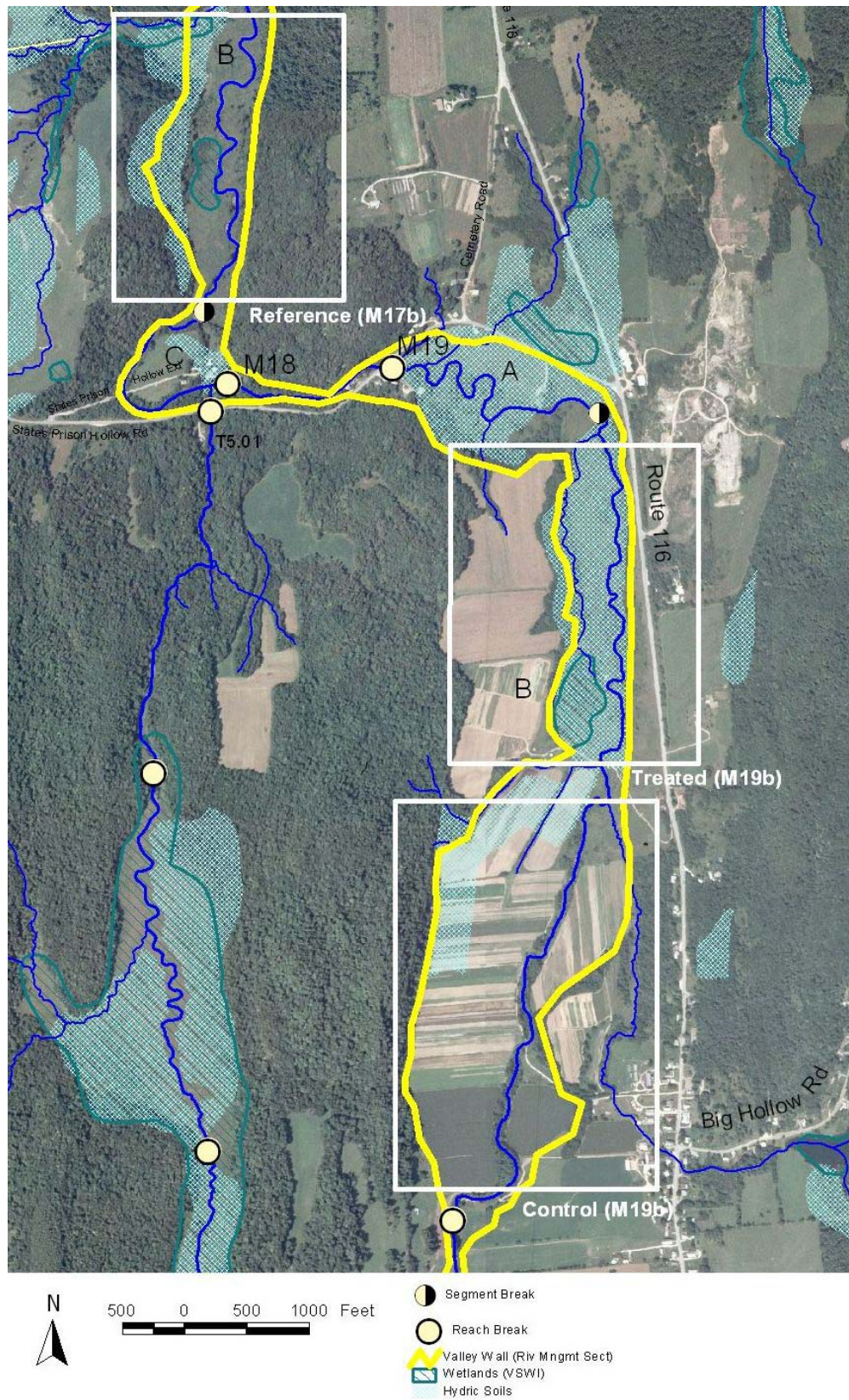
Goals: ***Project-specific:*** Evaluate effectiveness of various Best Management Practices to accelerate passive channel and floodplain restoration. ***Reach- & Watershed-specific:*** Control and reduce suspended sediment / coarse sediment (and phosphorus) mobilization from the reaches in question over the long term by accelerating a return to balanced planform, profile, and channel dimensions – thereby slowing water / sediment transport through the reaches, facilitating coarse sediment storage in the reach, and improving floodplain access to promote overbank storage of fine / suspended sediments (and associated phosphorus). ***Habitat- & Species-Specific:*** Over the long-term, reduce sedimentation & improve instream habitats for endangered & threatened freshwater mussels & fish communities.

Expected Additional Benefits: (1) Reduced sediment loading, fining, (and nutrient loading) to in-reach and downstream channel sections (mussel habitat) over the long term. (2) Improved habitat in the Treatment section – including improved morphologic diversity and provision of additional refuge areas through increased density of pool features and introduction of large woody debris, boulders (former rip-rap), and possibly engineered log jam structures. (3) Possible increase in flow attenuation realized in Lewis Creek (M19B) corridor upstream of properties at risk of fluvial erosion hazards (i.e., Starksboro ball fields and along States Prison Hollow Road Extension at the base of the bedrock falls). (4) Project Treatment site is publicly accessible and can serve as a demonstration site for other locations within the watershed and State-wide.

Additional Ranking Criteria: (1) Project was identified as a priority in a 2009 *Watershed Management Plan* currently being completed by LCA under FY09 Corridor Grant Funding. Shannon Hill Pytlik has offered preliminary support for the project. (2) Project is consistent with stated goals and recommendations of the *March 2008 River Corridor Plan, Lewis Creek Reaches: M14-M18* and the *January 2006 River Corridor Plan, Lewis Creek Starksboro Valley Reaches: M19-M22*. (3) Project is located on section of the Lewis Creek that the State of Vermont has listed as impaired (VTDEC WQD, 2008): Lewis Creek main stem, 12.3 miles from Lower Covered Bridge upstream to footbridge (Reach M08 through M20) – *E. coli*, agricultural runoff. (4) US Fish & Wildlife has committed resources and financial support for project in this priority watershed due to longterm benefits of sediment reduction for threatened and endangered native mussels and fish. (5) Lewis Creek Association has preliminary approval from the Starksboro Conservation Commission which stewards these VLT-conserved lands (Selectboard approval is still pending). (6) Army Corps of Engineers (Mike Adams) has offered preliminary support and guidance for permit requirements.

Organizational Chart: Lewis Creek Association (lead contact, Marty Illick) will rely on qualified consultant(s), South Mountain Research & Consulting (SMRC, Kristen Underwood), Milone & MacBroom, Inc. (MMI, Roy Schiff) to complete physical assessments and modeling, prepare restoration designs, identify permitting needs, oversee restoration implementation, and conduct baseline and ongoing project monitoring. Work will be guided by a Steering Committee of project partners, including River Management Section, US Fish & Wildlife, Town of Starksboro and adjacent landowners, VTDEC Biomonitoring & Aquatic Studies, VT Fish & Wildlife, and NRCS.

Funding Request: \$50,000



Site Location Map: Lewis Creek, Starksboro, Addison County.

Starksboro C2394N – Reach M17, Segm C - Paskiewicz

Landowner: Linda G. Paskiewicz
Street Address: 291 States Prison Hollow Road, Starksboro
Mailing Address: same

Description: Residential parcel along right bank at the base of the bedrock gorge. Located at the transition from semi-confined to unconfined valley setting, with slope reduction from approximately 6.9% to 0.8%. Site of avulsion in 1938 flood. Berm along right bank protects the house.

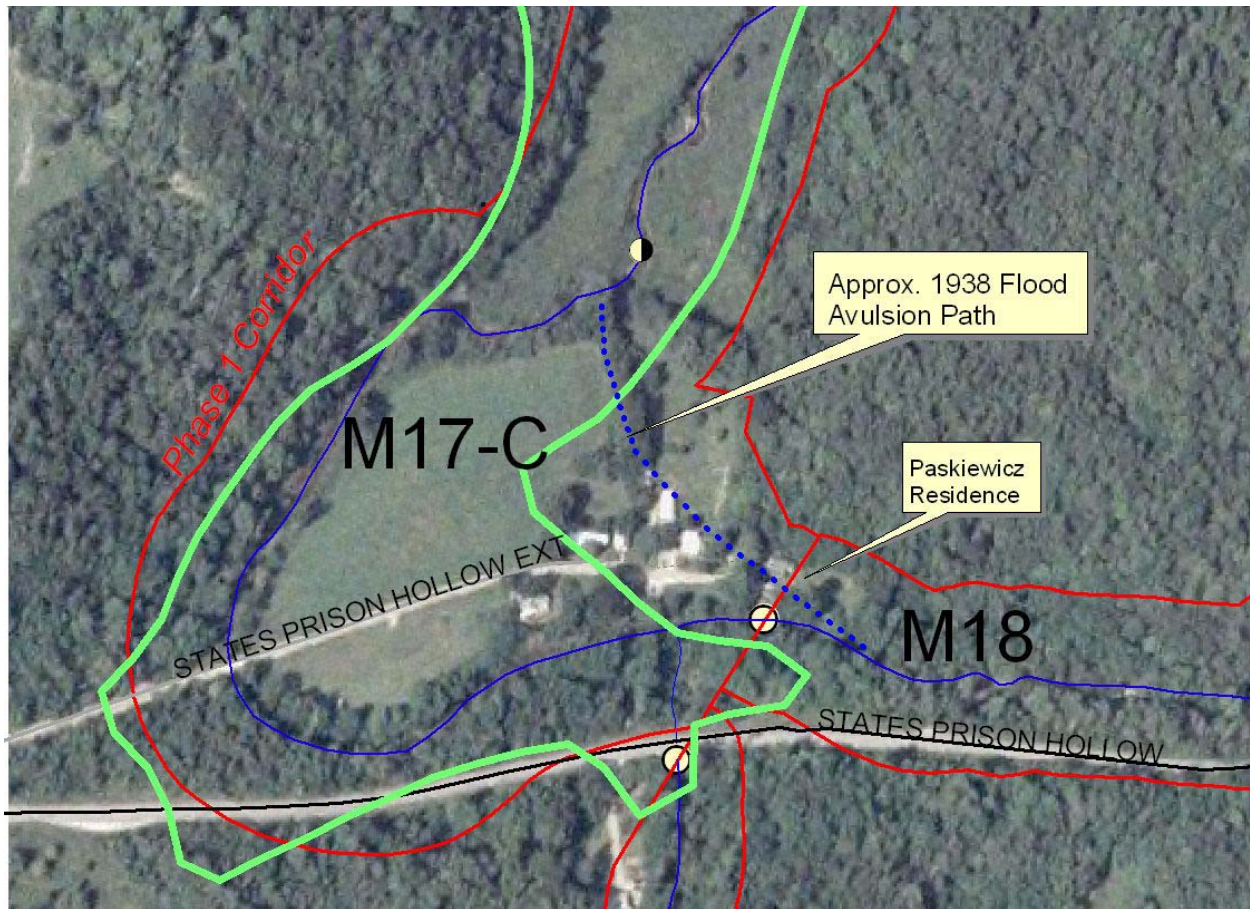


Figure 1. Location of Paskiewicz residence. River corridor (Phase 1) outlined in red. 2003 base photograph. Blue line represents surface waters digitized from 1995 orthophotographs. Green line indicates area of 100-year flood digitized by ACRPC from Town of Starksboro, VT Flood Insurance Rate Map Panel 05, effective date: December 4, 1985.

Starksboro C2394N – Reach M17, Segm C
9/18/2007 – 6:00 PM Personal Visit – Linda Paskiewicz
Attending: Marty Illick, Alison Wagner, Kristen Underwood

Background

Ms. Paskiewicz purchased the property approximately 6 years ago. The house was constructed c1840. Ms. Paskiewicz has noted that States Prison Hollow Road Extension was inundated once in the past 6 years – from stormwater drainage off the fields west of the house. Local anecdotal information indicates that the front porch of her house was washed away in the 1938 flood (see Figure 1). A small right-bank flood chute adjacent to the channel is active during Spring flows, but water has not extended beyond the cobble / boulder/ earthen berm separating the river from her lawn area in the 6 years she has lived there. Her house is supplied by a shallow well, located within one bankfull width of the Lewis Creek channel. Documents generated during the purchase of her property stated that the house is not located within the 100-year flood plain. Ms. Paskiewicz does not have flood insurance.

Land uses and long-term commitments within the corridor:

This lot has been in residential use for over 150 years. No plans to change the residential use of this parcel were articulated by Ms. Paskiewicz.

River Corridor Constraints

Following the 1938 flood, debris was cleared from the Lewis Creek channel (Hanson, 1998) and a cobble/boulder/earthen berm was constructed along the right bank to protect the house. This berm continues downstream of the house adjacent to other residential buildings along States Prison Hollow Extension; and a left-bank berm is also present downstream of the house. A small wooden outbuilding is present on the lot approximately 130 feet to the east (upstream) of the house (adjacent to reach M18 of Lewis Creek).

Current Concerns of the Landowner

Ms. Paskiewicz recalled the 2006 wash out of the States Prison Hollow Road and noted that sedimentation in pools at the base of the gorge appears to have increased in the months since the mass failures. Ms. Paskiewicz has previously reported her concerns for fish health and habitat to the State of Vermont.

Ms. Paskiewicz acknowledges the flood damages that occurred in 1938 in the hollow and shared a picture of the flood damage found in *Bertha's Book: a view of Starksboro's history* (Hanson, 1998). Until our meeting, future flood risks to the property did not appear to be a concern of Ms. Paskiewicz.

River Corridor Alternatives Acceptable to Landowner

During the September 2007 meeting, Kristen Underwood brought up the topic of the FEMA-FIRM maps (see Figure 2) – their degree of accuracy in locating areas at risk of inundation flooding at the base of the gorge, and also the fact that erosion hazards are not well captured by the FEMA-FIRM maps. Historic accounts of the 1938 flood and the placement of the berms along Lewis Creek (see Figure 3) appear to suggest the high risk of erosion and inundation flooding damage to the Paskiewicz property. Ms. Paskiewicz indicated that she would like to learn more about the potential flood risks at her location.

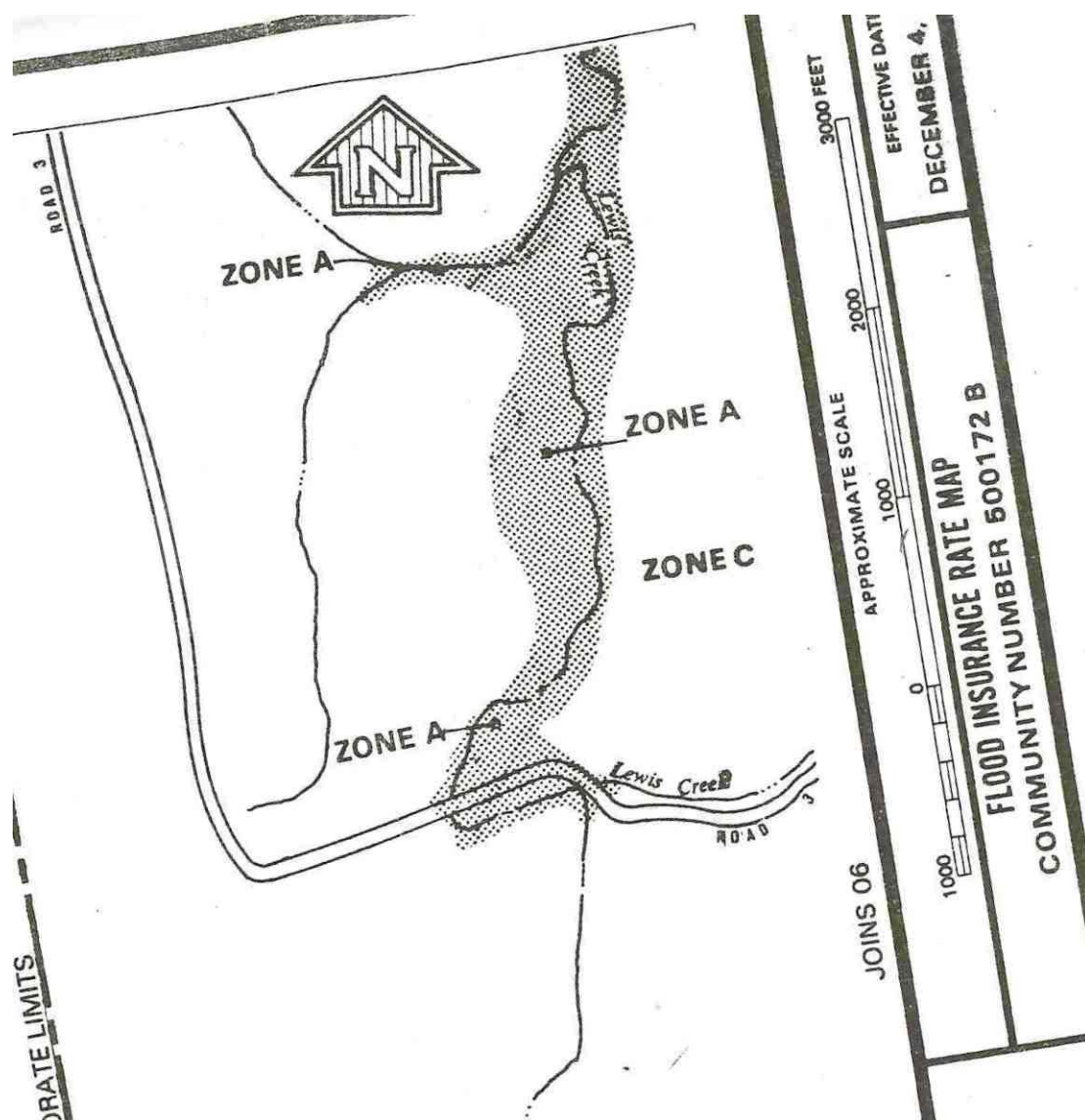


Figure 2. Reprint of Town of Starksboro, VT Flood Insurance Rating Map, panel 05 for vicinity of Paskiewicz residence. Former alignment of States Prison Hollow Road depicted. Zone A indicates Areas of 100-year flood: base flood elevations and flood hazard factors not determined. Town of Starksboro, VT Flood insurance Rate Map Panel 05, effective date: December 4, 1985.

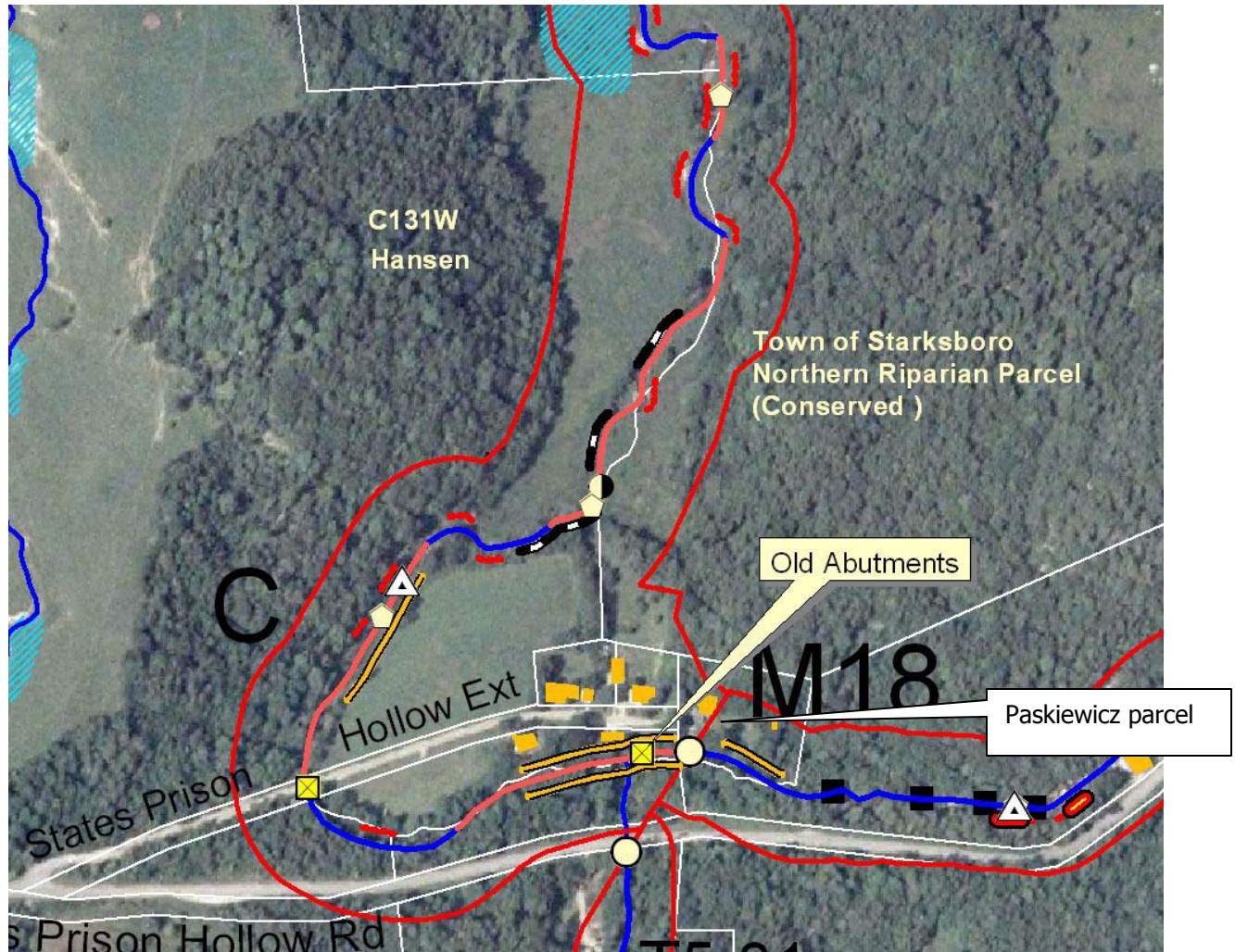


Figure 3. Phase 2 stream geomorphic assessment data for Segment C of reach M17 in vicinity of Paskiewicz residence. *Old abutments are present, just downstream of Paskiewicz residence at the location of the former crossing of States Prison Hollow Road, a portion of which now remains as States Prison Hollow Extension. White lines indicate parcel boundaries. Base photograph, dated 2003.*

	Reach Break		Beaver Dam		Crossing Structure
	Segment Break		Debris Jam		Bankfull Constrictor (red)
	1974 channel		Mass Failure		FPW Constrictor (yellow)
	1999, 1995 channel		Erosion		Development in Corridor
	Straightened Channel		Wetlands (NWI)		Streambank Revetment
	Phase 1 Corridor		Bedrock grade control		Berm
					Ph 2 Cross Section

2008 Updates

Lewis Creek Association met with the Starksboro Conservation Commission on 11 February 2008 and discussed concerns for fluvial erosion hazards at this site, and elsewhere along the river corridor. (see attached meeting notes).

Starksboro Conservation Commission
2/11/2008 – 7:30 PM Starksboro Conservation Commission special meeting
Attending: Marty Illick, Alison Wagner, Kristen Underwood, Amy Diller
Starksboro CC: Louis DuPont, Robert Turner, Jody Higgs

Following Meeting Minutes prepared by Louis DuPont, Starksboro Conservation Commission

A brief account of a presentation by Kristen Underwood and Marty Illick on the 2008 Lewis Creek Corridor Plan to Starksboro Conservation Commission members on February 11th 2008 at the Town Library.

Present: Kristen Underwood-South Mountain Research, Marty Illick—Director Lewis Creek Association, Amy Diller—Watershed Coordinator Addison County Regional Planning Commission, Alison Wagner, Jody Higgs, Robert Turner, Louis duPont

Marty spoke about the Federal Emergency Management Agency maps for Starksboro and how they are not always accurate, particularly as regards States Prison Hollow. The house of Linda Paskowitz is actually in the floodplain that was created by the 38 flood.

Marty said that the town plan's flood hazard text and the FEMA flood hazard map, which informs how insurance companies handle flood insurance for home owners, needs to be updated. Marty also said the two Lewis Creek Corridor Plan also identify management options for Starksboro's North and South Riparian parcels, and the possibilities for managing these river corridors in ways that could help to mitigate potential flood hazards downstream.

Kristen then spoke about the evolving town plan and bylaw language for protecting stream and river banks and corridors from encroaching development that is prone to flood inundation or erosion hazards. Our zoning ordinance in Starksboro currently calls for a 100 ft. setback from the stream for building, but less than 100 ft. is allowed if there is "no adverse impact". As "adverse impact" is vague and often difficult to agree upon, we have end up with structures in the fluvial erosion hazard land area. She also mentioned that a number of towns including Lincoln and Middlebury, have gone beyond the basic FEMA language of "inundation hazard" zones to include "Fluvial Erosion Hazard" zones. After the extremely damaging July flood of several years ago, Lincoln particularly knows the hazard posed by streambank and gully erosion. Linda P.'s house is at risk to erosion hazards. While the corridor plan will have town plan and bylaw guidance language, Addison County Regional Planning Commission and Amy are available to help Starksboro make town plan improvements.

Kristen also mentioned that FEMA is in the process of re-drawing the FEMA maps, but that this is a slow process. She said that if a town is proactive, it may be able to have its maps re-drawn sooner than otherwise. In order to make sure that the maps are made more accurate, and landowners are able to properly insure their investments, the Town needs to work with FEMA. The corridor plan that will be submitted to the Select Board, Planning Commission, and the CC, will help in this work. The plan will be distributed by the end of March as recommended by SCC and others.

Marty inquired about the possibility of improving the Creek's access to the flood plain in the Southern Riparian Parcel. This would likely involve some bulldozer work on the left bank (looking downstream). This work could potentially help to de-energize the downstream section with the States Prison Hollow neighborhood. If the town is interested to explore this option, LCA can pursue and get back to the SCC.

Kristen then reminded us of a couple of instances recently, where the town allowed homes to be built adjacent to the Lewis Creek. In her opinion, one was at least partially within the “fluvial erosion hazard” zone.

Amy said that she was willing to help by providing examples of recently revised Town Plans and Zoning Ordinances that dealt with riparian issues.

Robert mentioned that the upcoming Town Plan revision should also include language describing the importance of the stream corridor to our local wildlife populations for both habitat itself and as a travel corridor.

Marty added that the FEH land area only addresses instream aquatic animals such as mussels, fish and macroinvertebrates.

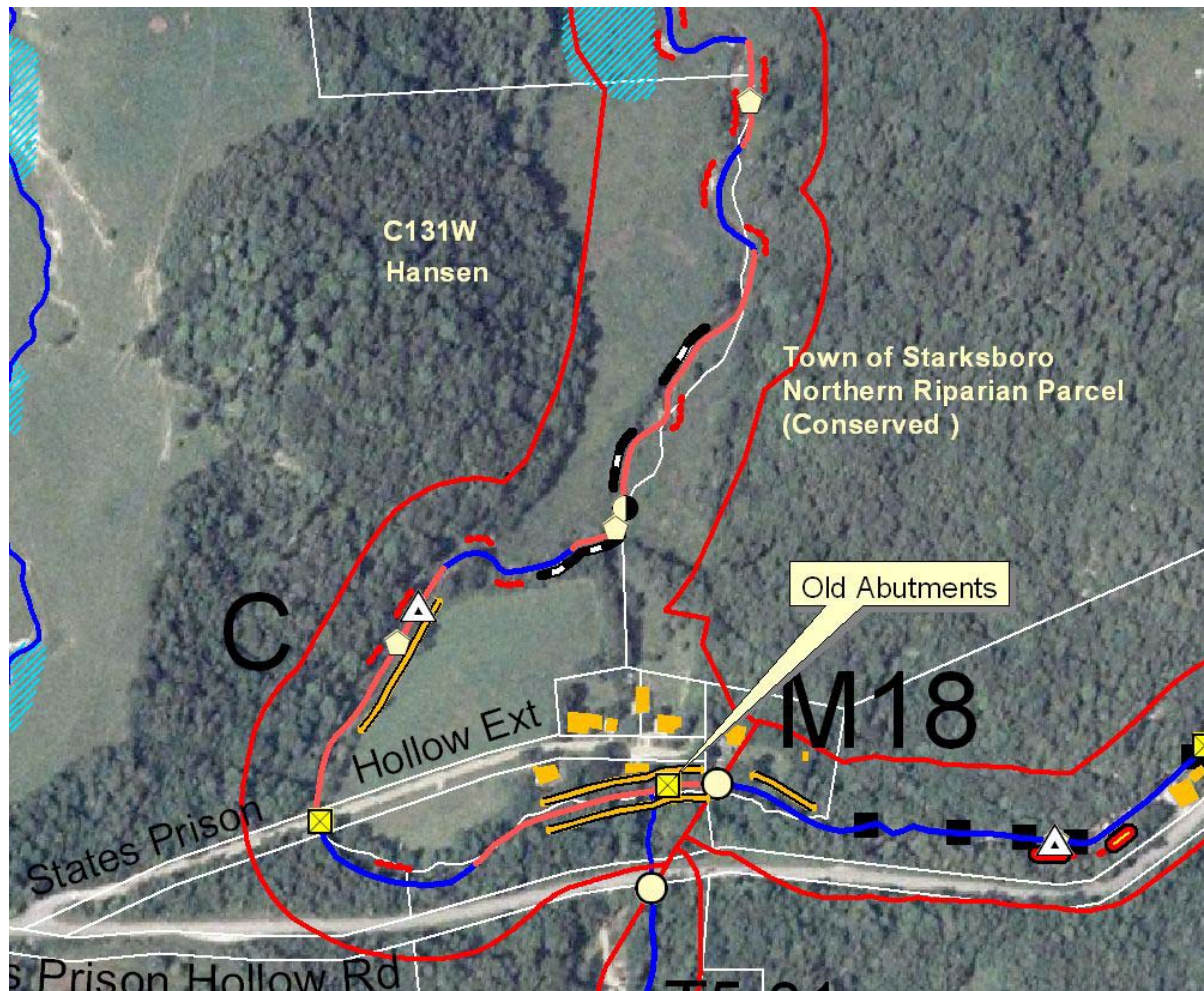
Louis described the effort and investment that has gone into creating and improving the towns recreation fields and pavilion. The Rec. Committee particularly, as well as the other town boards, would be very interested in any proposals that would help to protect these investments and ward off future flood damage.

Marty then suggested that a meeting with the States Prison Hollow neighborhood might be a good idea. This would increase their awareness of potential hazards. This could possibly happen after the plan has been submitted.

Starksboro C131W – Reach M17, Segments C, B - Hanson

Landowner: Steven & Sylvia Hanson
Street Address: 1363 States Prison Hollow Road, Starksboro

Description: Agricultural lands along right and left banks downstream of States Prison Hollow Road Extension. Bordered on north and east by Town of Starksboro lands – Northern Riparian Parcel (conserved). Berm along right bank immediately downstream of States Prison Hollow Extension (Segment C); limited armoring and historic channelization on fallow lands further downstream (Segment B).



- | | | |
|----------------------|-----------------------|----------------------------|
| Reach Break | Beaver Dam | Crossing Structure |
| Segment Break | Debris Jam | Bankfull Constrictor (red) |
| 1974 channel | Mass Failure | FPW Constrictor (yellow) |
| 1999, 1995 channel | Erosion | Development in Corridor |
| Straightened Channel | Wetlands (NWI) | Streambank Revetment |
| Phase 1 Corridor | Bedrock grade control | Berm |
| | | Ph 2 Cross Section |

Starksboro C131W – Reach M17, Segm C, B
Steven Hanson, Sylvia Hanson

Following several letters and phone calls, a meeting was not able to be convened with the Hanson's in the available time frame.

See Corridor Plan Table 27,

Project 3 – Potential berm removal and active / passive restoration of incised channel.

Project 4 – Protection River Corridor, Potential Wetlands Restoration, Stream Buffer plantings

Rapid Habitat Assessment report for Lewis Creek (MMI, 2008) also recommends removal of the berm.

Starksboro – Reach M17, Segment B – Town of Starksboro lands Northern Riparian Parcel (conserved)

Landowner: Town of Starksboro
Street Address: VT Route 116, Starksboro

Description: Former Cota Farm lands – fallow agriculture and forest - along right and left banks downstream of States Prison Hollow Road Extension. Bordered on south by Hanson Farm and on north by LaRue lands. Limited armoring and historic channelization, especially near southern extent of parcel. Conservation easement held by Vermont Land Trust.

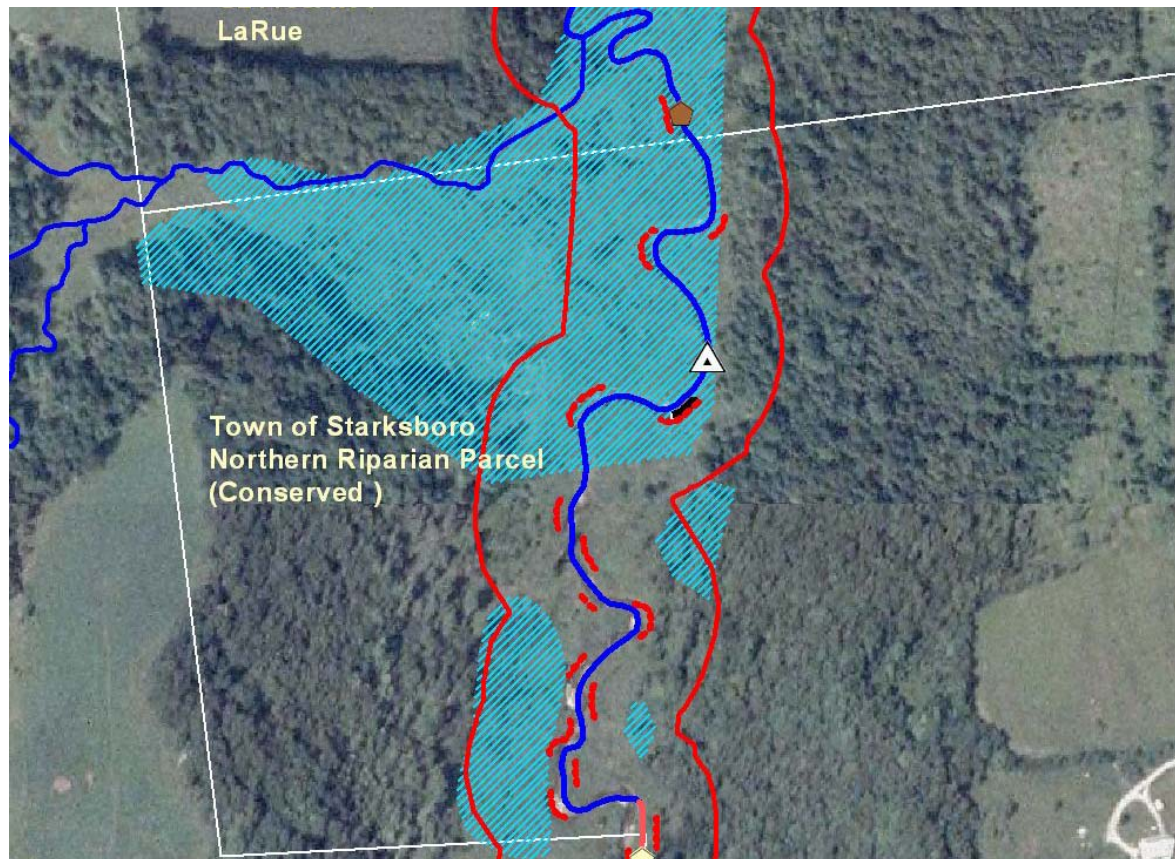


Figure 1. Northern Riparian Parcel, Lewis Creek Reach M17-B.

Starksboro – Reach M17, Segm B – Town of Starksboro Northern Riparian Parcel

Background

The Town of Starksboro Northern Riparian Parcel is approximately 92 acres in area comprised of former Cota Farm lands north of States Prison Hollow Road. These lands were transferred to the Town of Starksboro in December of 1998, along with the Southern Riparian Parcel encompassing portions of Lewis Creek reach M19 south of States Prison Hollow Rd. These two parcels are part of a multi-acre conservation project involving the Town of Starksboro, Vermont Land Trust, and the Vermont Housing Conservation Board. The Starksboro Conservation Commission is primary steward of these lands and Lewis Creek Association partners with the Commission regarding management of the activities that pertain to the Lewis Creek.

A total of 3,200 feet of Lewis Creek frontage is estimated for this Northern Riparian Parcel. The Lewis Creek forms the western boundary of the parcel in its southern portion, and bisects the northern portion of the parcel (See Figure 2).

The 28 July 2003 Management Plan for the Cota Lands Conservation Parcels states that access to the Northern Riparian Parcel “is via a 50-foot right-of-way extending from Green Mountain Cemetery Road on the east” (Town of Starksboro, 2003).

Land uses and long-term commitments within the corridor:

Management goals for the Northern Riparian Parcel, expressed in the Town of Starksboro, 28 July 2003 *Management Plan for the Cota Lands Conservation Parcels*, include:

- “to conserve and protect the public outdoor recreational, scenic, environmental, ecological, cultural, forestry, agricultural and open space resources of the Protected Property”;
- to “provide opportunities for educational activities”;
- to “permit the maintenance of public trails incidental to appropriate public recreational use”, and
- “to conserve wildlife habitats associated with the Protected Property for present and future generations.” (p. 6)

The management plan further outlines that:

- structures are prohibited (p. 7);
- vehicular traffic is prohibited (p. 7);
- “Management will encourage vegetation buffers...by plantings as needed” (p.7).
- “Future efforts at streambank stabilization will likely be limited to planting” (p.8).
- “Since the stream channel in this area meanders in a well defined corridor, no streambank protection measures are anticipated” (p.10).

In summary, the Northern Riparian Parcel “is to be managed primarily to conserve wildlife habitat, maintain or improve water quality, provide education opportunities for local school children and adults, and for non-motorized recreation” (p. 10).

River Corridor Constraints

Historically, the Northern Riparian Parcel was part of the Cota Farm. Former hay and/or pasture use is inferred from review of 1942 and 1962 aerial photographs. Historic channelization is also inferred from review of these photographs. At present, lands along the Lewis Creek corridor in the Northern Riparian Parcel are mostly fallow, and dominated by wetlands (NWI). Short sections of old rip-rap armoring constrain the channel planform to a limited degree. Pockets of rip-rap are being eroded and undermined by active lateral adjustments of the channel.

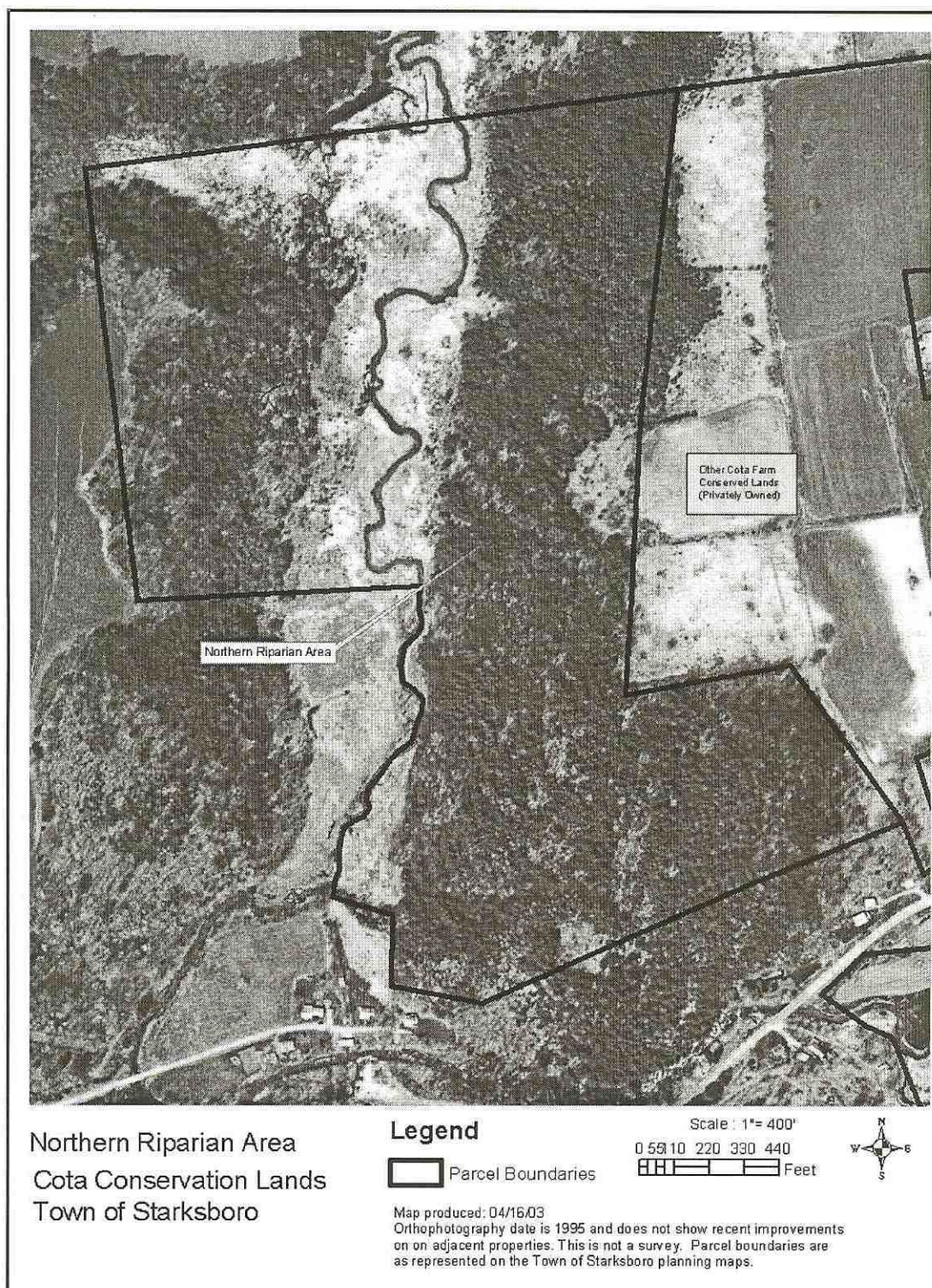


Figure 2. Location of Northern Riparian Parcel, excerpted from Town of Starksboro, 28 July 2003 Management Plan for the Cota Lands Conservation Parcels, Appendix B.

2009-2010 Updates:

Parcel is being considered for inclusion in a proposed accelerated passive restoration project (see writeup under M19, pages 9-10). (September 2009 application to Clean & Clear; possible EPA Section 319 grant application).

In April 2010, various stakeholders involved in managing this parcel (and the other associated parcels conserved with VT Land Trust) attended a meeting hosted by the Starksboro Conservation Commission to keep communication lines open concerning ongoing management of the parcels. Lewis Creek Association attended along with its consultant South Mountain R&CS.

Starksboro C21163AW1 – Reach M17, Segment B – LaRue / Morgan

Landowners: Robbin LaRue, Chris Morgan
Street Address: 4857 VT Route 116, Starksboro

Description: Fallow pasture spanning Lewis Creek, with corn and hay fields in outlying areas from the Creek valley, fronting on VT Route 116. Wetlands contiguous to the Creek. One bankfull-constricting farm bridge crossing, in a state of disrepair.

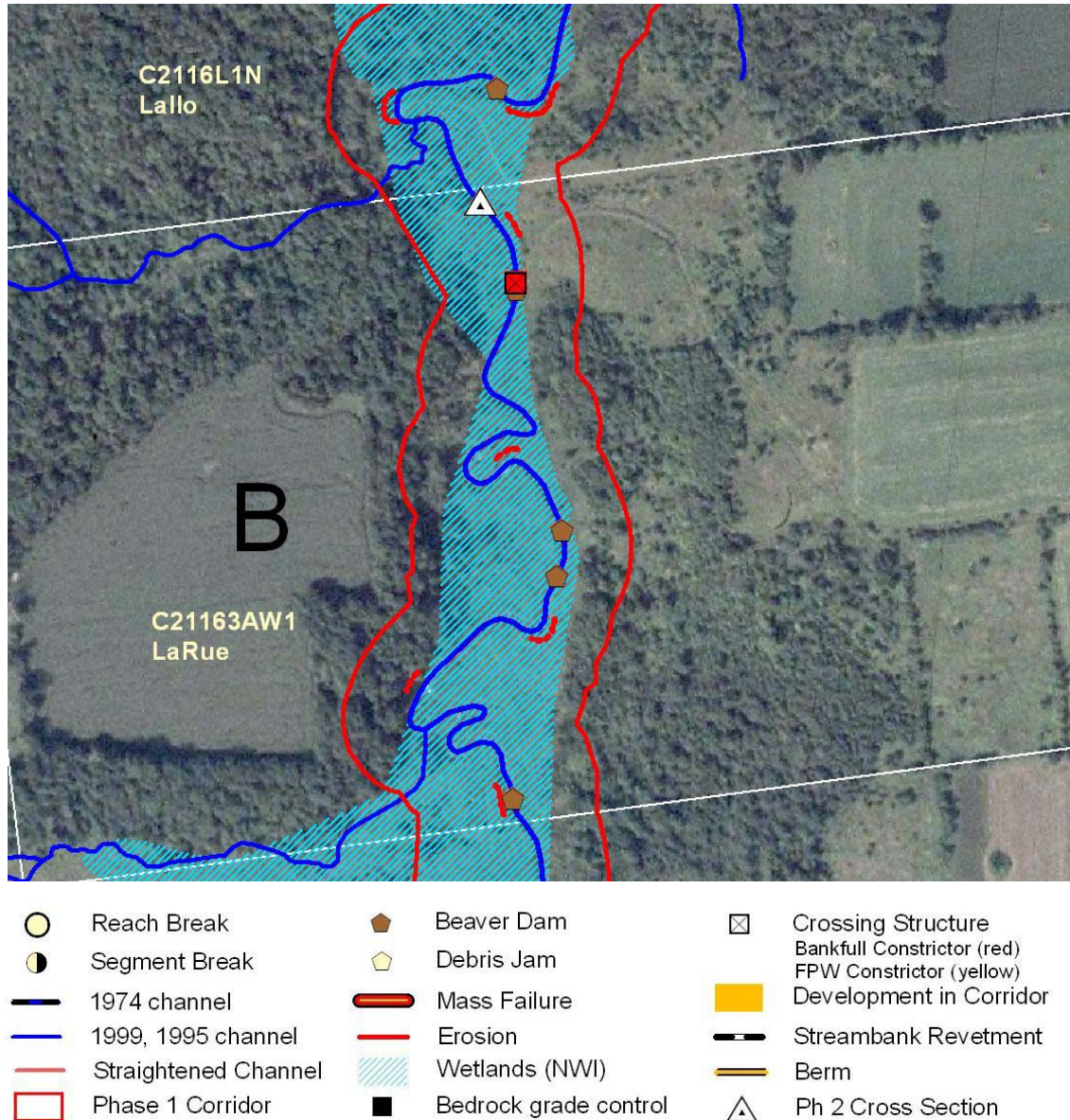


Figure 1. Phase 2 stream geomorphic assessment data for Segment B of reach M17 in vicinity of LaRue property. *White lines indicate parcel boundaries. Base photograph, dated 2003.*

Starksboro C21163AW1 – Reach M17, Segm B – LaRue / Morgan
Reference Corridor Plan, Table 27, Project 6

Background

Kristen Underwood met with Robbin LaRue (9/10/2007) and walked the Lewis Creek from States Prison Hollow Road Ext downstream to the LaRue private bridge.

LaRue and Morgan acquired the property in 1994. Fields are leased to local farmers for corn production (in the western half of the parcel) and hay (in the eastern half). The parcel is enrolled in the current use program. There are no conservation easements on the parcel. Former Cota lands abutting to the south are owned by the Town of Starksboro and have been placed into conservation (easement held by the Vermont Land Trust).

The corridor itself is a combination of forest cover and wetland vegetation. Aside from the bridge crossing, agricultural land uses have not encroached significantly within the corridor in the last several years. Possible historic pasture use was evident on the 1962 and 1942 photos spanning the channel in vicinity of the crossing. Robbin noted that the Shepards farmed the land from the 1940s to the 1980s, and grazed cows in this area (now fallow). Trees have revegetated in the corridor considerably since the 1942 and 1962 photographs.

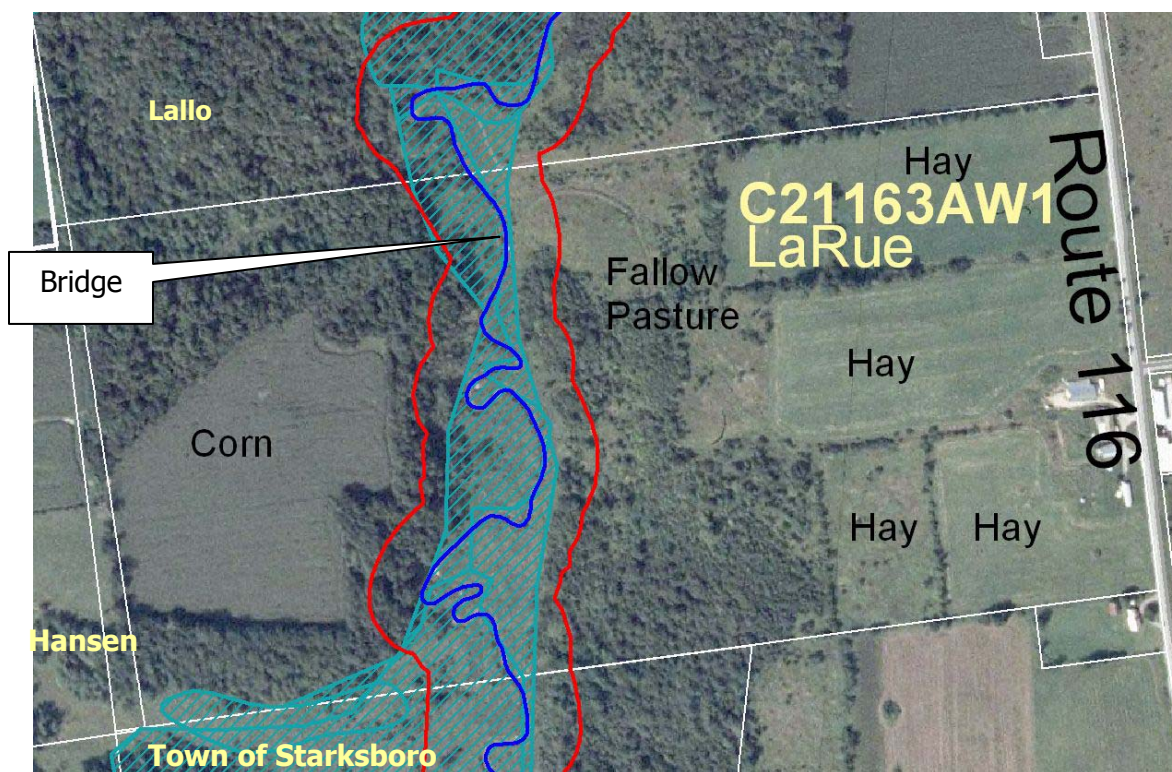


Figure 2. Present land use constraints within the LaRue corridor.
(2003 NAIP base image; red line indicates Phase 1 corridor (SGAT v.4.50); turquoise hatched lines indicate NWI wetlands)

River Corridor Constraints

There is a private bridge crossing near the middle of the property which permits access to fields and forest along the western half of the property from the eastern half which has frontage along Route 116. While secondary access is possible to the western half of the property across private lands from States Prison Hollow Road, there is no deeded right-of-way or other legal access through these private lands from States Prison Hollow Road. At present, the bridge is used primarily for private recreation, but Robbin and Chris would like to restore the bridge to a condition which could support farm vehicles.

The bridge is constructed of wooden planking over steel I-beams supported on a laid-up stone abutment (right bank) and a concrete abutment (left bank). The approximate bridge span is 18 feet, and clearance to the stream bed is approximately 6.3 feet (measured September 2002). This crossing is significantly undersized with respect to the reference bankfull width (52.2 feet) and the measured bankfull width (33.7 feet). A downstream scour pool was observed in Sept 2002. On 10 September 2007, a beaver dam was present within 3 feet upstream of the bridge. Debris from spring runoff (according to Robbin) was observed on the deck of the bridge. The bridge is in considerable disrepair. Several small sticks have been placed between remaining wooden planks. Robbin suspects this has been done by area residents who use the bridge (against her and Chris' wishes) to access the property with ATVs. Robbin expressed concern for riders' safety and will be talking with their neighbors – there is also concern for liability.



Figure 3. LaRue private bridge,
Reach M17, Segment B
10 September 2007

Land uses and long-term commitments within the corridor:

As present land owners, Robbin and Chris do not foresee future encroachments within the corridor – other than improving the existing crossing to support farm vehicle access to the western side of the property. They would like not to constrain their abilities in the future to possibly farm more intensively and/or build a home(s) on the property (outside the corridor).

Current Concerns of the Landowner

Robbin expressed concerns for overall health of the river. She would like to learn more about the geomorphic conditions, as well as overall ecology of the full parcel. (They have seen black bear, deer, beaver, porcupine, wild turkey, ducks, geese. We observed a heron, and deer and raccoon tracks on 10

September, as well as several beaver dams, beaver slides, and trails up into the adjacent woods). She would be very willing to have a UVM or Middlebury student(s) study the parcel and offer suggestions for wildlife management, invasives management, etc.

We encountered many items of household and farm rubbish in the river (much more than Kristen recalls from walking the river in 2002) - several tires, pottery and glass shards, plastic bottles and bags, one drum, etc. We speculate that the large mass failure and road collapse that occurred last year along the States Prison Hollow Road may have “liberated” a household or farm dump. A river cleanup day with LCA volunteers would be appreciated, if at all possible.

Most importantly, they would like to rehabilitate the bridge crossing. She understands that a wider span and higher clearance of the bridge crossing would be less constricting for the river, and would improve longevity of the bridge – but would also involve more resources than they have typically been able to invest in maintenance of the bridge. They would appreciate any technical / financial assistance that might be available.

River Corridor Alternatives Acceptable to Landowner

Robbin stated that she and Chris are open to many possibilities. She would like to see the river restored to its historic condition and encourage practices that would support a diversity of wildlife. She would prefer private over public access to the property, discouraging hunting (through posting) and ATV access. As present landowners, they are committed to supporting a passive geomorphic approach and preserving sediment and nutrient attenuation functions offered by the ample floodplain connection and channel-contiguous wetlands. They would be open to hearing more about possible conservation options.



Figure 4. View upstream (south) from center of LaRue property; beaver dam in foreground; Hogback Mountain in background.



Figure 5. View upstream (south) from vicinity LaRue private bridge.

2009-2010 Project Development

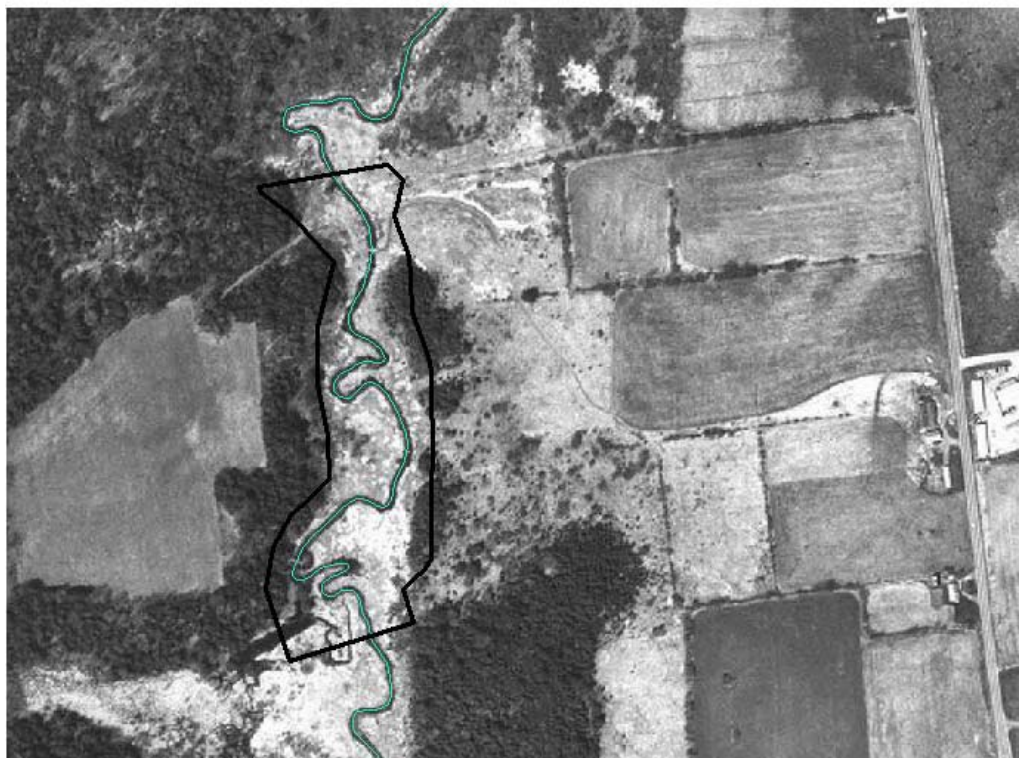
The LaRue property is a candidate for potential conservation through the VT River Conservancy. A draft delineation of the river corridor easement boundary has been generated by the VT River Management Section (see next page). The approximate easement area is 12.6 acres. On 12 February 2010, Marty Illick (LCA) and Kristen Underwood (SMRC) met with Robbin LaRue to discuss potential opportunities for riparian easement with the VT River Conservancy. Robbin indicated interest in learning more, and meeting with Steve Libby of the VRC, and submitted a letter of commitment.

Under FY2010 Clean & Clear funding through the LCA, VRC will evaluate the LaRue property in 2010. To the extent feasible, evaluations will also include a review of ecologically sensitive features and natural communities in the hopes of identifying additional state, federal and local partners (e.g., VFW Landowner Incentive Program, USDA WHIP) that could enable conservation of lands outside of and contiguous to the riparian corridor. A key element of this potential conservation project will include improvement of the deteriorating farm bridge on the property – to enable farm equipment access to fields on the western half of the property, but also to improve fish and aquatic organism passage and geomorphic compatibility of this structure which is undersized with respect to the bankfull width and of very low clearance.




Peter Lossmann of NRCS was contacted on 28 August 2009 with regard to potential NRCS programs that may be able to support design/ reconstruction of the bridge. Pete indicated that such a project may be able to be funded through WHIP, but probability is low.

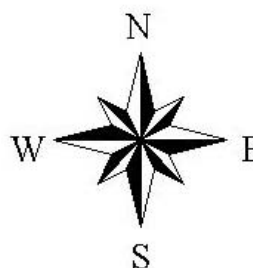
The Nature Conservancy walked the property on 12 June 2009 as part of a field-truthing exercise for refinement of their Active River Area modeling project.

Larue Draft River Corridor Easement



500 0 500 1000 Feet

 Larue2.shp
 FEH01SWFEH.shp
 S06rpts.shp



*Proposed river corridor easement received from Shannon Pytlik, VT River Management Section,
3 February 2010, Approximate corridor acres = 12.7ac.*

Starksboro B21166E – Reach M16 – Clifford

Landowners: Clifford, Eric
Street Address: 6147 VT Route 116, Starksboro, VT 05487

Description: Dairy farm lands spanning Lewis Creek. Mixture of forest, corn fields, hay fields, and pasture land uses comprising the corridor. Wetlands (NWI and prior-converted) contiguous to the Creek.

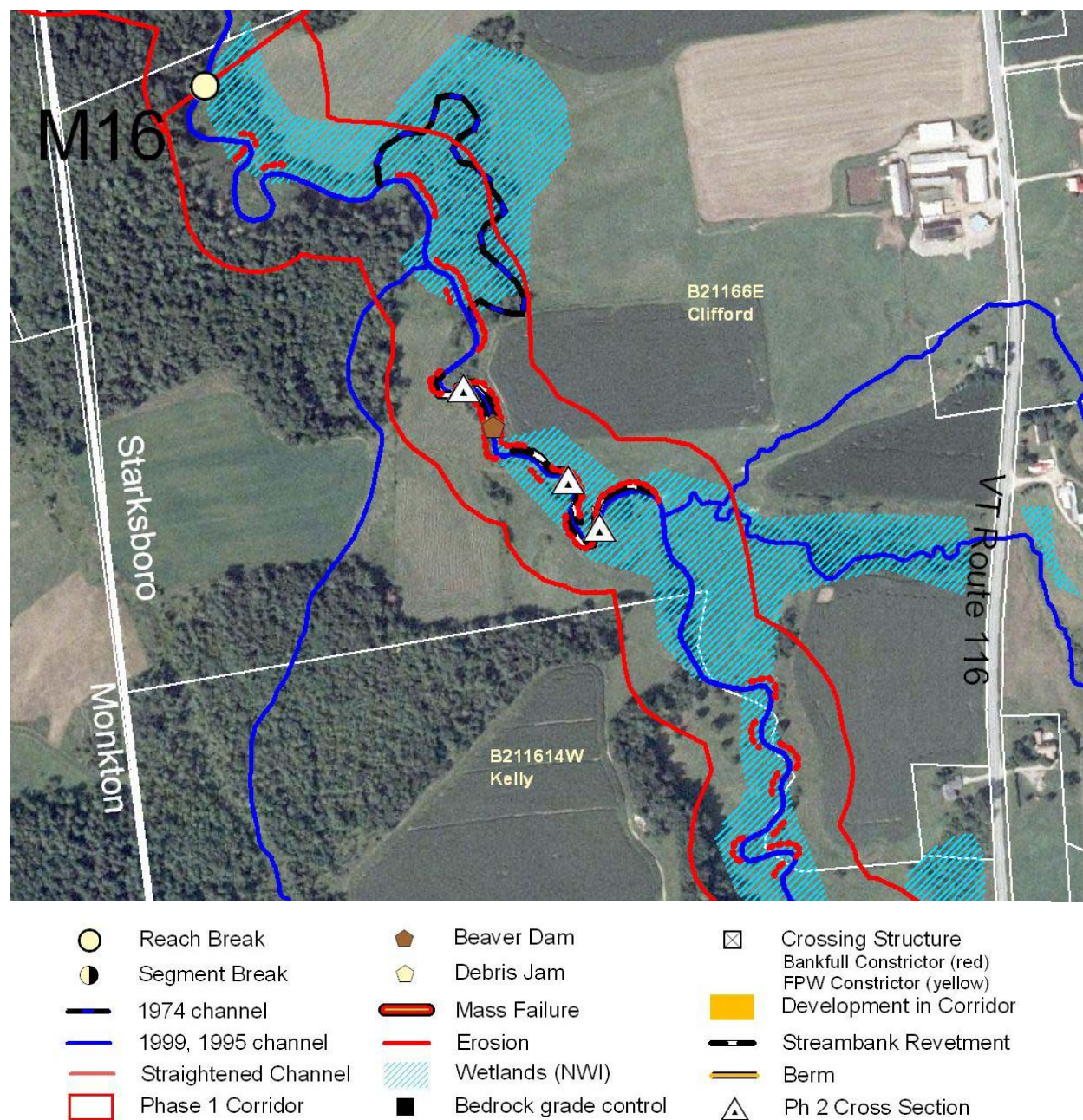


Figure 1. Phase 2 stream geomorphic assessment data for reach M16 in vicinity of Clifford property. White lines indicate parcel boundaries. Base photograph, dated 2003.

Starksboro B21166E – Reach M16 – Clifford Farm
Reference Corridor Plan, Table 27, Project 9

Background

The Clifford farm along Lewis Creek is located west of Route 116 in the town of Starksboro (see Site Location Map, Attachment 1). Unstable streambanks have been a concern at this site for several years; stream bank erosion has been exacerbated by direct pasturing of cattle, beaver activity, and lack of forested riparian buffers. The site has undergone several phases of restoration from 2001 to 2005 involving the participation of the landowner and several partner groups including the Natural Resource Conservation Service, US Fish & Wildlife, Lewis Creek Association, Youth Conservation Corps, the University of Vermont and local school groups. Restoration activities have included: installation of cedar revetments, installation of willow waddles, planting of acorn seeds, and planting of tree seedlings (see Table 1 for a summary and timeline of major restoration efforts). Pastured livestock (dairy cattle) had direct access to the stream until 2007 when fencing was installed under a CRP / CREP project. Access to the Lewis Creek is now limited to one stabilized equipment / livestock crossing located in the middle of the parcel.

VT Agency of Natural Resources, in partnership with Lewis Creek Association, conducted a Phase 1 and Phase 2 Stream Geomorphic Assessment of the Clifford site in August of 2001 (VTDEC, 2003). At that time two prominent meander bends at the Clifford site had been treated with cedar revetments by NRCS earlier in the Summer (see Meander Bend A and B in attached Map 1).

The second geomorphic assessment was conducted by LCA in May/June of 2005 using then current Phase 2 and Phase 3 (survey-level) protocols. In the intervening years between the two geomorphic assessments, NRCS and partners had installed cedar revetments on both banks along a majority of the site, cows had been fenced out of the Creek, a minimum 35 foot buffer had been established along the right bank of the Creek (facing downstream) along the western boundary of the Clifford corn field, and tree seedlings had been planted along the right bank buffer area (approximately 0.7 acre). These features are depicted on the attached 2001-2005 Restoration Map (Map 1).

By 2005, erosion along the prominent meander bends treated in 2001 was mostly healed and these banks were no longer actively slumping (see Figure 2). Conversely, erosion along other segments of restored streambank was active, and seedlings planted in 2003 were being carried on slump blocks into the channel (see Figure 3). Based on the width of these slump blocks, lateral migration was estimated at 2 to 3 feet in two years. It should be noted that some of these slumping banks (but not all) were associated with the location of a breached beaver dam, and beaver impoundments and activities may have compromised the effectiveness of the revetments in some areas.

Soils along the streambank and bed of the Lewis Creek are somewhat cohesive, but highly erodible. Medium brown and gray fine sands with silt and clay were noted along streambank profiles sampled in May 2005 (see Table 1). Underlying these sands is a layer of varved clays at depths typically submerged below Summer low water levels. Cross section profiles completed during a Phase 3 survey in June 2005 indicated that the dominant streambed material was fine to medium gravel, and all streambed particle sizes observed appeared to be mobile in a bankfull or higher-magnitude flow event.

Peter Lossmann of the NRCS noted that between 2001 and 2005, pools had scoured to underlying clays along the extent of restoration (interview, 11 May 2005). Mr. Lossmann theorized that installation of cedar revetments may have increased roughness elements along the channel margins, and translated erosive energies into downward vertical scour. Several exposures of varved clays were noted in pool features along the profile of the Clifford site in 2005 geomorphic assessments. Clay was noted in 2001

also, but the accuracy of location and elevation data were not sufficient in the two assessments to quantify vertical or lateral adjustments.



Figure 2. Meander Bend A at Clifford site (reference Map 1). (Above) - meander in August 2001 exhibiting active slumping and erosion; note cedar revetments along water line. (Right) - meander in May 2005, erosion mostly healed.



Figure 3. Active bank slumping noted May 2005 along banks treated with cedar revetments in 2003.



On some streambank sections (for example on approach to Meander Bend B in Map 1), the cedar revetments installed in 2003 were noted to be laterally outflanked (Figure 4). This bend is one of four bends along the profile that have radii of curvature much less than regime equations would predict for the given channel width (see Attachment A). Meanders are continuing to broaden and migrate, and the radius of curvature calculations detailed in Attachment A indicate those tighter meander bends (i.e., ones with very small radius of curvature) can be expected to erode more severely than others along the profile. Such increased erosion on approach to this tight meander bend may have contributed to lateral outflanking of the cedar revetments. It is also possible that vertical scour would have lead to undermining of the revetments in this location.



Figure 4. View upstream from Meander B in Map 1 (May 2005). Cedar revetments along right bank (facing downstream) installed in 2003 were laterally outflanked. Background: volunteers installing willow waddles along top of cedar revetments.

Based on these observations, and in consideration of the geomorphic information made available by Lewis Creek Association and the VTDEC River Management Section, NRCS began to recognize the importance of corridor protection at this highly-sensitive site experiencing increased lateral adjustment and sedimentation. Active restoration techniques were traded for a more passive approach – i.e., stepping back from the river banks with the more intensive pasture and cropping uses and providing a considerably-wide corridor within which the river can begin to seek a more balanced planform, profile and dimension. In the process of unconstrained meander extension, the Lewis Creek will be gaining length, reducing its slope, reducing the erosional energies, and building more point bar areas for sediment deposition.

The concept of corridor easements to protect a meander beltwidth (6 to 8 times channel width area) surrounding the channel was discussed with the Cliffords. In the end a narrower protected area was identified as a compromise (see Map 3), but the riparian buffer is still greater than the minimum called for under Acceptable Agricultural Practices or traditional CRP agreements.

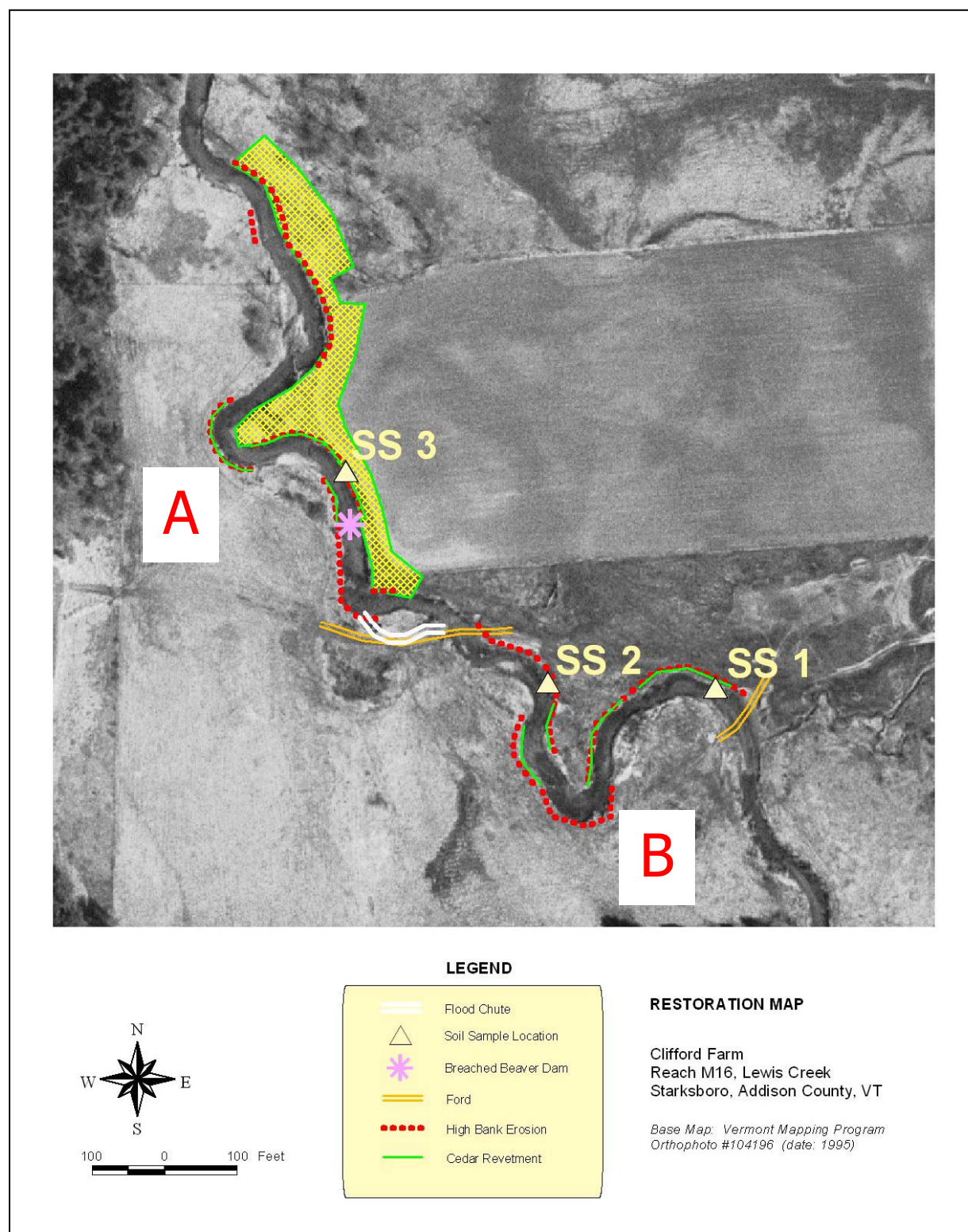
Livestock have been excluded from the channel, except at a single, stabilized equipment / livestock ford. Alternate watering sources have been established for the cattle. A riparian buffer has been established along more than 1000 feet of the channel that ranges in width from 35 to more than 100 feet in many

places (see Map 4). Active cropping and pasturing no longer occurs within this buffer area. Essentially the corridor area will remain undisturbed. These actions will reduce *E. Coli*, nutrient, and sediment impacts to Lewis Creek – both by substantially reducing direct fecal inputs to the Creek and streambank trampling, as well as by reducing the legacy of phosphorus and other nutrients to floodplain soils within the corridor, which may be subject to erosion in the future as the river adjusts to regain a more balanced condition.

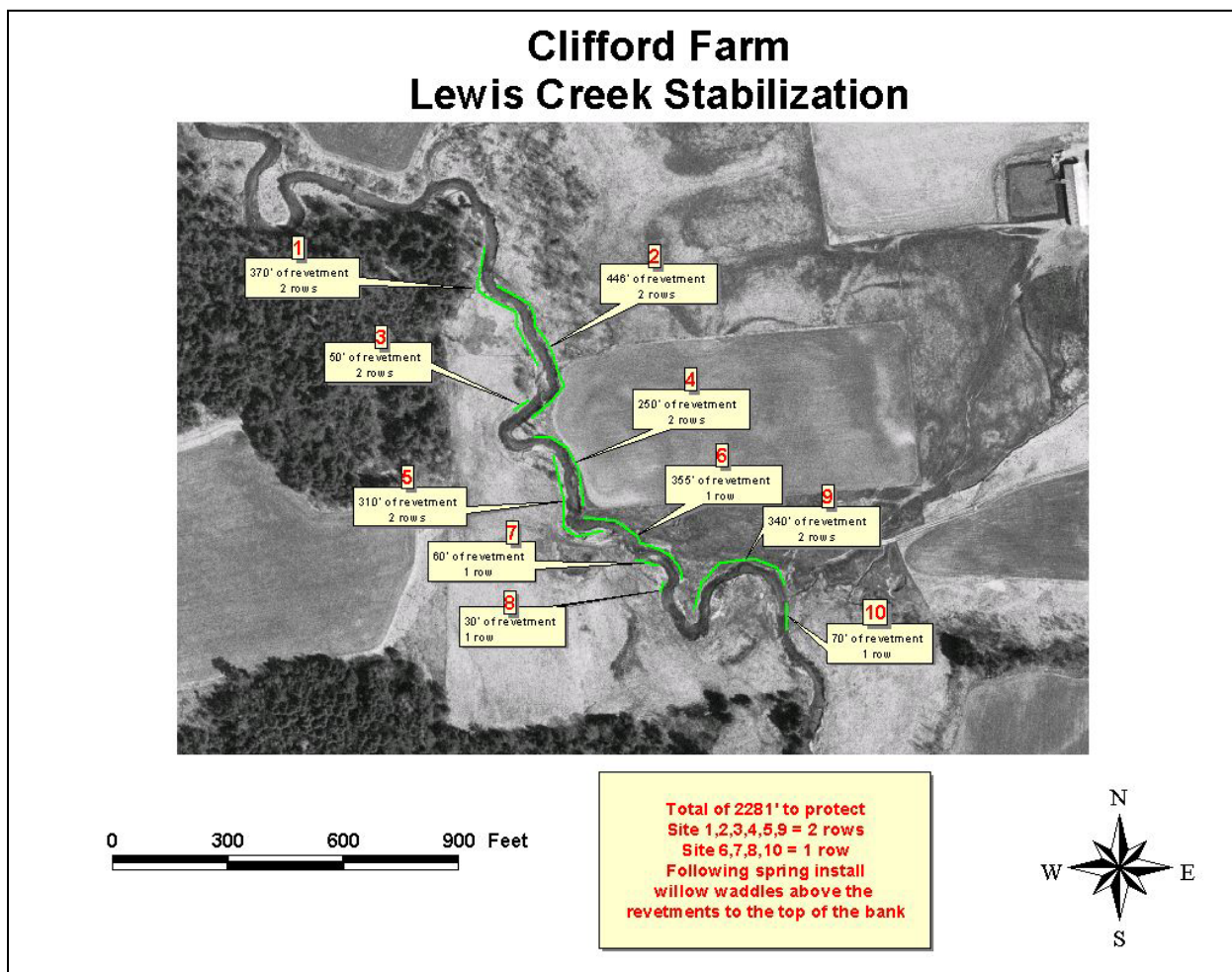
From 2001 through 2007, a series of seed and sapling, tree and shrub plantings has been implemented by the Cliffords, assisted by NRCS, USFW (Partners for Wildlife), UVM students, CVU students, Hannaford Technical Center students, Stark Mountain Woodworking of New Haven, The Nature Conservancy, and the Lewis Creek Association. These plantings will gradually mature into a forested buffer, offering greater roughness along the channel margins and further slowing the rate of lateral channel adjustments.

**Table 1. Restoration and Assessment History
Clifford Farm, Reach M16, Lewis Creek, Starksboro, VT**

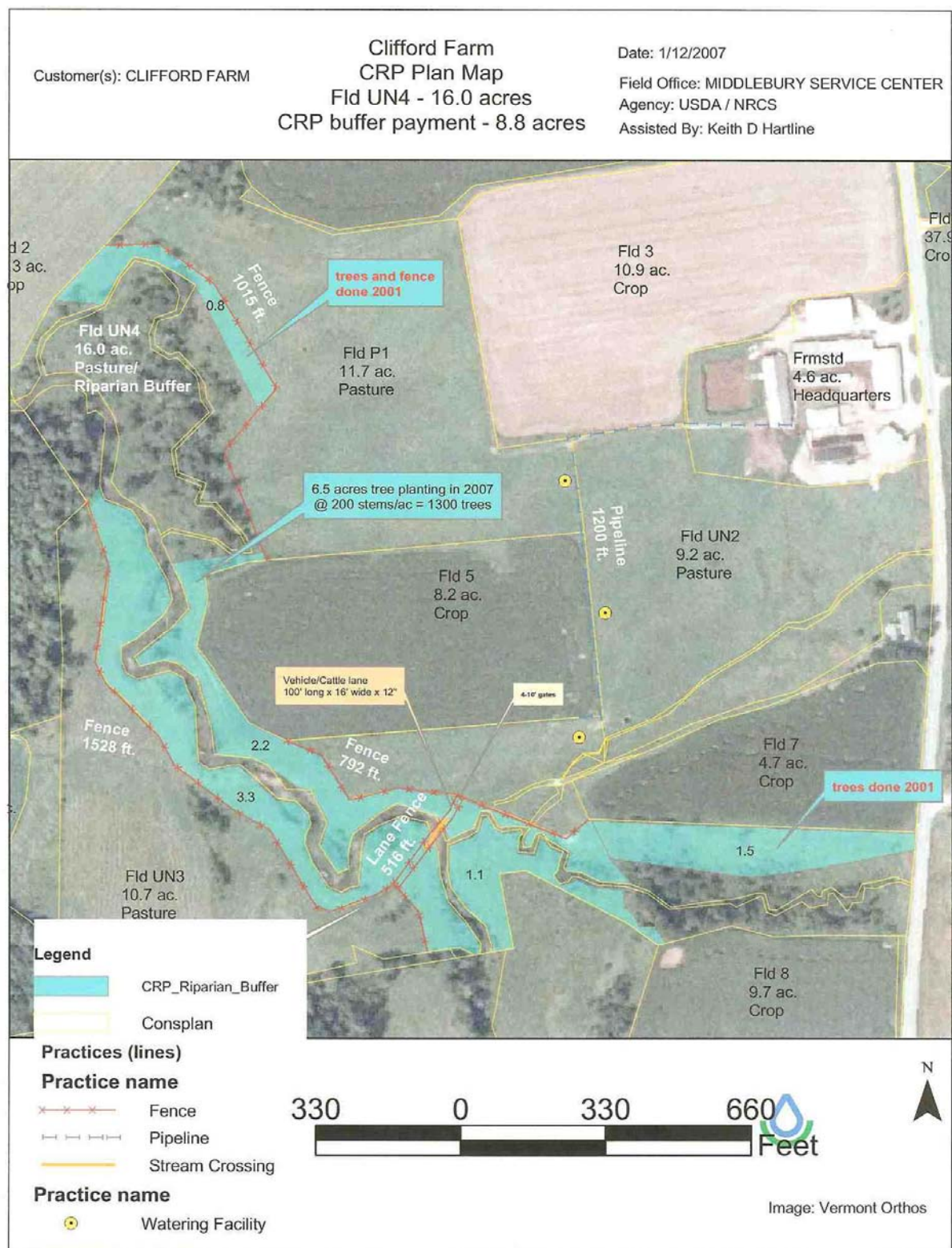
Year	Left Bank	Right Bank	Description	Partners
Fall 2001			Acorn seed planting April 2003 assessment by NRCS showed 90% germination	NRCS, LCA
2001	X		Cedar revetments, outside meander bend of two tight meanders (Sites A and B on Figure 2-1. Restoration Map).	NRCS, YCC
2001 (23 August) Phase 2 Stream Geomorphic Assessment – VTDEC River Management Section				
2002		X	Tree plantings – bare root trees/shrubs – 220 plants/Ac April 2003 assessment by NRCS showed 70% survival	NRCS, LCA UVM –Watzin/Keeton
2003	X	X	Cedar revetments on all but Sites 9 & 10 (see Figure 2-2: Sept 2003 NRCS Map “Clifford Farm: Lewis Creek Stabilization”)	NRCS
2004		X	Cedar revetments at Sites 9 & 10	NRCS
2005 May 11		X	Stream-co willow waddles – 2 rows above revetments at sites 9 & 10	NRCS, LCA, Bill Scott & Hannaford technical center students
2005 (11 May) Streambank Composite Soil Sampling for Total Phosphorus content – Lewis Creek Association				
2005 (11 May, 24 June) Phase 2 and Phase 3 Stream Geomorphic Assessments – Lewis Creek Association				
2007 April	X	X	1300 seed plantings – trees and shrubs – starting from fence line and working toward the river, both left and right banks.	NRCS, USFW, (Partners), LCA, Stark Mountain Woodworking, UVM (Gund Institute students), CVU students (Environmental Club), TNC (supplied seeds)
2007	X	X	Fence line and stabilized stream crossing installed (see 2007 Clifford Farm CRP Plan Map)	NRCS



Map 1. 2001-2005 Restoration Map of Clifford Farm, Reach M16, Lewis Creek.
Notes: Site A and B indicate large left-bank meander bends that were first treated with cedar revetments in 2001 (NRCS). Yellow hatched pattern denotes areas of tree plantings and buffer established, 2003. Map prepared by South Mountain Research & Consulting from observations on 11 May 2005.



Map 2. NRCS Revetment Plan, Clifford Farm, Reach M16, Lewis Creek.
Map prepared by NRCS – Middlebury (Keith Hartline)



Map 3. 2007 Clifford Farm CRP Plan Map, Reach M16, Lewis Creek.
Map prepared by NRCS – Middlebury (Keith Hartline)

Attachment A. Radius of Curvature Data

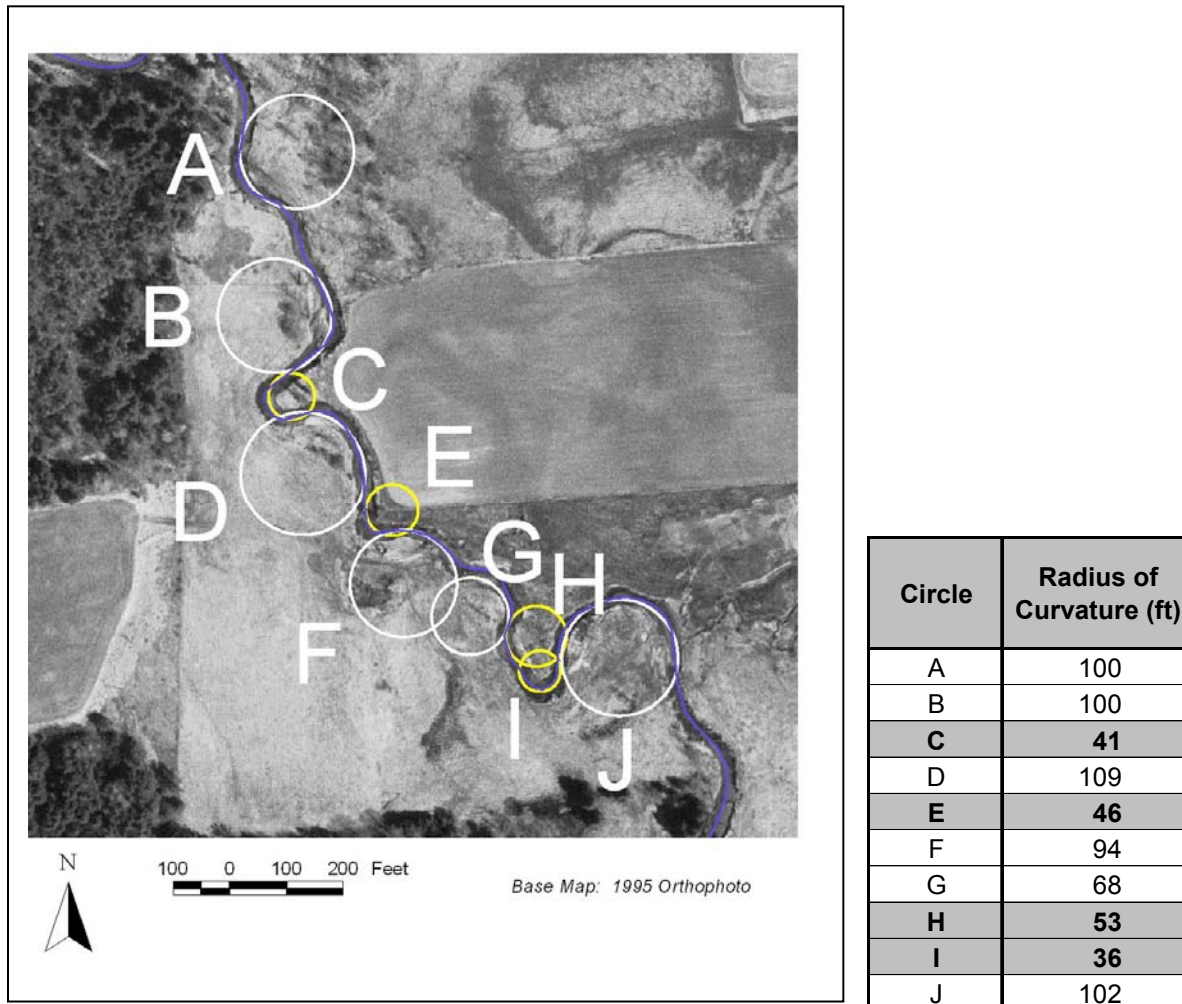


Figure A-1. Radius of Curvature of meander bends at Clifford project site, Reach M16, Lewis Creek.

Blue line indicates center line of Lewis Creek channel (1995). Circles approximate the radius of curvature of individual meander bends along the channel platform. Circles highlighted in yellow (C, E, H, and I) indicate a meander radius of curvature that is undersized with respect to predicted radius of curvature for the indicated channel width, based on equation from Williams, 1986 (see Table A-1).

Tight meander bends at the location of yellow-highlighted circles would be expected to exhibit excess erosion, and potential for neck cutoffs. Restoration along the outside of these meander bends would not be advised given the high potential for lateral and/or vertical undermining of the structures during continued erosion. Similarly, buffer plantings along the outside of these undersized meander bends should be cautioned as investments in the corridor and along the bank may be compromised by the continuing erosion.

Table A-1. Radius of Curvature Calculations, Reach M16, Lewis Creek.

Reach	Width _{bklf} (feet)	Source	Radius of Curvature		
			Williams Eq. 33	Range, Williams (SD)	
			Radius of Curvature Predicted (ft)	Low (ft)	High (ft)
M16	60.6	Phase 1 (regime)	129	84	200
	44.0	Cross Section (XS-1)	90	59	140
	68.6	Cross Section (XS-2)	148	96	230
	56.3	Cross Section (XS-3)	119	77	184
	42.0	2001 Phase 2	86	56	133
	42	Low	86	56	133
	69	High	148	96	230
	54	Average	114	74	177

Reach	Width _{bklf} (meters)	Source	Radius of Curvature		
			Williams Eq. 33	Range, Williams (SD)	
			Belt Width Predicted (ft)	Low (ft)	High (ft)
M16	18	Phase 1 (regime)	39	26	61
	13	Cross Section (XS-1)	27	18	43
	21	Cross Section (XS-2)	45	29	70
	17	Cross Section (XS-3)	36	24	56
	13	2001 Phase 2	26	17	40
	13	Low	26	17	40
	21	High	45	29	70
	17	Average	35	23	54

From Williams, 1986; *Journal of Hydrology*, 88 (147-164).

Equation 33: Radius of curvature, $R_c = 1.3 \cdot W^{1.12}$ (in feet); applicable Width (W) range (4.9 to 7,000 feet); 79 data points, worldwide; Sample correlation coefficient of 0.97; Standard Deviation of -35 % to +55 %.

Starksboro B25L5S – Reach M15, Segment B – Padua and Cobble Creek Nursery

Landowners: Padua, John & Patricia
Street Address: 991 Tyler Bridge Road, Starksboro
Mailing Address: 991 Tyler Bridge Rd, Bristol VT 05443

12/7/2007 – 12:00 Noon Meeting with John Padua
Attending: Kristen Underwood, Marty Illick
Reference Corridor Plan, Table 27, Project 10

Background

The Padua's own land along the southwest side of Lewis Creek in the towns of Monkton and Starksboro (Figure 1). A parcel north of the Tyler Bridge Road was acquired circa 1999; the western boundary of this recently-created lot is not depicted by the (somewhat outdated) parcel boundaries on Figure 1. Padua lands include approximately 1,900 feet of frontage along the Lewis Creek including the vicinity of the Hollow Brook confluence. The Lewis Creek corridor (Phase 1) on Padua lands is partly forested and partly agricultural. The Padua's operate Cobble Creek Nursery – a wholesale tree and shrub nursery that includes both container stock and field stock. Tyler Bridge Road crosses the Lewis Creek between separate parcels of Padua land. Nursery stock is maintained on both sides of the road along the Lewis Creek left-bank floodplain. No structures are present in the Padua corridor, except for incidental sheds associated with the nursery operations. The Padua house, accessed from Tyler Bridge Road, is on a knoll which is elevated approximately 25 feet above the Lewis Creek and located just south of the left-bank corridor along the Creek.

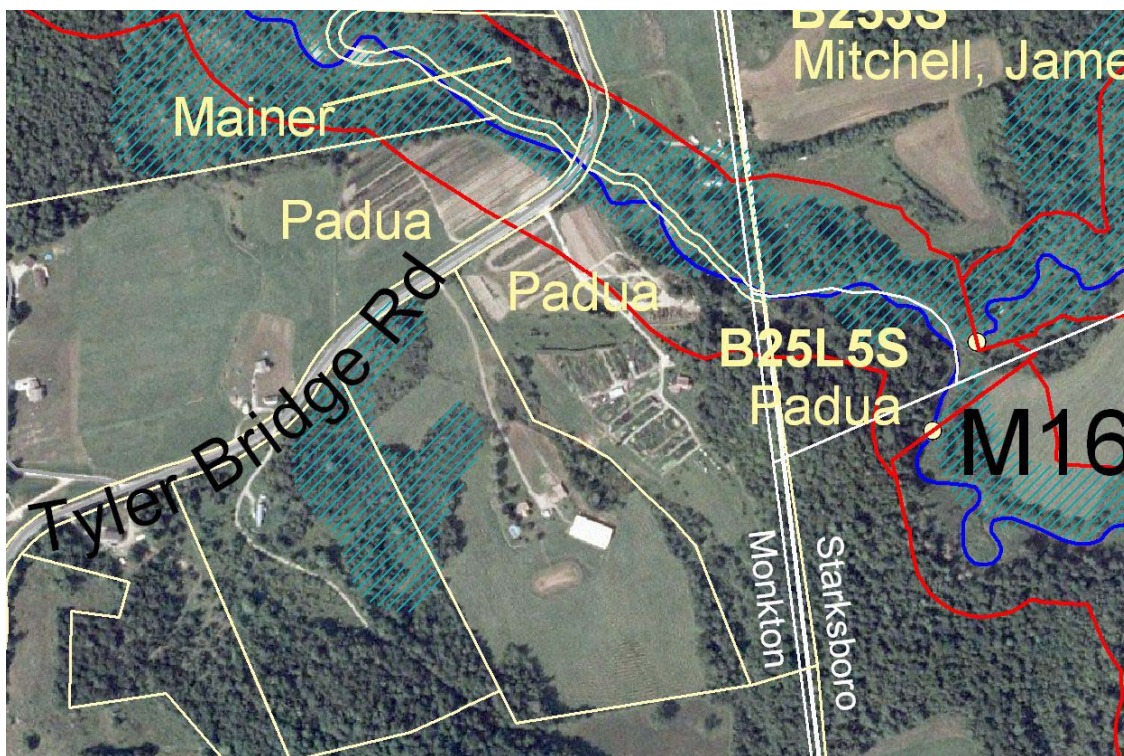


Figure 1. Padua property, Tyler Bridge Road, Monkton, Starksboro, VT (2003 NAIP base image; red line indicates Phase 1 corridor [SGAT v.4.50]; turquoise hatched lines depict NWI wetlands; white lines are Monkton and Starksboro approximate parcel boundaries [not current]).

River Corridor Constraints

(bridges, roads, buildings, agricultural structures and land uses)

- Current constraints:

There are minor structures (semi-permanent sheds) associated with the nursery currently located within the Lewis Creek corridor on Padua lands. The Tyler Bridge Road crosses the Lewis Creek corridor between Padua parcels; a bridge crossing conveys the road over Lewis Creek. The span of the bridge (62 feet) is slightly wider than the reference bankfull width (55.5 feet) and measured bankfull width (57.3 feet) of the channel (SMRC, 2007).

- Land uses and long-term commitments within the corridor:
(e.g., farming practices, public access, lands carrying easements)

Approximately 3.8 acres of tree / shrub nursery container and field stock are located within the Lewis Creek corridor (GIS estimate). The northern Padua parcel, according to John Padua, is a permitted building lot; the likely building envelope is located on the highest ground straddling the Phase 1 corridor (see Figure 2).

Current Concerns of the Landowner

(e.g., flooding losses, erosion, upstream land uses, etc.)

John Padua noted that they are strong supporters of efforts to protect river health and water quality. In the 1980s, family members used to catch 16- to 19-inch brown trout. Today, they notice increased sedimentation in the Creek, and area fishing is reportedly not as prolific as it once was.

They have observed beaver activity periodically. On occasion, the beavers have dropped large trees in the river, which have then locally altered the flow patterns and lead to some increased streambank erosion. In the past, they have paid to have beavers trapped and removed from the area, due to loss of nursery stock by beaver harvesting.

There have been two moderate flood events in the time that they have lived along the Creek; one approximately 10 years ago; and a second in January 2006. No major erosion losses were incurred by the Padua's.

Their past interest in possible conservation options (through VLT) was tempered by the fact that conservation agreements tended to limit or prevent horticultural activities (e.g., removal of top soil) within close proximity to the river. Their nursery operations depend on the ability to grow trees and shrubs in the organically-rich, well-drained floodplain soils – and remove the topsoil (e.g., dig up young trees/shrubs supporting the root ball with native soils). We discussed that conservation options through other programs (e.g., VT River Conservancy, USDA CRP program) may now allow for more flexibility in that regard, provided that their nursery operations (or other future plans for their lands) can accommodate an adjusting river and no structures in the corridor.

Kristen Underwood brought up the small gully erosion occurring along the left-bank of the Lewis Creek immediately upstream of the Tyler Bridge Road. John Padua noted that this small channel has begun to widen and deepen considerably in the last couple of years. He surmises that it is related to tributary drainage that has been diverted from a driveway culvert site on neighboring lands to the southwest owned by the Frye's. He and the Frye's have noted that the Frye driveway culvert has become blocked with sediment and debris, and a portion of the drainage from an intermittent tributary that previously drained to the northwest to a Tyler Bridge Road culvert and ditch along the western boundary of the northern Padua parcel, instead now is diverted to the Padua nursery lands. This diverted flow is picked up by drainage patterns within the nursery and is ultimately delivered to the small channel which joins the Lewis Creek just upstream of the Tyler Bridge Road (Figure 2).

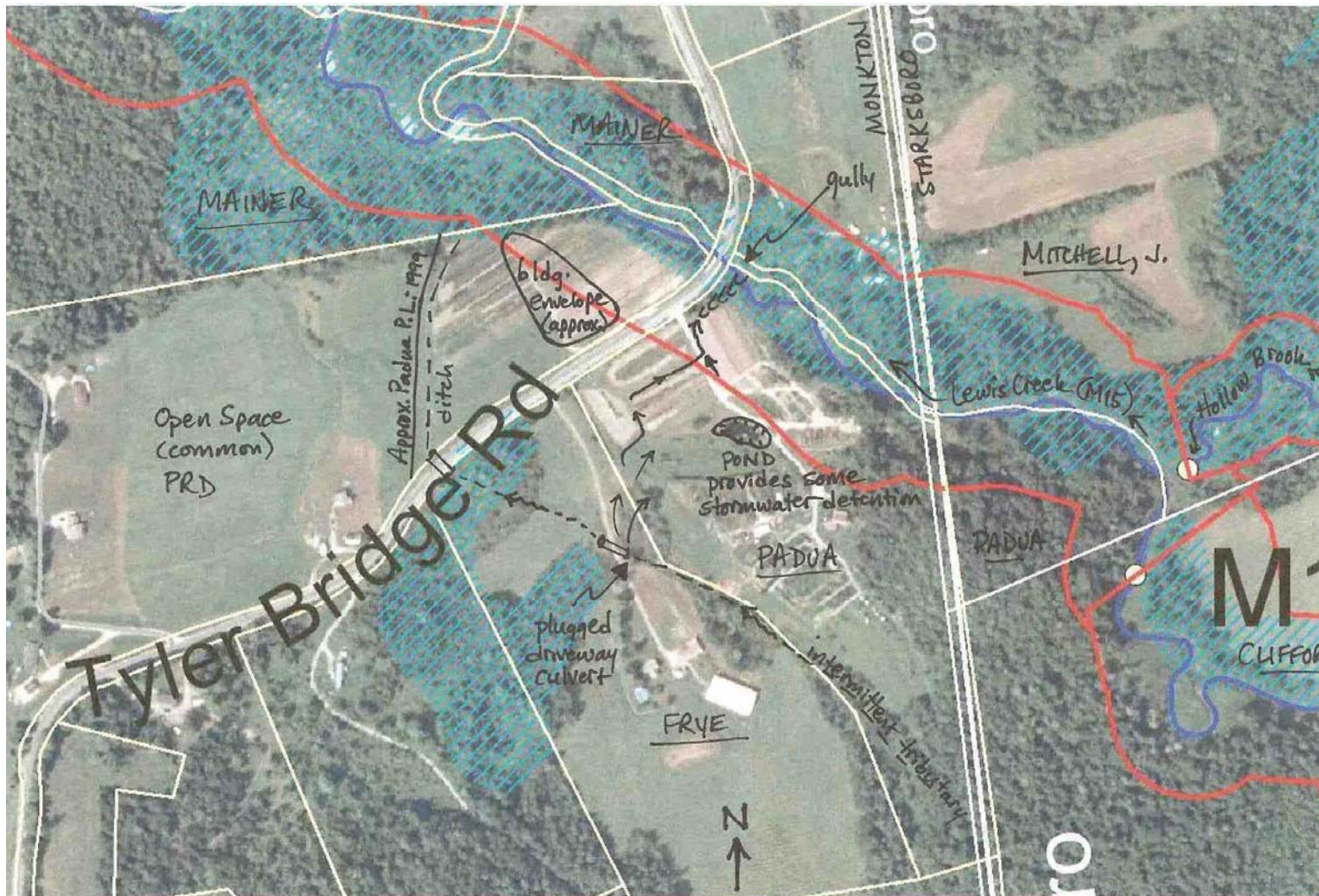


Figure 2. Drainage features in vicinity of Padua property (notes from 3 Dec 2007 meeting w/ John Padua – not field-verified). (2003 NAIP base image; red line indicates Phase 1 corridor [SGAT v.4.50]; turquoise hatched lines depict NWI wetlands; white lines are Monkton and Starksboro approximate parcel boundaries [not current]).

We discussed that changes to local drainage patterns may have increased flows to this small channel to a degree that may have exceeded thresholds for erosion – contributing to the head cuts and development of gully erosion noted in this small channel. Mr. Padua stated that they irrigate only minimally at the nursery – typically during very dry conditions. During those times, much of the irrigation water is absorbed at the tree sites, and little runoff is produced. The upper fields (at the southern extent of the nursery) drain to the north, and a small pond provides some detention of flows. John Padua will contact Pete Lossmann at NRCS to see if a USDA program might be available for technical and financial assistance to resolve this drainage issue. We advised that River Corridors Program or other funding might also be available for local match, or for related efforts on non-agricultural lands (e.g., at the Frye culvert).

River Corridor Alternatives Acceptable to Landowner

(Based upon geomorphic data, corridor constraints, and local needs.)

John Padua stated that he and his wife would be open to hearing more about possible conservation options, and would like to review a copy of the corridor plan. They would also be open to discussing possible opportunities for technical and funding assistance through either the NRCS or River Corridors Program to resolve the stormwater drainage issues on their property and the neighboring Frye property to reduce the gully erosion along the southeast side of Tyler Bridge Road. The Padua's would like to preserve the potential for developing a building on the northern Monkton parcel.

2009 Project Updates

Peter Lossmann (NRCS- Middlebury) and Kristen Underwood (SMRC) visited the Cobble Creek Nursery on 27 August 2009. John Padua stated that wet conditions in 2008 and especially in spring/ summer of 2009 have exacerbated drainage issues along the intermittent tributary/ drainage swale that passes through his nursery. The gravel driveway has been overtopped and washed out several times, and the headcut at the top of the gully has worked upstream revealing a buried phone line (at clipboard in Figure x-b). A buried power line is reportedly also in close vicinity of the phone line, but has not yet been exposed in the gully.



a



b

Figure 3. Location of headcut at transition from intermittent drainage swale to gully to Lewis Creek, view upstream. (a) 29 November 2006; (b) 27 August 2009.

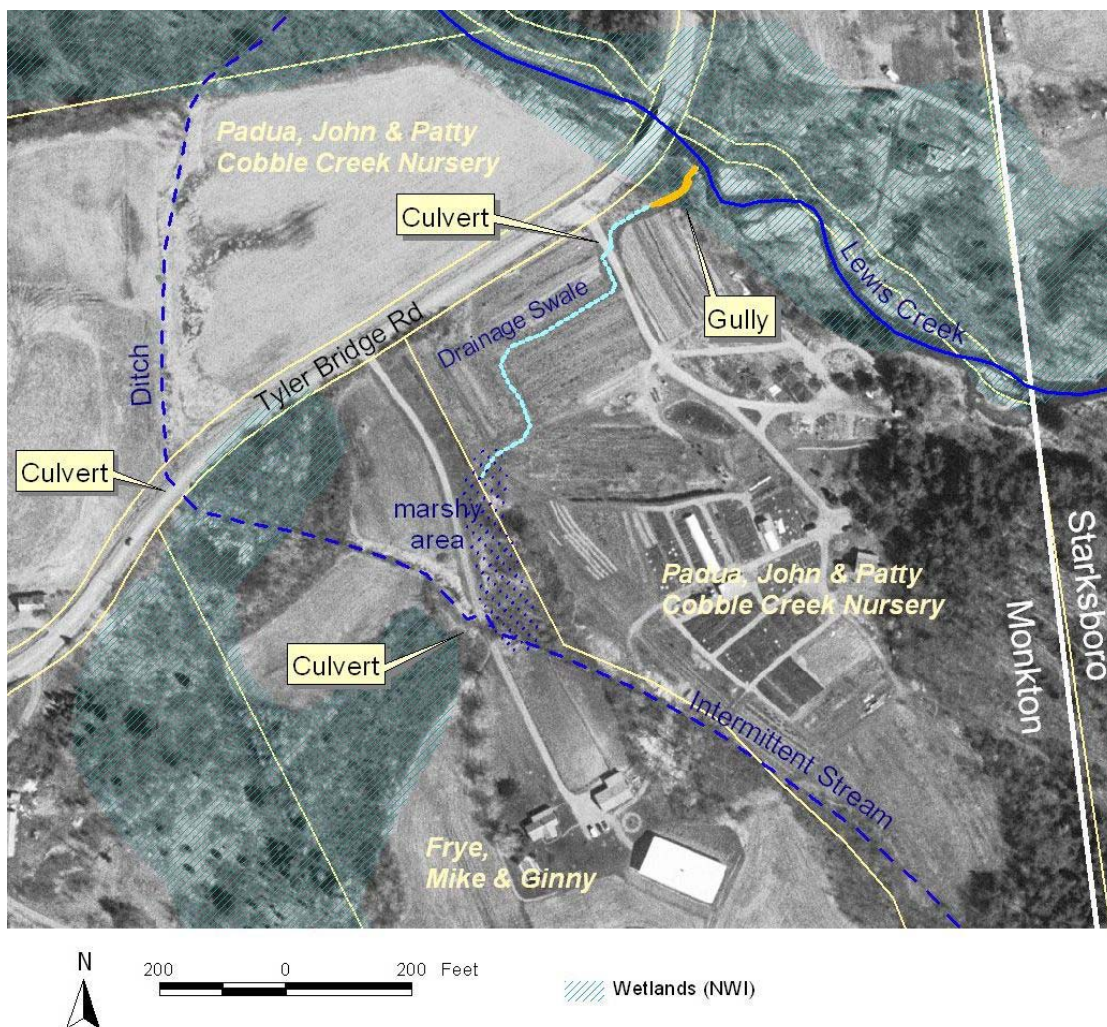


Figure 4. Existing drainage conditions, Padua and Frye properties, August 2009.

The gully extends approximately 75 feet upstream from the confluence with Lewis Creek, and ranges in depth from approximately 5.5 feet near the confluence to 2.5 feet near the head cut (upper extent). The width of the gully ranges from approximately 8 to 4 feet. Assuming an average depth of 4 feet, width of 5 feet, and length of 75 feet, this gully has been the source of approximately 56 cubic yards of sediment to the Lewis Creek over recent years. Fields on the Padua property have been in hay and pasture since at least 1940 through 1980 (based on review of historic aerial photographs); the tree nursery has been active since approximately 1994. Thus, a legacy of nutrients is possible in these gully soils.

Based on limited field evaluations, anecdotal evidence, and review of historic aerial photographs, it appears that a change in area drainage patterns has increased flows to the drainage swale on Cobble Creek Nursery lands to a degree that may have exceeded thresholds for erosion – contributing to the head cut and development of gully erosion. An intermittent stream drains to the northwest crossing the neighboring Frye residential property passing under the Frye driveway through a culvert and under Tyler Bridge Road through a culvert. This stream channel has been historically ditched north of the Tyler Bridge Road on the northern Padua parcel. According to John Padua, the Frye driveway culvert has silted

in over the years, and surface water from this channel tends to pool in a marshy area along the east side of the driveway at the western edge of the Padua property and at the upstream end of a drainage swale through the Cobble Creek Nursery. A portion of the flows in this intermittent stream is now diverted to the northeast onto the Cobble Creek Nursery property. In recent wet years, the drainage swale through the nursery has conveyed more water during storms and spring runoff. The Cobble Creek Nursery driveway has been overtopped several times, washing out portions of the driveway. Accelerated head-cutting of the swale and gullying has been noted during these recent years.

On 27 August 2009, Pete Lossmann (NRCS) collected elevation data along the drainage swale to characterize the grade, and support engineering design to:

1. improve grades along the drainage swale to reduce occurrence of ponded surface water through the nursery fields;
2. replace the Cobble Creek driveway culvert (with a wider span, lower invert elevation, and less pronounced approach and exit angles);
3. re-grade the gully and re-bury the utilities;
4. stabilize the gully walls and outlet with a combination of energy-dissipating structures, armoring, and/or vegetated banks.

A USDA EQIP project was discussed as a possibility with landowner enrollment (although Pete Lossmann expects that it may rank low due to the small size of improvements (i.e., a 90-ft gully).

In late 2009, Lewis Creek Association allocated funding to Cobble Creek Nursery to enable purchase of a portion of the supplies necessary to improve the drainage swale and stabilize the gully: gravel, larger culvert, rip-rap for the gully stabilization. John Padua will commit personal resources (remaining supplies, labor, equipment, contractor expenses) to implement the improvements.

A future Clean & Clear application may be possible to replace or rehab the Frye driveway culvert to restore drainage to the original channel west of the driveway. Alternately, a detention pond structure may possibly slow stormwater flows diverted toward the Cobble Creek Nursery from this intermittent stream. Constraints: Would require disturbing wetlands.

Frye, Michael & Virginia
Tyler Bridge Rd
Monkton, VT
453-3994

Monkton 219-1 – Reach M15, Segment B – Carrico

Landowners: Carrico, Tony & Renee
Street Address: 2668 Gilman Road, Monkton
Mailing Address: 2668 Gilman Road, Hinesburg VT 05461

11/19/2007 – 4:00 PM Meeting with Tony & Renee Carrico
Attending: Kristen Underwood, Marty Illick
Reference Corridor Plan, Table 27, Project 11

Background

Kristen Underwood and Marty Illick met with Tony & Renee Carrico and walked the property including the abandoned Lewis Creek meander below the house.

The Carrico's acquired the property in 2006; they own approximately 11 acres of land. The house, accessed from Gilman Road, is on a terrace which is elevated approximately 25 to 30 feet above the Lewis Creek floodplain. A small field at the northern extent of the property has traditionally been in hay, which is cut each year by a nearby landowner.

The Lewis Creek corridor on Carrico lands is a combination of forest cover and wetland vegetation. No structures are present in the Carrico corridor and agricultural land uses have not encroached significantly within the corridor in the last several decades. An abandoned meander of the Lewis Creek trends through the Carrico lands. Based on review of annual flights of the Lewis Creek valley maintained at NRCS offices in Middlebury, VT, the avulsion that resulted in this meander cutoff occurred beginning in 1994, and by 1995 most of the flow of the Lewis Creek was occurring in the new planform of the channel. Prior to the avulsion, this meander was migrating to the north and east and the high, eroding bank was within approximately 50 feet of the house (then owned by Kerrigan). In 1990, NRCS participated in a bank stabilization project at this site which involved rip-rap at the toe of the slope and plantings of willows and dogwood shrubs and tree saplings along the bank.

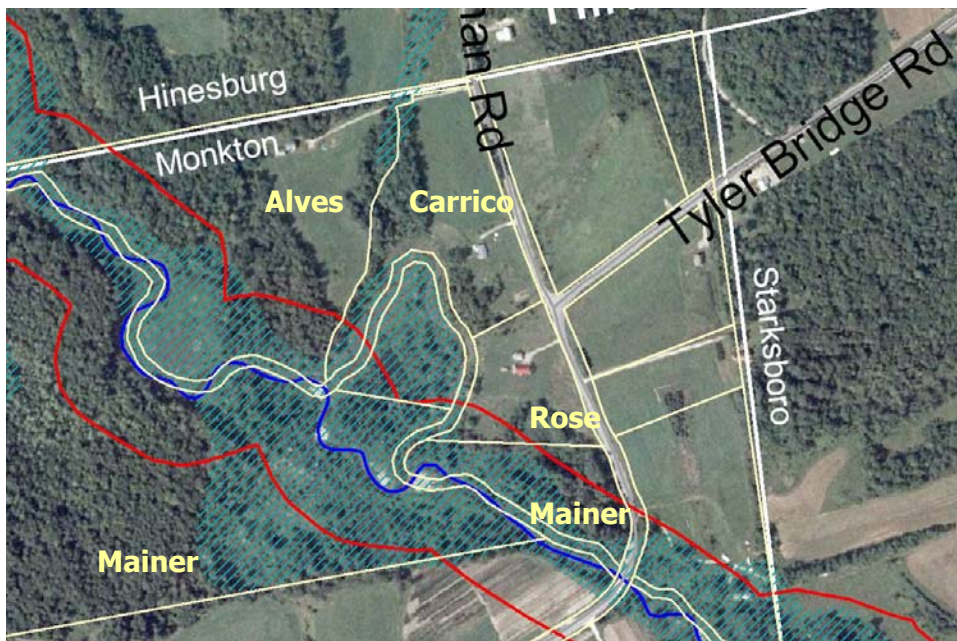


Figure 1. Carrico property, Gilman Road near the intersection with Tyler Bridge Rd. (2003 NAIP base image; red line indicates Phase 1 corridor (SGAT v.4.50); turquoise hatched lines indicate NWI wetlands)

River Corridor Constraints

(bridges, roads, buildings, agricultural structures and land uses)

- Current constraints:

There are no structures currently within the Lewis Creek corridor on Carrico lands. If the Lewis Creek were to re-occupy the abandoned meander at some time in the future, the Carrico and Rose homes would be located within the right-bank corridor of the new river planform.

- Land uses and long-term commitments within the corridor:
(e.g., farming practices, public access, lands carrying easements)

As present land owners, Tony and Renee Carrico do not foresee future encroachments within the corridor.

Current Concerns of the Landowner

(e.g., flooding losses, erosion, upstream land uses, etc.)

Tony & Renee expressed concerns about erosion along a small tributary to the Lewis Creek that flows along their southern border (see Figure 2). Waters are conveyed under Gilman Road through a culvert and flow to the southwest to the abandoned Lewis Creek meander. Upstream of the Gilman Road crossing this tributary appears to flow from the north in an unconfined, wetland-like setting; for a short section it has been apparently channelized along the Gilman Road. Downstream of the Gilman Road crossing this tributary flows in a semi-confined valley ranging from approximately 12 to 25 feet below the terrace upon which the Carrico house and the nearby Rose house are built. We observed a lateral and vertical scour hole at the downstream end of the Gilman Road culvert. The culvert outlet is elevated above the channel and water cascades into the scour pool. The valley walls of this small tributary are vegetated by herbaceous cover with the occasional shrub and deciduous tree. In an area approximately 150 ft downstream of the culvert, the banks of this tributary are eroding, and fracture lines were observed near the top of the bank along the right-bank (facing downstream).

Based on review of the USGS topographic map, this tributary channel receives drainage from an area to the north and east, between Gilman Road and Tyler Bridge Road. This area has seen increased residential development between 1948 and the 1983, based on review of historic topographic maps and aerial photographs. It is possible that increased runoff from this developed area may have contributed to increased erosion along the banks of this tributary (exacerbated by the undersized culvert). It is also possible that road ditch runoff along Gilman Road may be contributing to increased flows. A new culvert has been installed in recent weeks which diverts some road ditch runoff under Gilman Road at a location further to the north of the Carrico home to a second tributary channel that flows along the northwest border of the Carrico property.

Tony & Renee have not noticed erosion along the tall bank behind the house along the abandoned Lewis Creek meander. A healthy covering of red-osier dogwood and willows was noted along this tall bank.



Figure 2. Drainage features in vicinity of Carrico property.

Base map: 1999 1:5000 black & white orthophotograph, Vermont Mapping Program; turquoise hatched lines indicate NWI wetlands; white lines indicate Monkton parcel boundaries.

River Corridor Alternatives Acceptable to Landowner

(Based upon geomorphic data, corridor constraints, and local needs.)

Tony & Renee are open to possibilities, and would like to review a copy of the corridor plan. They would be open to hearing more about possible conservation options. Also discussed was the possibility that the Lewis Creek corridor might be expanded to include the area of the abandoned meander (see Figure 3).

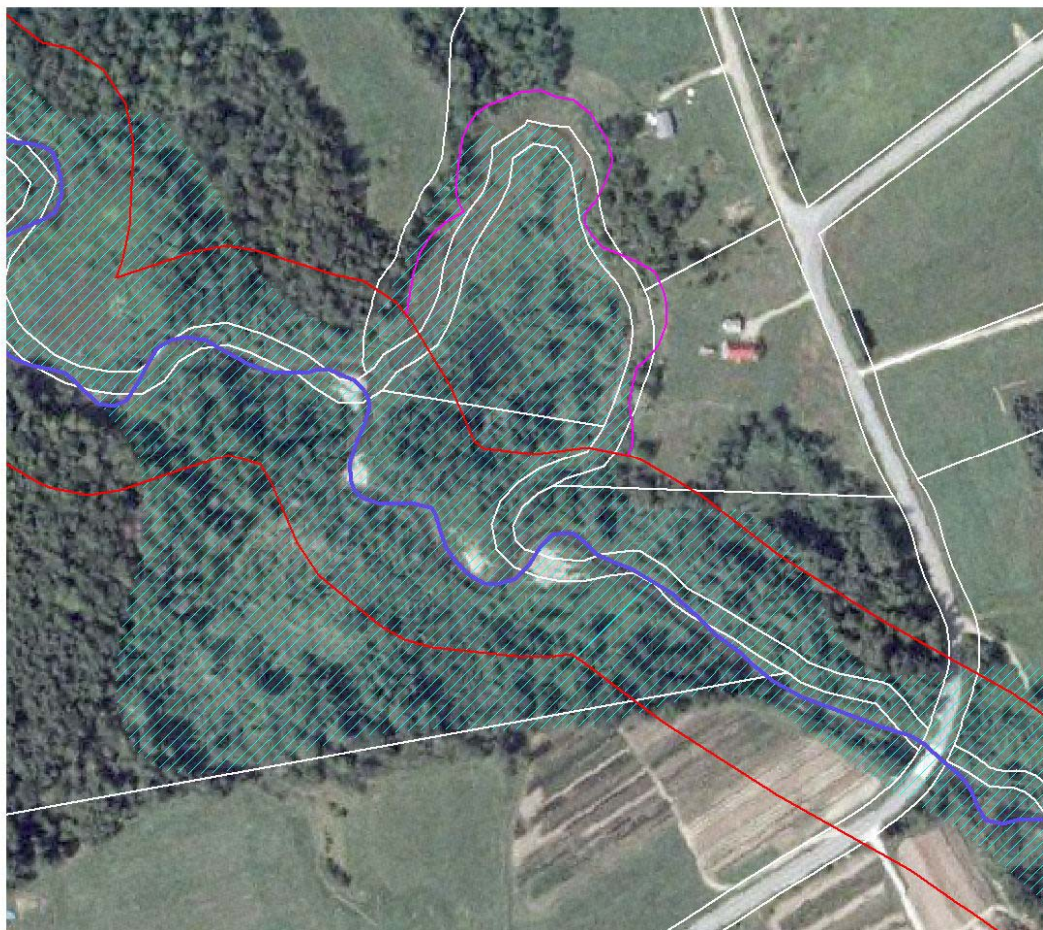


Figure 3. Potential extension of Lewis Creek corridor (in purple) to the top of the valley wall to encompass the abandoned meander.

Base map: (2003 NAIP base image; red line indicates Phase 1 corridor (SGAT v.4.50); turquoise hatched lines indicate NWI wetlands; white lines indicate Monkton parcel boundaries).

Monkton 219-3 – Reach M15, Segments B & A – Alves

Landowners: Alves, Caroline
Street Address: 2572 Gilman Road, Monkton
Mailing Address: 2572 Gilman Road, Hinesburg VT 05461

10/4/2007 – 7:00 PM Meeting with Caroline Alves
Attending: Kristen Underwood, Marty Illick, Stevie Spencer
Reference Corridor Plan, Table 27, Project 11

Background

Caroline Alves has occupied the property for approximately 19 years. The house, accessed from Gilman Road, is on a terrace which is elevated approximately 25 to 30 feet above the Lewis Creek floodplain. A small field at the northern extent of the property has traditionally been in hay, which is cut each year by a nearby landowner.

The Lewis Creek corridor on Alves lands is a combination of forest cover and wetland vegetation. Ms. Alves maintains a small garden plot on the floodplain on the inside of the Lewis Creek meander bend. No structures are present in the Alves corridor and agricultural land uses have not encroached significantly within the corridor in the last several decades.

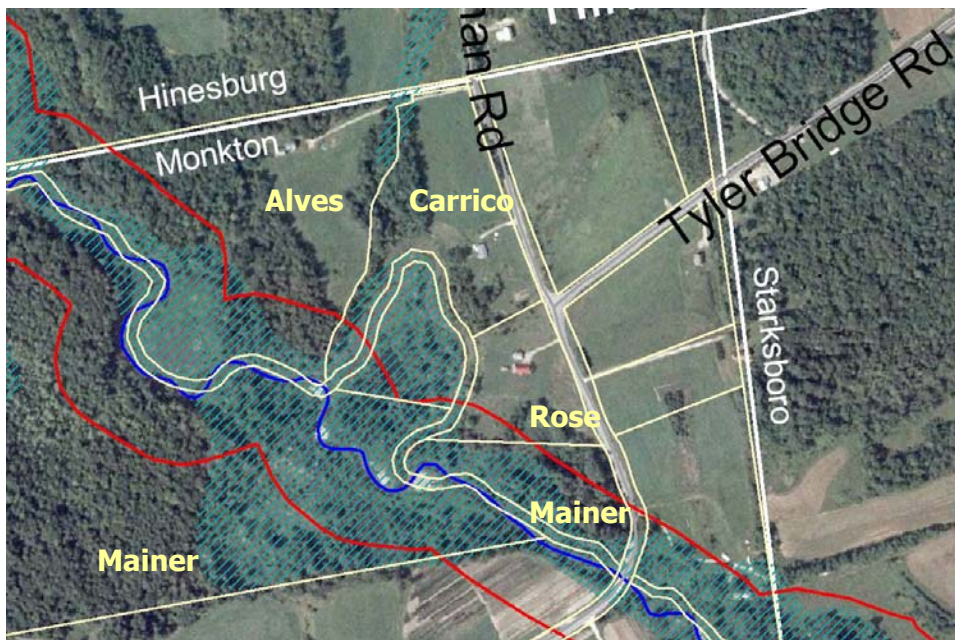


Figure 1. Carrico property, Gilman Road near the intersection with Tyler Bridge Rd.
(2003 NAIP base image; red line indicates Phase 1 corridor (SGAT v.4.50); turquoise hatched
lines indicate NWI wetlands)

River Corridor Constraints

(bridges, roads, buildings, agricultural structures and land uses)

- Current constraints:

There are no structures currently within the Lewis Creek corridor on Alves lands.

- Land uses and long-term commitments within the corridor:
(e.g., farming practices, public access, lands carrying easements)

As present Ms. Alves does not foresee future encroachments within the corridor.

Current Concerns of the Landowner

(e.g., flooding losses, erosion, upstream land uses, etc.)

Ms. Alves has periodically planted shrubs and trees along the high bank which forms the northwest channel boundary of the abandoned meander. This high bank has been prone to erosion and slumping.

Following abandonment of the meander of the Lewis Creek just upstream from Alves lands, Ms. Alves wonders about the location of property lines in the area, including the Alves / Carrico common line, since the deeds often reference the Lewis Creek channel (which has now moved substantially).

River Corridor Alternatives Acceptable to Landowner

(Based upon geomorphic data, corridor constraints, and local needs.)

Ms. Alves would like to review a copy of the corridor plan, and would be open to hearing more about possible conservation options. Management goals of a potential conservation project that would be important to Ms. Alves, include: control of invasive species, management to restore natural communities, preventing ATV, snowmobile and other motorized access, controlling hunting access (for safety).

Hinesburg 12-01-38.000 – Reach M15, Segment A – Lorraine

Landowner: Dexter Lorraine
Street Address: 652 Lewis Creek Road, Hinesburg, VT 05461
Contacts: 482-2981 (H), cdexter@accessvt.com

Description: 20 acres (approx). Residential lot accessed off Lewis Creek Road. Parcel includes approximately 800 ft of frontage along Lewis Creek.

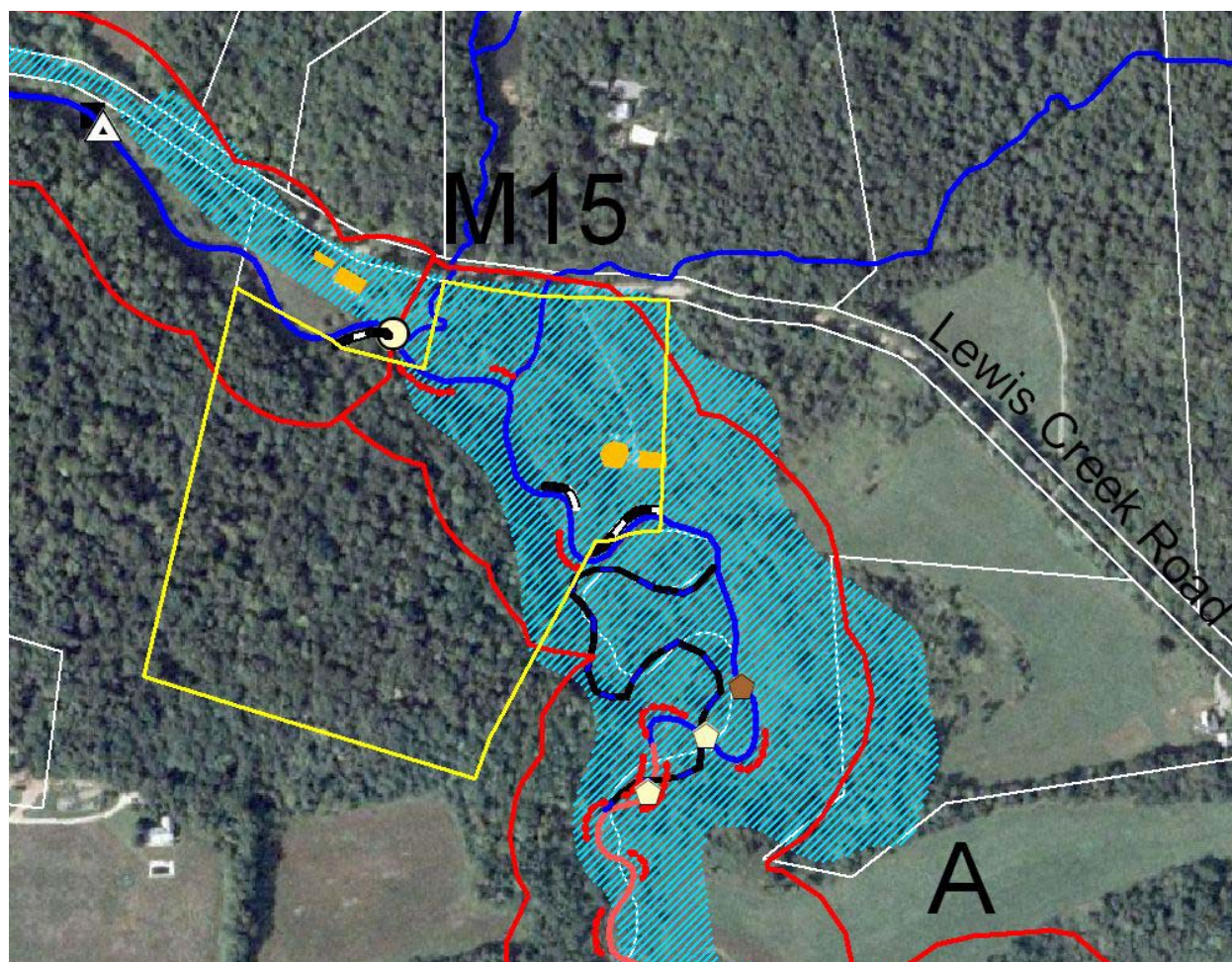


Figure 1. Phase 2 geomorphic features in vicinity of Dexter Lorraine parcel, reach M15-A, Hinesburg. Lorraine property outlined in yellow.



Hinesburg 12-01-38.000 – Reach M15, Segm A – Lorange
November 2007 – Marty Illick telephone Interview with Dexter Lorange
Reference Corridor Plan, Table 27, Project 12

Background

In the fall of 2007, Dexter provided a brief history of the many bank stabilization projects that he organized for his very active stretch of Lewis Creek in order to protect his house and associated buildings. In the late 1990s, Partners for Wildlife (USFW) and LCA volunteers helped with planting trees and shrubs along his floodplain, which have since mostly fallen into the river. After a passive approach was tried, he installed a revetment/rip-rap project in 1999 through Partners for Wildlife. According to Dexter the revetments failed. He then installed various sections of rip-rap treatments over the next 3 to 4 years, many of which have since been outflanked or covered by active sedimentation. The most recent streambank stabilization project was installed in 2006 by John Barrows, excavating contractor (see Figure 2). Project records should be on file with the ACOE, FWD and the Town of Hinesburg. Dexter reported that in the spring of 2006, a 4-foot "sandbar" was created adjacent to the rip-rap site, and in the spring of 2007 a 20-foot "sandbar" was created. The stream continues to move laterally and is destabilizing the left bank across from his home which appears to be close to a valley wall.



Figure 2. Rip-rap armoring installed circa 2006 along right bank at Dexter Lorange property off Lewis Creek Road in Hinesburg (Segment M15-A). View downstream, 29 November 2006.

Land uses and long-term commitments within the corridor:

The Lorange parcel is in residential use. It is largely forested, except for the driveway and immediate vicinity of the house site. Wetlands (NWI) are mapped along the lower-elevation areas contiguous to the channel (Figure 1).

Mr. Lorange recalls some mention of land use restrictions associated with the portion of his parcel across the Lewis Creek, but could not recall the details. These could be identified through review of the deed.

River Corridor Constraints

Rip-rap armoring has been installed along the right bank, as described above. Also, the residential home and outbuildings are located in the right-bank corridor within 50 to 300 feet of the Lewis Creek. (Note: the present position of the Lewis Creek channel is different than depicted by the VHD line on Figure 1 – it is closer to the buildings indicated in orange). A gravel driveway leads south from Lewis Creek Road to access the home.

Current Concerns of the Landowner

Mr. Lorange is concerned by the excessive erosion / deposition in the Lewis Creek channel in close proximity to his home and associated buildings.

River Corridor Alternatives Acceptable to Landowner

Dexter said he was very interested in LCA conservation ideas and would like to be part of the M15 conservation discussion. He said he could be in email contact or attend meetings when he is in town.

2009- 2010 Updates

A separate project writeup has been submitted by Lewis Creek Association concerning project development activities in 2009 and 2010.

Hinesburg (various parcels) – Segments M12-A, M11 – Baldwin

Landowners: Baldwin family
Street Address: 220 Drinkwater Road, Hinesburg

1/14/2010 – 1:00 PM Meeting with Matt Baldwin, Mary Baldwin
Attending: Kristen Underwood, Shannon Hill Pytlik, Allen Karnatz, Alex Wylie
Reference Corridor Plan, [Table xx](#), [Project xx](#)

Background

Baldwin Family has expressed interest in conserving parcels of their farm with VT Land Trust. VLT invited participation of Lewis Creek Association and VTANR River Management Section for portions of the farm along the river corridor of Lewis Creek. The Baldwin Farm is presently managed for hay production / sale. A limited number of livestock (est. 20 head cattle) are also raised on the farm, bred, and sold.

The Lewis Creek corridor (reaches M11, M12-A) on Baldwin lands is dominated by hay fields with a narrow herbaceous buffer; to the south side of Lewis Creek, forested buffer is more prevalent. Lands have excellent drainage, southern exposure, and are highly productive. Drainage tiles were reportedly installed by the previous farmer along parcel 11-01-02.100 (and possibly 11-01-05.001); these drain to ditches and tributaries to Lewis Creek, but not directly to Lewis Creek. Beaver activity has been present over the years in both the main stem of the Lewis Creek and in the tributaries that cross Baldwin parcels.

River Corridor Constraints

(bridges, roads, buildings, agricultural structures and land uses)

- Current constraints:

There are no structures currently within the Lewis Creek corridor on Baldwin lands, except for a town bridge over the Lewis Creek on Baldwin Road.

- Land uses and long-term commitments within the corridor:
(e.g., farming practices, public access, lands carrying easements)

As present the Baldwins do not foresee future encroachments within the corridor. Their expectation is to continue production of hay.

Current Concerns of the Landowner

(e.g., flooding losses, erosion, upstream land uses, etc.)

Matt Baldwin expressed concern for lost soils along the banks of the Lewis Creek immediately downstream of the Baldwin Rd bridge, which has experienced increasing erosion in recent years. A mid-channel bar has developed which has caused flows to widen and erode the north and south banks of the creek. Erosion is especially pronounced during spring runoff and/or ice-out conditions.

The Baldwins value the productive farm lands and wish to protect these lands from future development.

River Corridor Alternatives Acceptable to Landowner

(Based upon geomorphic data, corridor constraints, and local needs.)

The Baldwins are open to various conservation options (through VLT, VRC) and would be open to hearing more about conservation and buffer improvement options through USDA programs (CRP, CREP). The

meeting was initially set up to discuss conservation of parcels 11-01-02.1 and 11-01-02.100; after hearing the perspective of River Management Section and the importance of conserving the river corridor, the Baldwins offered that they would consider an easement on river parcels to the east toward Baldwin Bridge (i.e., 11-01-05.001 – both sides of river) – additional or likely in place of the portion of 11-01-02.100 north of Drinkwater Rd. There would likely be some necessary exclusions of small acreage for existing and/or proposed family house sites.

Next Steps

(Based upon geomorphic data, corridor constraints, and local needs.)

Allen and Alex (VLT) in consultation with the Baldwins will revise their internal estimates of proposed parcels/ acreage and seek revised estimates for the cost of appraisals.

Shannon Pytlik (VTANR River Management Section) will consider the additional river parcels, and revise estimates of corridor acreage and proposed compensation for river corridor easements based on river segment sensitivity and soil types. If this project proceeds further, Shannon would like to carry out field visits along the river segments in question and possibly collect additional cross section data in areas previously impounded by beavers (esp Segment M12-A). The Baldwins would need to apply to the next round of competitive grants through the Clean & Clear program (expected RFP July 2010) for financial support of the river corridor portion of the overall conservation project.

Allen and Kristen communicated to the Baldwins that Lewis Creek Association stands ready to assist financially with a portion of the appraisal fees, and to help with fund-raising for the pending conservation project.

Continued Project Development – 2010

Shannon Pytlik communicated that if the Baldwins were to participate in CREP as well as conserve a portion of their lands through VLT and VRC, the CREP enrollment should occur first. Then easements would be pursued following CREP.

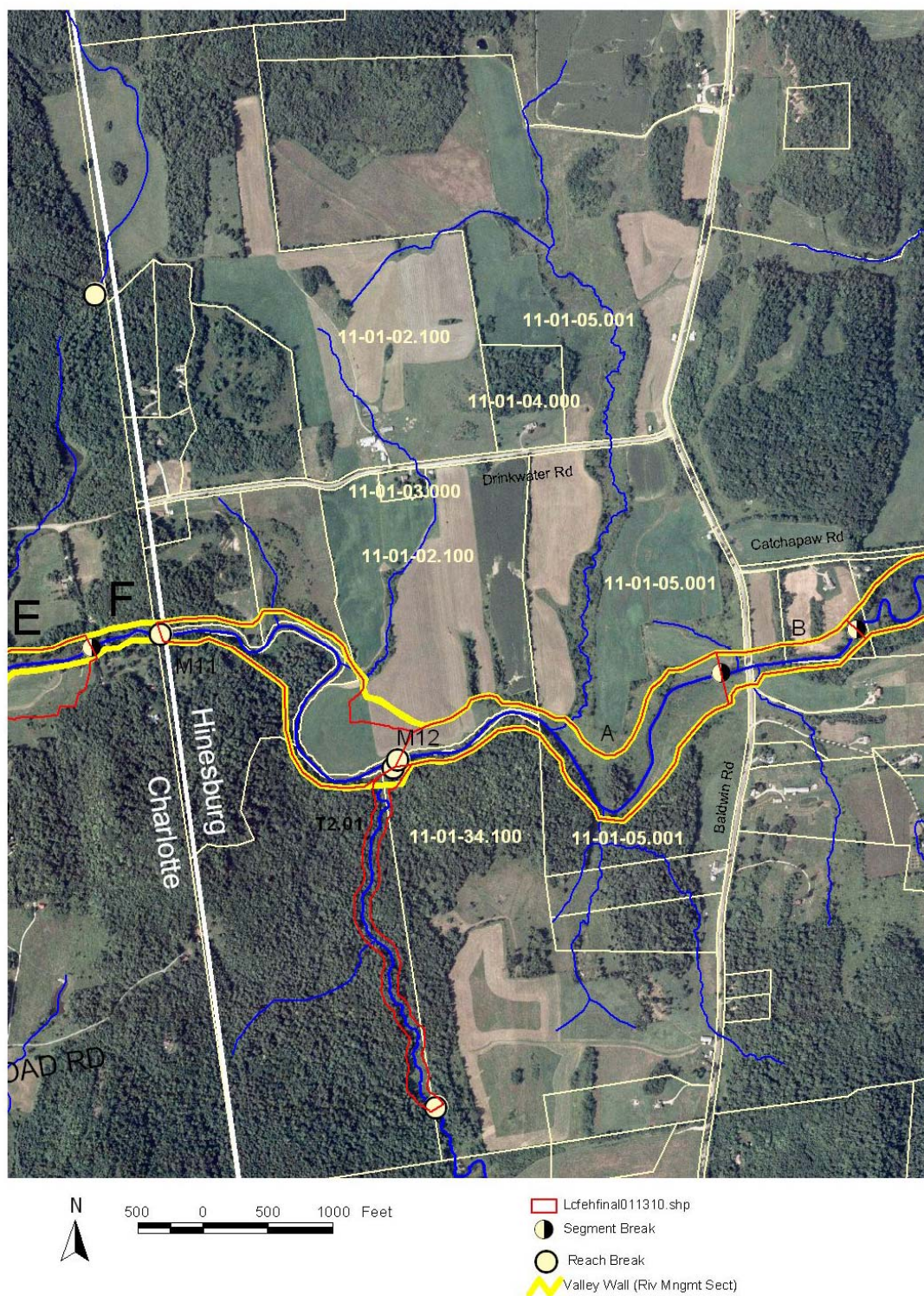


Figure 1. Vicinity map: Baldwin farm parcels, Drinkwater Rd / Baldwin Rd. (2003 NAIP base image; red line indicates draft FEH corridor (1/13/2010 from VTANR); bold yellow line = valley walls mapped by VTANR; fine light yellow line = Hinesburg parcels c.2009). Parcel lines are approximate only.

Charlotte (Various parcels) – Reach M08, vicinity Quinlan Covered Bridge –

Landowners: various

Street Address: along Spear Street, Monkton Rd, and Lewis Creek Road

An alternatives analysis to evaluate potential river and floodplain restoration scenarios in vicinity of the Quinlan Covered Bridge was funded by the VT Clean & Clear program in FY2010. Please see the separate summary report for this project.

Ferrisburg 050142001 – Reach M04 - Booth

Landowner: David Booth
Street Address: Arcadia Brook Farm, off East Greenbush Road, Ferrisburgh
Mailing Address: 192 Bird Haven Lane, No. Ferrisburgh, VT 05473

Description: Residential and agricultural parcel along right bank including corridor lands and upslope areas just upstream of Greenbush Road bridge crossing.

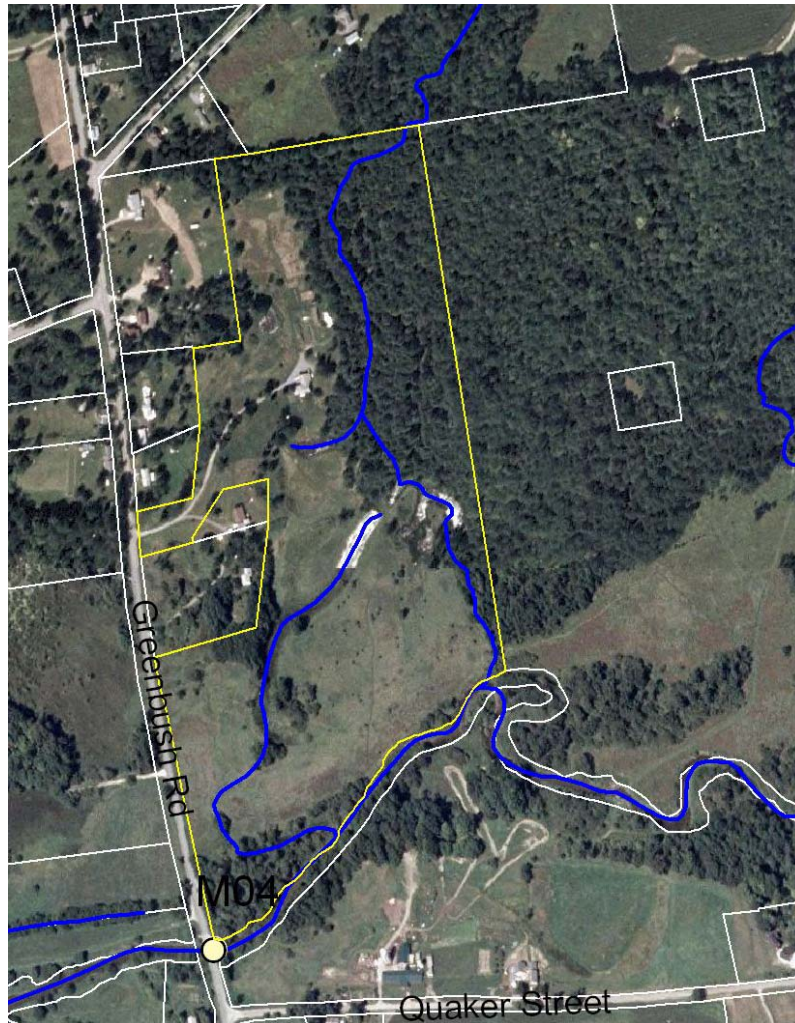


Figure 1. Location of Booth property. *Parcel outlined in yellow. 2003 base photograph.*

Ferrisburgh 050142001– Reach M04

6/12/2009

Personal Visit – w/ David Booth

Attending: Marty Illick, Kristen Underwood, Paul Marangelo (TNC), Dan Farrell (TNC)

Background

Mr. Booth has been operating a vegetable / flower garden on the property for at least the past 7 years.

Land uses and long-term commitments within the corridor:

Vegetable cropping with ample vegetated buffers along the Lewis Creek. Possibility for grazing livestock in future.

River Corridor Constraints

Vegetable crops

Current Concerns of the Landowner

Control of invasives

Sustainable and economically viable farming

River Corridor Alternatives Acceptable to Landowner

Would like to find out more about conservation options. Is open to discussions with downstream farmers about multi-reach opportunities for more optimal use of farm lands and increased riparian protections.

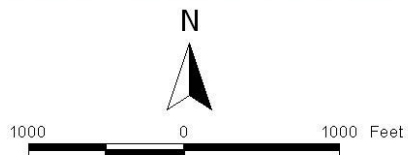
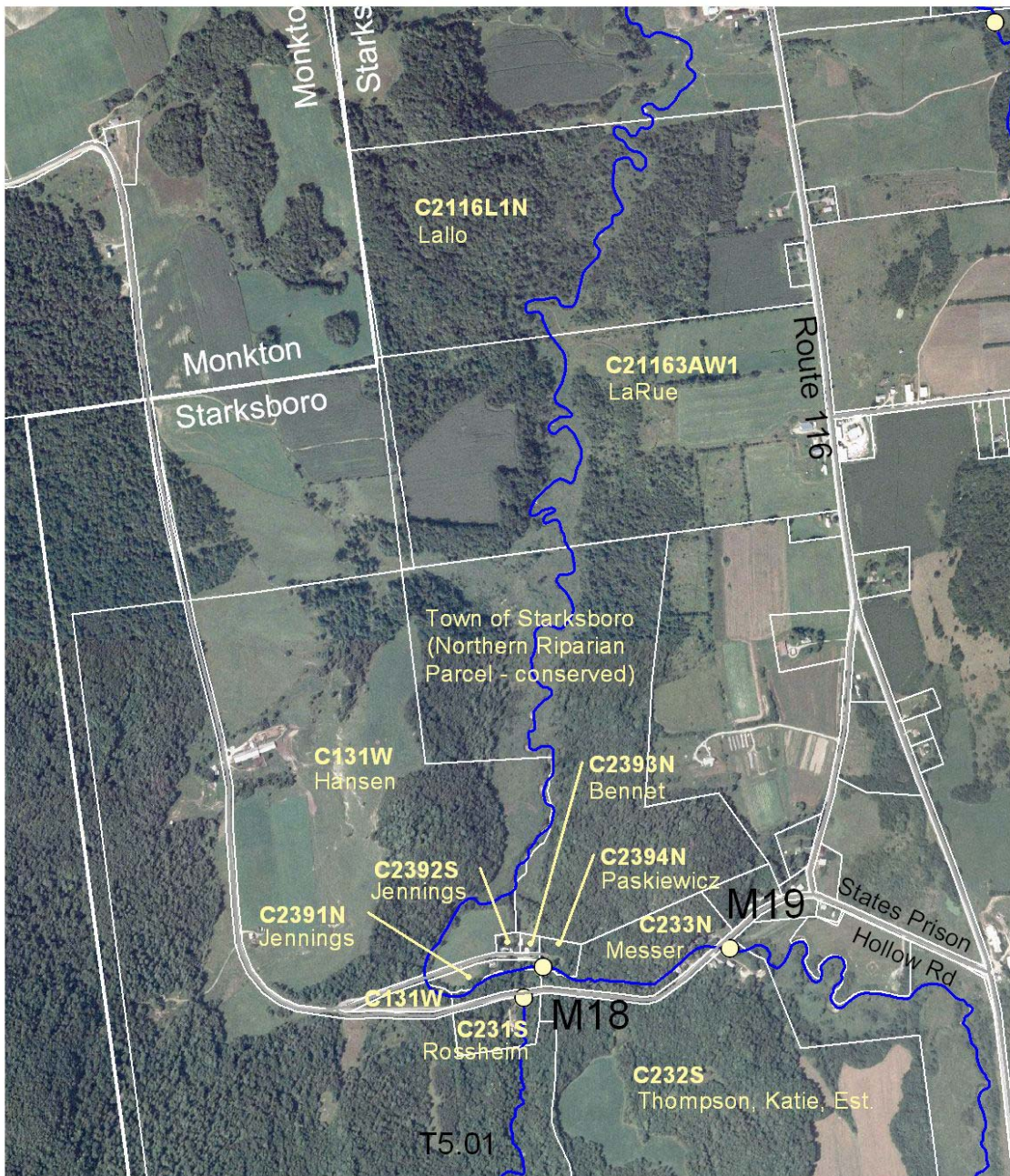
Would like to explore opportunities for native shrubs, trees, berries that could be managed as a retail crop, but would also offer shading and erosion-resistance along the banks of the Lewis Creek.

Next Steps

Lewis Creek Association is having conversations with nearby farmers (e.g., Ayer, Duvas, etc.) with a goal to convene a meeting with Booth to discuss potential opportunities for cooperative farming and increased riparian protections.

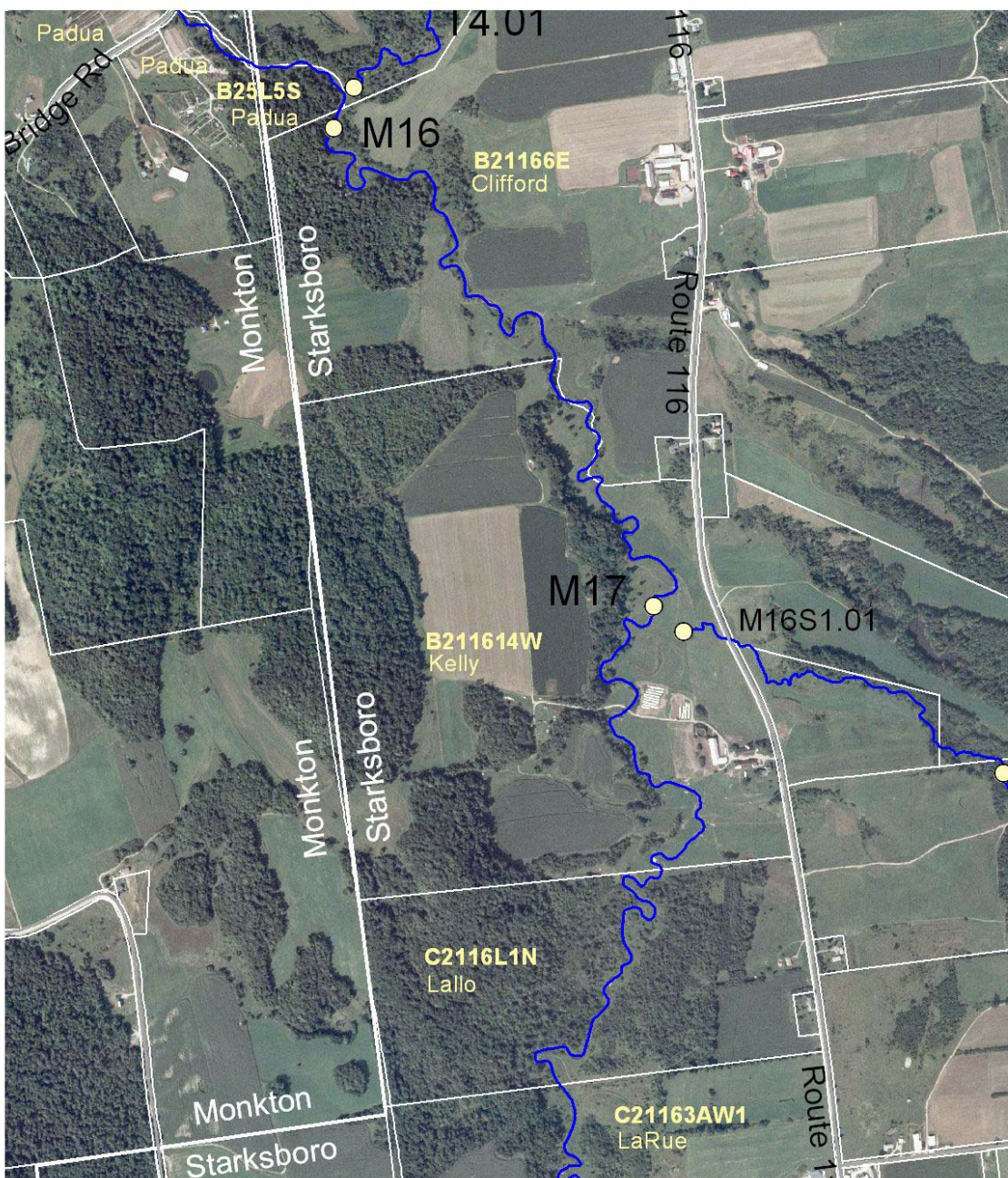
Tax Parcel Maps

Excerpted from: Lewis Creek Association, March 2008, River Corridor Plan, Lewis Creek: Reaches M14-M18. Towns of Hinesburg, Monkton, and Starksboro, Appendix B.



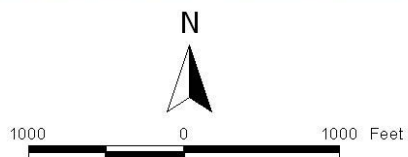
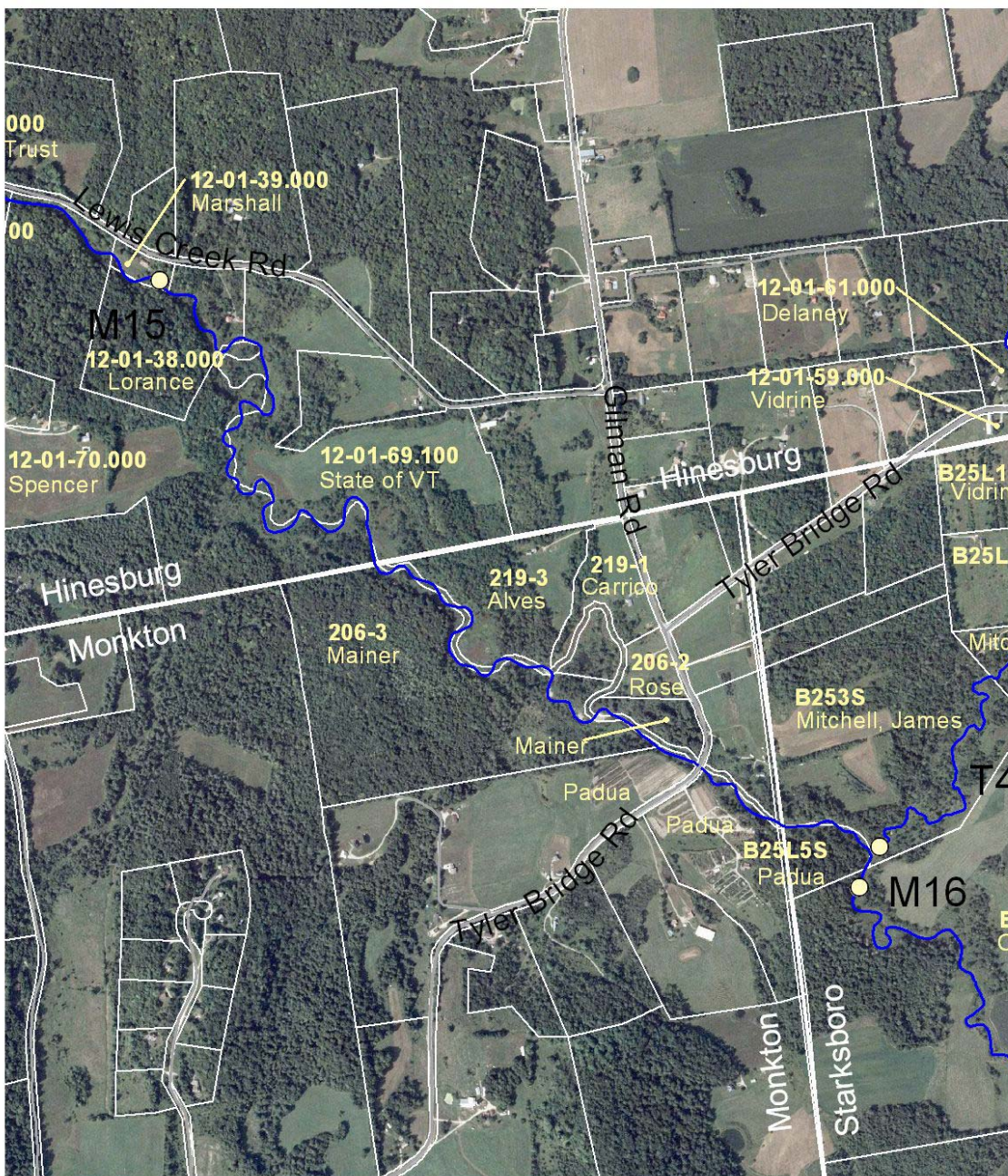
Corridor Plan: Reaches M14 - M18
Lewis Creek Watershed

M18, M17 Parcel Mapping



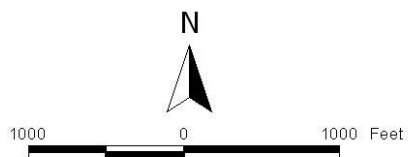
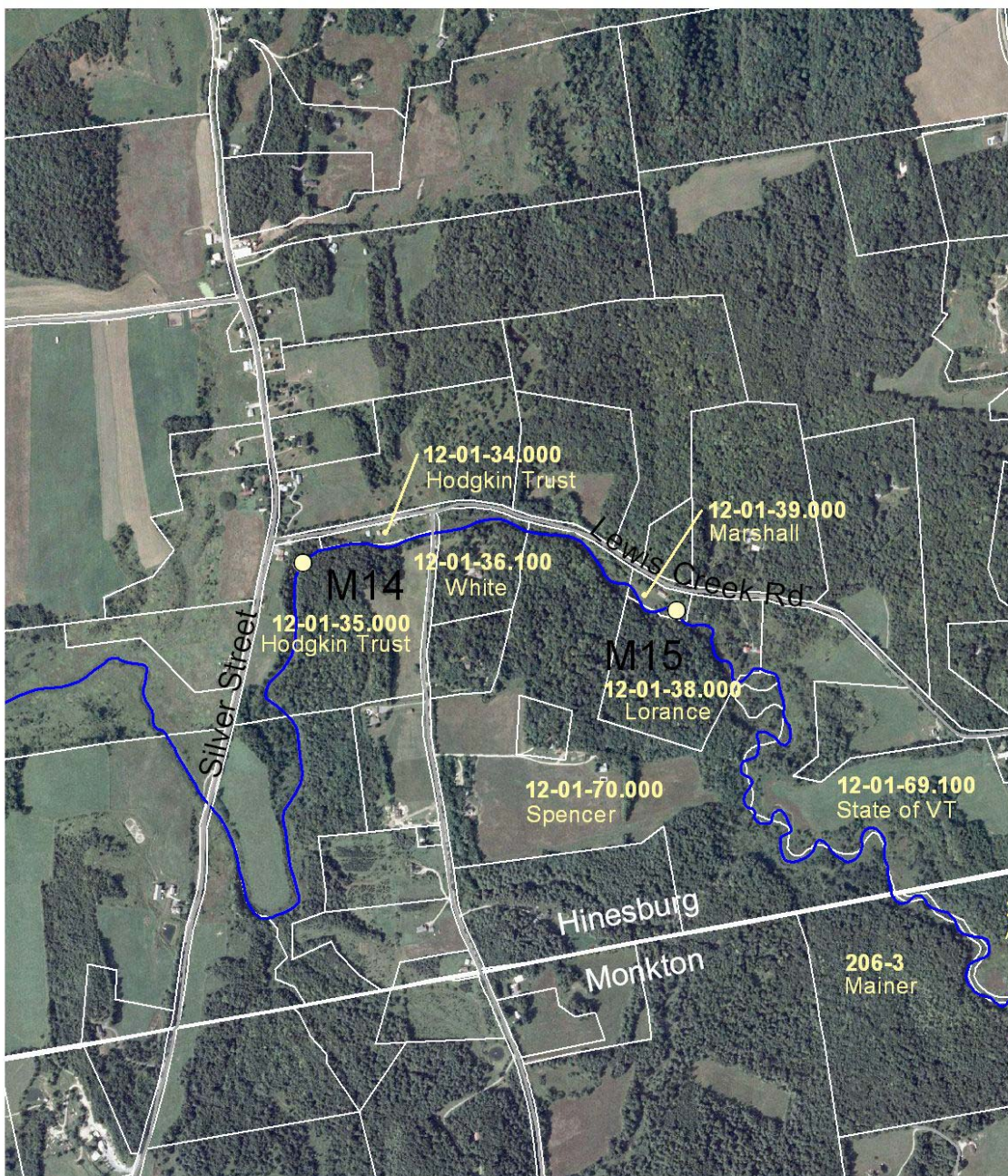
Corridor Plan: Reaches M14 - M18
Lewis Creek Watershed

M17, M16 Parcel Mapping



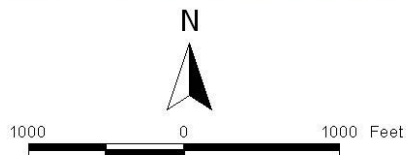
Corridor Plan: Reaches M14 - M18
Lewis Creek Watershed

M15 Parcel Mapping



Corridor Plan: Reaches M14 - M18
Lewis Creek Watershed

M14 Parcel Mapping



Corridor Plan: Reaches M14 - M18
Lewis Creek Watershed

T4.01 Parcel Mapping

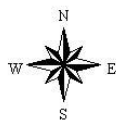
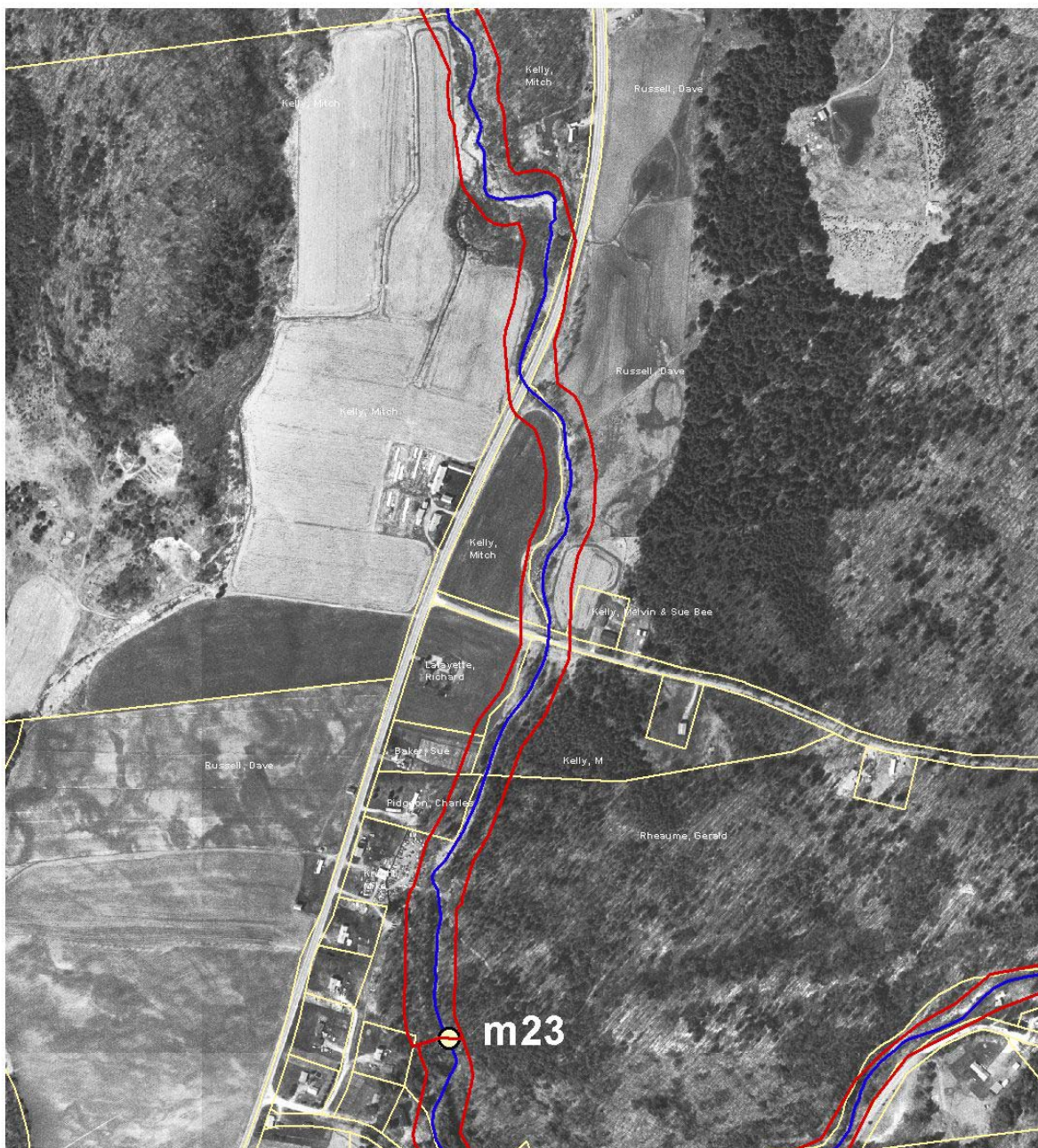
Excerpted from:

Lewis Creek Association, January 2006, River Corridor Management Plan (Draft), Lewis Creek: Starksboro Valley, Reaches M19-M22.

Appendix A.

Proceeding from south to north, upstream to downstream, vicinity of Hillsboro Road to the Ballfields at State Prison Hollow Road:

- M22 upstream
- M22 downstream
- M21
- M20
- M19 upstream
- M19 downstream



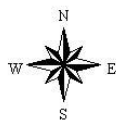
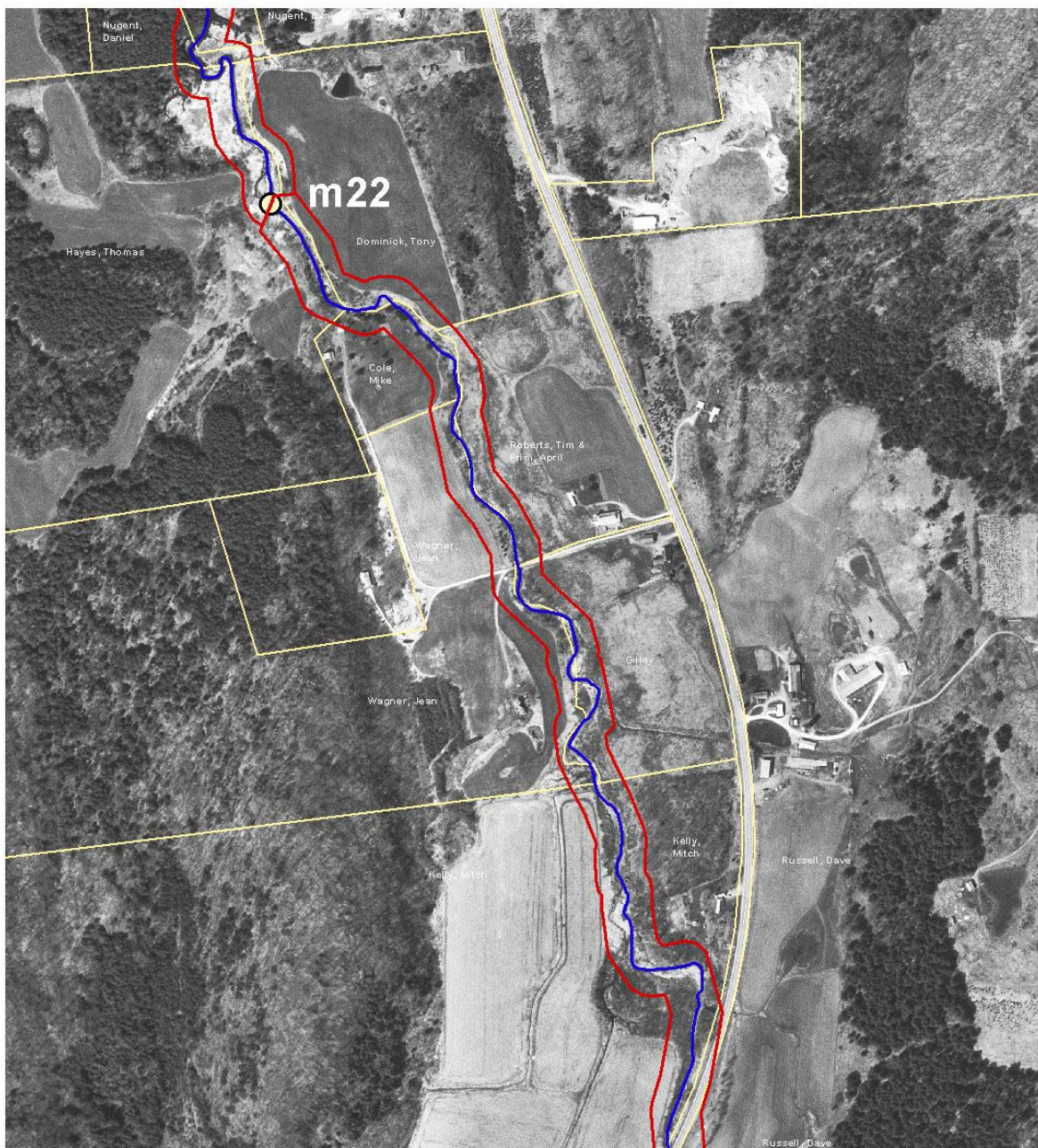
500 0 500 Feet

**Reach M22 - Upstream
Lewis Creek, Starksboro, VT**

Base Map: 1995 Orthophoto, VTMapping Program

*River Corridor (in Red)
developed by VTDEC WQD, Mar 2004*

*Property Lines (in white)
are approximate - not surveyed*



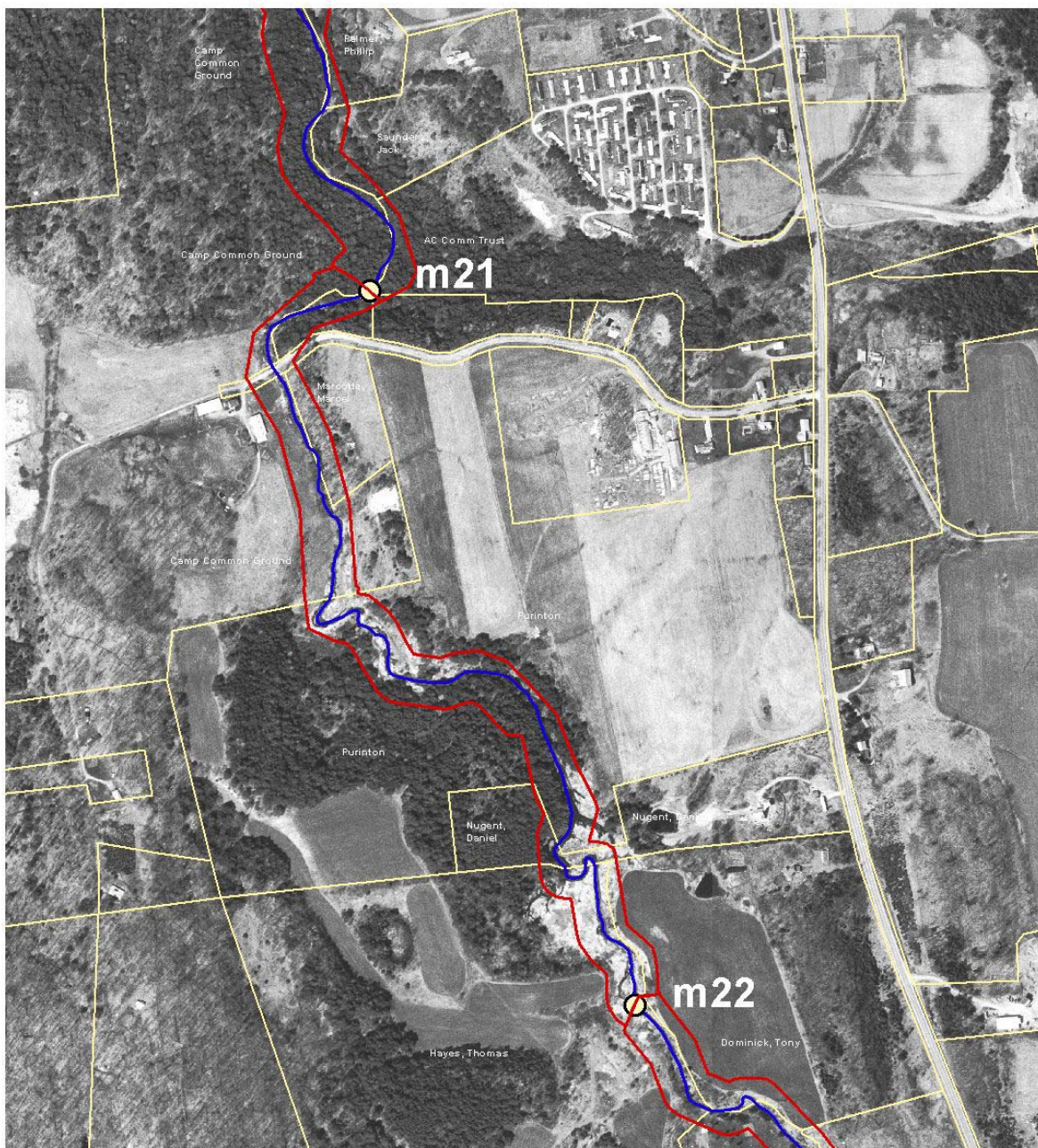
500 0 500 Feet

**Reach M22 - Downstream
Lewis Creek, Starksboro, VT**

Base Map: 1995 Orthophoto, VTMapping Program

*River Corridor (in Red)
developed by VTDEC WQD, Mar 2004*

*Property Lines (in white)
are approximate - not surveyed*



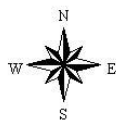
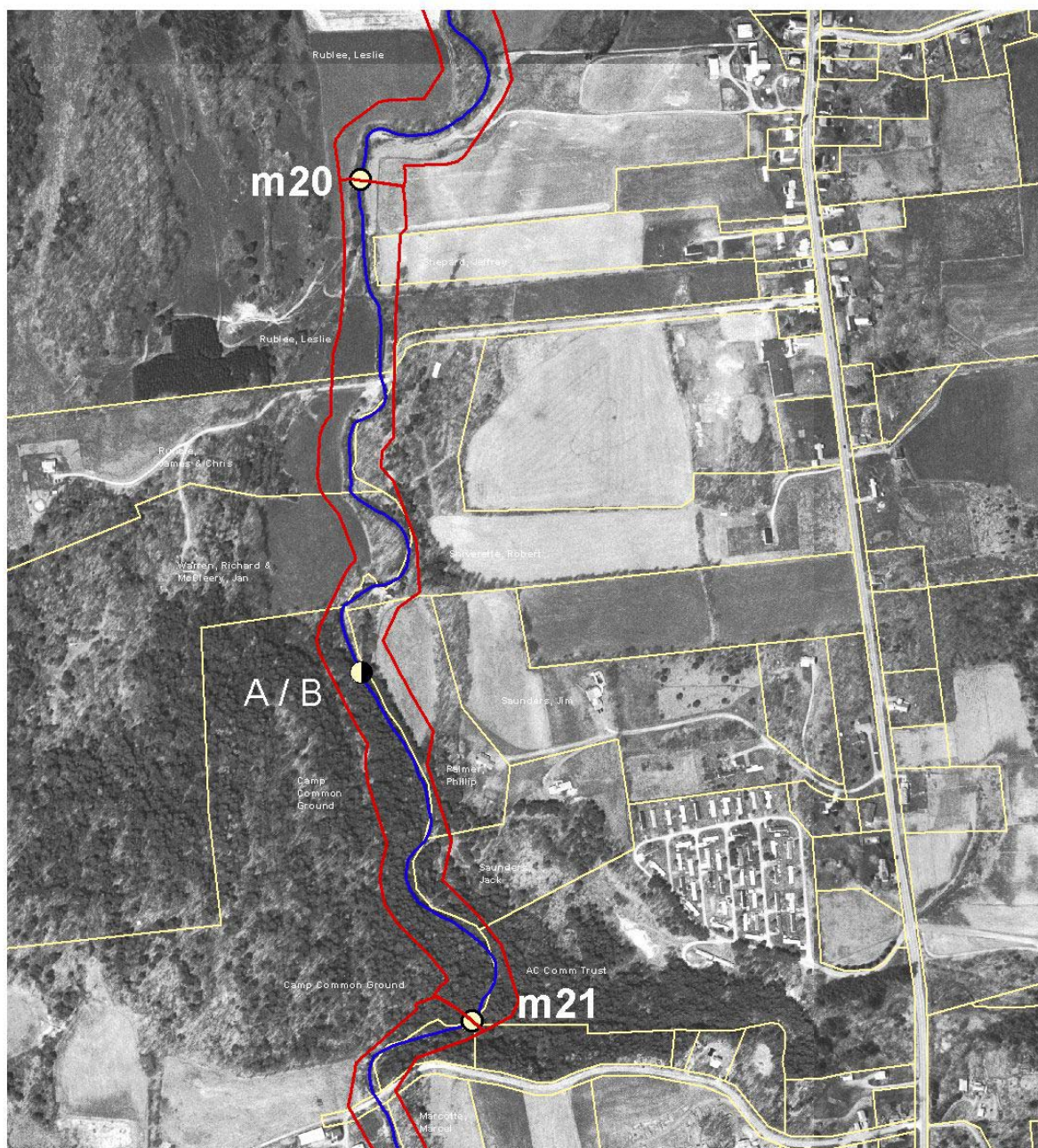
500 0 500 Feet

Reach M21
Lewis Creek, Starksboro, VT

Base Map: 1995 Orthophoto, VTMapping Program

River Corridor (in Red)
developed by VTDEC WQD, Mar 2004

Property Lines (in white)
are approximate - not surveyed



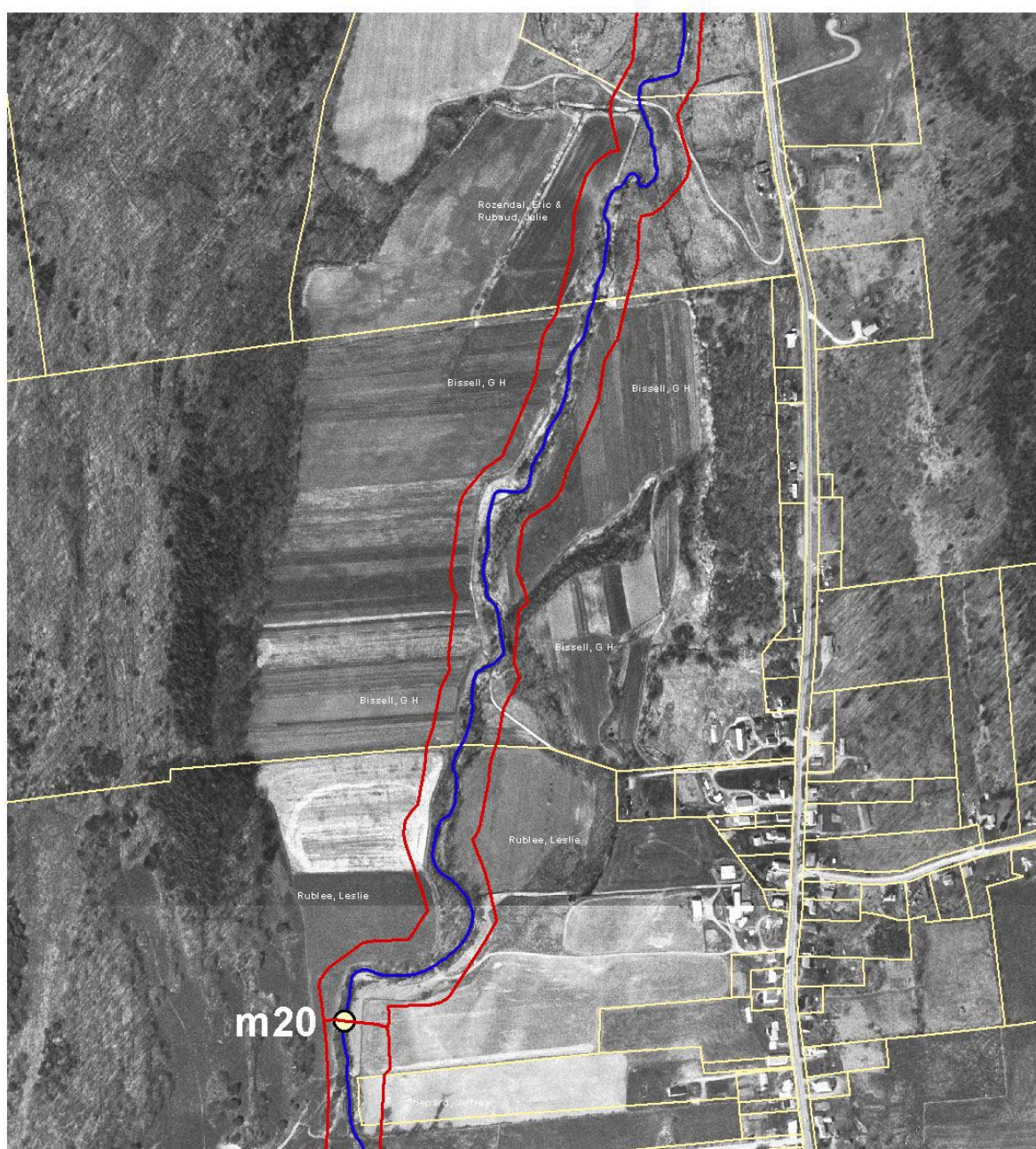
500 0 500 Feet

Reach M20
Lewis Creek, Starksboro, VT

Base Map: 1995 Orthophoto, VTMapping Program

River Corridor (in Red)
developed by VTDEC WQD, Mar 2004

Property Lines (in white)
are approximate - not surveyed



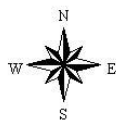
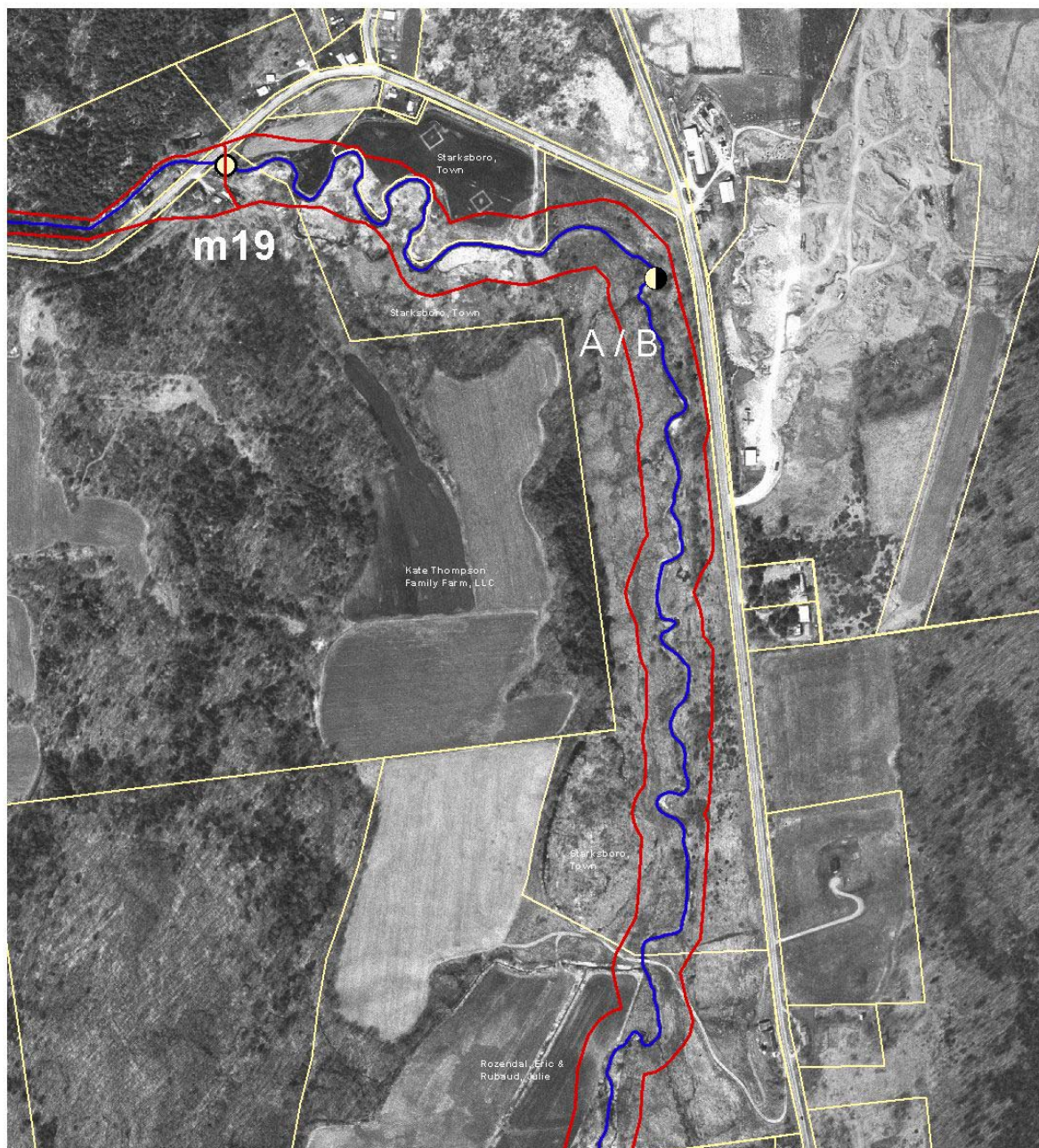
500 0 500 Feet

**Reach M19 - upstream
Lewis Creek, Starksboro, VT**

Base Map: 1995 Orthophoto, VTMapping Program

*River Corridor (in Red)
developed by VTDEC WQD, Mar 2004*

*Property Lines (in white)
are approximate - not surveyed*



500 0 500 Feet

**Reach M19 - downstream
Lewis Creek, Starksboro, VT**

Base Map: 1995 Orthophoto, VTMapping Program

*River Corridor (in Red)
developed by VTDEC WQD, Mar 2004*

*Property Lines (in white)
are approximate - not surveyed*