

Vermont Rivers and Roads Training Program 5-Year Progress Report December 2016

“Show Me and I’ll Remember the River”

Considering the River in the Design, Construction and Maintenance of Transportation Infrastructure in Vermont



Forward

There is a saying in the academic community: “Tell me and I’ll forget, but show me and I’ll remember.” This saying has been a common theme heard from folks attending the Vermont Rivers and Roads Tier II Training Program in the first five years of training events held throughout the state from 2012 to 2016.

Now five years later, the comments from over 350 Tier 2 attendees have been unanimously positive with many folks saying this “show me and I’ll remember” comment in their own words. The common theme is that *“the afternoon field trips really brought home the message from the morning class and river flume presentations, and now I have a better understanding of what to do after the next flood hits Vermont.”*

Participants leave the Tier 2 training with the basic knowledge and skills to distinguish between stable and unstable rivers, identify various types of river instability, understand a river’s response to alternative structural elements and design and build those treatments for more robust repairs to our transportation infrastructure. Some VTrans staff who enjoyed the early training events have asked if they could take a refresher training, and thus validating the training program success.

Abstract

This 5-Year Progress Report for 2016 is formatted the same as the previous 2014 and 2015 Annual Reports to the Legislature and updated with summary statistics of the program presentations and overall response to the program with an *Appendix A of Evaluation Comments* by the type of participants (VTrans, towns, consultants and contractors). This 2016 Annual Report also includes a Forward and Abstract sections, an expanded list of future target audiences and new report sections on training program improvements, the transition of program management within VTrans to the Vermont Local Roads (VLR) Program and future promotion and marketing initiatives with the help of Regional Planning Commissions, etc.

A summary review of Evaluation forms submitted by participants at the end of each training event was compiled for the 5-year period to assess the recent success and future needs of the Rivers and Roads training. This summary shows a marked improvement in the message reaching the audience in just 5 years. More people report strong agreement that the event was a good use of their time and applicable to their job, and more people report strong agreement that the content will help them rebuild more flood resilient roads while recognizing the importance of aquatic habitat.

This relatively rapid improvement is attributable in part to the refinement in the content and delivery since program development and pilot-training in 2012 and the 19 training events provided since 2013. The feedback from the participant’s Evaluation forms over 5 years has informed the training program on what’s relevant to the attendees’ needs and the content that is important to add, refine or replace.

The initiative on future promotion and marketing includes a brief training logistics overview and new locations for future events in other locations around the state. The Appendices include the undated Rivers Program flyer on the Rivers web page and the dated VLR program flyer with specific 2016 training events. The Rivers Program flyer is purposefully undated for informational purposes on the Rivers Program web page, while the VLR program flyer will be updated each year with the future training schedule of event dates and venues.

Introduction

Following Tropical Storm Irene, Vermont recognized the need to create a training program for persons involved with in-stream work. State and local road maintenance personnel need exposure and experience with practices that minimize impacts to river stability and aquatic habitats and maximize infrastructure stability. The VTrans Post-Irene Task Force issued a recommendation to, “Expand VTrans, municipal, RPC and private sector operational knowledge of river dynamics at various levels.” The legislature passed Act 138 which called for ANR to, “Provide training on how to conduct stream alterations... activities necessary during...emergency conditions that pose an imminent risk to life or a risk of damage to public or private property... these trainings shall be made available to municipal, state and federal agency personnel.” The Agency of Natural Resources also recognized the benefits that such training would accrue and allocated river engineering and science staffing to work in conjunction with VTrans and the Vermont Fish and Wildlife Department to develop and deliver the Rivers and Roads Training Program.

VTrans Post Irene Task Force: “Expand VTrans, municipal, RPC and private sector operational knowledge of river dynamics at various levels.”

Act 138: “ANR shall provide training on how to conduct stream alterations... activities necessary during...emergency conditions that pose an imminent risk to life or a risk of damage to public or private property... these trainings shall be made available to municipal, state and federal agency personnel.”

Meeting on the Ground Needs

During flood emergency and recovery scenarios, the VTrans Maintenance and Equipment Workers and municipal road crews are on the front lines. River Management Engineer staffing limitations mean that VTrans operational staff have often had to implement recovery measures without technical assistance from ANR River Management Engineers. In these cases, operations staff can call upon design and engineering assistance from within VTrans but that assistance is limited in capacity and river engineering expertise.

With tight budgets and a lack of sufficient private sector expertise to draw on, municipal road crews are heavily reliant on ANR River Management Engineers and VTrans Operations staff for technical assistance. The consideration of river processes that promote long term river equilibrium (stability) and sustain quality habitat is relatively new in the engineering and design fields and there is not yet a widely-held expertise amongst design professionals within the private sector. Furthermore, municipal financial constraints restrict the extent to which municipal crews can utilize private sector expertise. Thus, the private sector does not now represent a sufficient resource to support flood recovery efforts at the municipal level.

In addition to serving VTrans and municipal road crews, the ANR River Management Engineers also serve private citizens, businesses and utilities during flood emergency and recovery periods. Private entities face the same financial and available technical assistance constraints that state and municipal entities do. This all creates a demand for ANR River Management Engineer assistance that can quickly outstrip capacity and results in instream work being conducted without sufficient technical assistance and oversight.

Another scenario that can lead to instream work being conducted without appropriate technical assistance is that of an imminent threat to life or property. When an imminent threat emerges, there may not be time to wait for technical assistance before taking action. While imminent threats may absolutely justify instream work conducted in the absence of technical assistance, it is also true that misinformed instream work, even when conducted with the intent of mitigating hazards, can significantly increase hazard levels.

In the absence of technical assistance, the degree of instream work conducted during flood recovery is in many cases excessive and only creates greater river instability. In other cases, the degree of work is appropriate but a lack of understanding of river processes leads to a less than ideal outcome and use of funds. These scenarios create the inevitable outcome that technical assistance capacity will be overwhelmed during widespread flood

recoveries. In order to increase Vermont's capacity to recover from flood events in a manner that increases Vermont's flood resiliency, the technical and operations staff who repeatedly find themselves on the front lines of flood recovery must be instilled with a basic level of knowledge of river processes, aquatic habitats and the appropriate and effective instream construction practices. This understanding will enable them to make better decisions about when and how to restore damaged infrastructure when technical assistance is not available. To that end the Rivers and Roads training is designed to:

1. Give front line transportation workers the ability to identify the degree and type of instability present at a particular river-road conflict site;
2. Give front line transportation workers the ability to estimate the degree of difficulty associated with rebuilding flood damaged infrastructure in a manner that accommodates stream equilibrium so that they know when to and when not to take action without technical assistance;
3. Give front line transportation workers the ability to rebuild flood damaged infrastructure while accommodating stream equilibrium and habitat features in less difficult situations;
4. Increase the capacity of VTrans design and engineering staff and private sector consulting engineers to provide assistance on those projects where accommodating stream equilibrium is more difficult.

Importantly, the training will increase general awareness and technical knowledge of river dynamics and habitat, so that better decisions can be made by technical and operation staff on the ground under normal situations on a day-to-day basis. *Significantly*, the training program has proven in the past 5 years to be very effective in building good relationships between the River Management Engineers (RME) and the participants who will respond to the next flood. The good rapport established in the training has already improved the working relationship on the ground between the RMEs and VTrans operations staff as proven in the aftermath of the July 28, 2014 flood in southeastern Vermont. The improved rapport expedited a very successful road repair project for flood recovery on Route 11 in Andover on 2014 that was quick, effective and economical.

Target Audiences and Course Descriptions

A myriad of skill sets are involved with design, construction and maintenance of transportation infrastructure. Not all transportation staff will use nor require the same degree of training. Not all transportation staff have the same degree of experience and formal education. These realities create a challenge to the effort of providing training in an efficient and effective method that is readily understood by all participants in any single training opportunity. To overcome this challenge the Rivers and Roads training has been developed as a tiered training in order to provide the appropriate degree of training to the various target audiences. Those audiences include:

- VTrans technical and operational staff,
- Municipal road crew personnel,
- Town Select Boards and Conservation Commissions, etc.,
- WSMD Rivers Program Flood Response Strike Teams,
- Other DEC, DF&W and DFPR technical and operational staff as appropriate,
- Private sector engineers, environmental and forestry consultants,
- Private sector equipment operators, and crew foreman of construction contractors,
- Regional Planning Commission and VTrans transportation planners,
- USDA NRCS and NRCD staff,
- Vermont Army National Guard Units.

Tier One Description

The Tier One training is an online self-guided training that creates a general awareness and understanding of: the societal value of rivers, the terms and concepts of physical river processes, aquatic habitat, the implications of historical river management, and how transportation infrastructure affects and is affected by physical river processes.

Tier Two Description

The Tier Two training is a classroom and field based training targeting the range of design, construction, maintenance and planning professionals. Tier 2 delves more deeply into the terms and concepts of physical river processes, aquatic habitat and the constraints and interactions between rivers and adjacent infrastructure. Tier 2 also explains the permitting process and standards that must be met when emergency protective measures implemented to mitigate imminent threats are authorized locally. The subject matter is presented via slide presentations, hands-on construction exercises in river simulation models referred to as river flume tables (see left-hand photograph on this report cover) and reinforced with in-field river observations and discussion.

Throughout the course of the training, participants come to understand that maximizing the accommodation of natural river processes leads to more robust riverside and stream crossing infrastructure. An emphasis is placed on accommodating stream equilibrium (e.g. vertical channel bed stability), avoiding practices that trigger further instability, and minimizing impacts to aquatic habitat during emergency flood response and recovery operations when technical support is not available. Specific topics include:

- Lateral and vertical river stability,
- Equilibrium channel width and boundary resistance,
- Reconstructing transportation infrastructure without creating or exacerbating vertical river instability,
- Recognizing where technical assistance is required to accommodate channel equilibrium, and
- Types and appropriate use of various reconstruction techniques.

Tier Three Description

The development of the Tier 3 training has now been completed as of 2016, with the goal that delivery will begin in the winter of 2017. Tier 3 will focus on advanced engineering and construction oversight topics, specifically the design and construction oversight of the stream alteration practices outlined in the 2014 *Vermont Standard River Management Principles and Practices* document. Because of its advanced and in-depth nature, the Tier 3 training has been developed as a series of modules with each module addressing approximately two stream alteration practices. The Tier 2 training will be a prerequisite to the Tier 3 training.

Class Sizes

The overall number of potential participants for each tier is large and the desired timeframe for getting those participants trained is short. An effective training program requires multi-day courses with small instructor to participant ratios. The below tables and graphs present a participant estimate and participant-instructor ratios for Tiers 2 and 3 trainings.

Table 1. Participant community and class sizes.

	Estimated Number of Participants			Class Sizes		
	VTrans	Other*	Total	Instructors Per Class	Participants Per Class	Participant In-structor Ratio
Tier 1	100	465	565	N/A	N/A	N/A
Tier 2	100	450	550	3	25	8.3
Tier 3	100	50	150	2	15	7.5

*Includes participants from municipalities, regional planning commissions, the private sector, consulting engineers and construction contractors in the next 5 years from 2017 - 2022.

Progress to Date

Tier 1 Trainings

Because the Tier 1 training is self-guided and offered via the internet with unrestricted access, visits are not tracked and it is not possible to state how many individuals have taken the training. However, the Tier 1 training is a prerequisite to the Tier 2 training, and based on informal surveys of Tier 2 participants, the estimate is that 90-95% of all Tier 2 participants have taken the Tier 1 on-line training.

Tier 2 Trainings

In October of 2012, a pilot Rivers and Roads Tier 2 Training was held for the purposes of testing the program as it had been developed at that point in time. Twenty-Five VTrans staff participated in the pilot training program. In 2013, four Tier 2 trainings were offered to VTrans staff at the VTrans Training Center (VTTC) in Berlin, VT, with field sites in Berlin and Waterbury. Approximately 20 VTrans staff participated in each of these trainings resulting in a total of 80 VTrans staff trained in 2013. Over the five years, 183 VTrans staff have attended.

In 2014, three Tier 2 trainings were offered to VTrans staff at the VTTC in Berlin. Three Tier 2 trainings were offered to municipal road crew members, local officials and regional planners at regional locations including Berlin, Mendon and Danville. Of the total 191 participants, 45 were VTrans staff and 41 were municipal road crew members.

In 2015, the Tier 2 format was modified slightly to mix participants from VTrans with those from municipalities. One state/municipal training was offered at the VTTC and three were held regionally in Danville, Cambridge and Wilmington. In addition, a special training was held for regional planning commission transportation planners (25 participants) and another was held for private sector engineers (18 participants), and both were offered at the VTrans Training Center in Berlin.

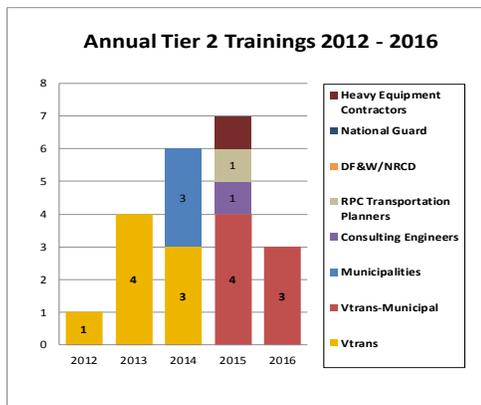


Figure 1. Tier 2 Training offerings, 2012 - 2016

Three state/municipal trainings hosted forty-seven participants for the Tier Two trainings in 2016. Trainings were regionally offered in Wilmington, Rutland, and Berlin VTTC. Over the five years, over 350 people have participated in Tier Two trainings.

Mixing participants from the various organizations is advantageous because it affords regional training sites to both VTrans and municipal staff and allows for state-municipal cross-pollination of ideas that results in technical transfer and the development of greater appreciation of differing perspectives which further builds good rapport among RMEs and participants. There were many instances during the state/municipal trainings in which VTrans and municipal participants conversed about the why and how of each-others' projects.

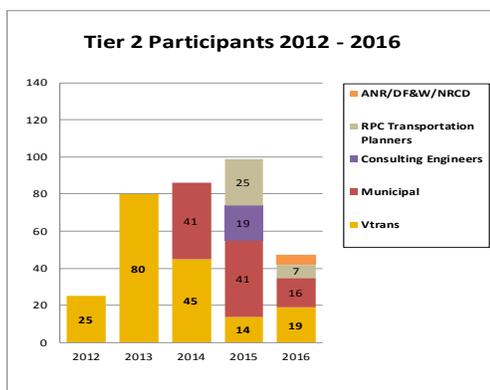


Figure 2. Tier 2 participant numbers grouped by organization 2012 - 2016.

The Regional Planning Transportation Planner training was held at the request of VTrans transportation planning staff as part of the VTrans Transportation Planning Initiative. Many of the Regional Planning Commissions' Transportation Planners have now attended the regional state/municipal trainings; helping to build support and understanding for municipal efforts and needs at a regional level during a flood recovery event. The private sector engineer training was the first of hopefully several offerings to the private sector engineering community to start in 2017.

The 2016 training year exhibits a steep decline in events offered and participants attending in comparison to the increase from 2012 through

2015. The decline observed in Figures 1 and 2 is attributed to the year of program staff transition in 2016 and identifies the need for promotion and marketing discussed at the end of this report.

Tier 3 Trainings

Tier 3 trainings will be directed at both the engineering and construction sector audiences and focus on design and construction oversight of river management practices. Subject matter will be taken primarily from the 2014 *Vermont River Management Standard Principles and Practices* document. The tier 2 training will be a prerequisite to the Tier 3 training.

The Tier 3 training was developed by a private consulting river engineer under a contract with the Lake Champlain Basin Program. The Basin Program's interest in funding development of the Tier 3 training stems from its priorities for improving the water quality of Lake Champlain and its watersheds both in Vermont and New York. The four training modules have been created for the technical designs, consistent with Vermont standards, for:

- Channel conveyance (opening-up clogged channels),
- Bed and bank stabilization (vertical and horizontal),
- Floodplain restoration, and
- Bridges and culverts.

As part of the contract, pilot trainings were held in both Vermont and New York in 2016. A total of 118 participants attended the pilot trainings of the four modules offered in 2016 Tier 3 half-day and full-day workshops.

Going Forward

Tier 1

Tier 1 trainings will continue to be delivered via the internet as a self-guided training that is required as a prerequisite to Tier 2 and available to anybody with internet access.

Tier 2

Planning for the 2017 Tier 2 training schedule, including assessment of remaining demand, is underway and the results of demand assessment will influence scheduling. However, based on previous demand estimates and the number of participants trained to date; preliminary plans are to hold two state/municipal trainings, and two trainings open to all sectors and focused more on the consultant and construction contractor private sector.

Figure 2 above shows that after the single pilot training in 2012 there was a peak in VTrans participation in 2013 and VTrans numbers have declined each year since then. In total 183 of the estimated 200 potential VTrans participants have attended the Tier 2 training to date. VTrans management is currently working to revise its estimate of continued demand for Tier 2 training. It is expected that VTrans staff participation will decrease as the total number of staff approaches the original estimate of 200. However, staff turnover and the potential interest in refresher trainings will likely mean that an estimate of 10 - 20 VTrans staff members will require training each year going forward.

With 251 municipalities across the State, it was originally estimated that a total of 350 municipal road crew personnel would participate in the Tier 2 trainings over time. However, that estimate assumed that in most cases, only road foremen would attend. The experience has been that many towns send several if not all of their road crew staff to Tier Two trainings. A reasonable revision of the estimated number of municipal staff interested in Tier 2 trainings would

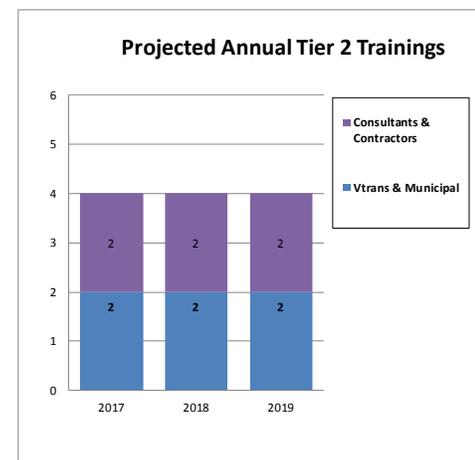


Figure 3. Planned Tier 2 Trainings from 2017 through 2019.

probably be in the range of 550 – 650. Staff turnover within VTrans and municipal crews is also a reality that must be kept in mind. To accommodate the estimated level of demand, four trainings are planned for years 2017 through 2019 (Figure 3 above). At the end of the 2018 field-training season, the remaining training need will be assessed and inform further Tier 2 offerings in 2019 and beyond.

In 2014, a representative of the Department of Forest Parks and Recreation (DFPR) attended a Tier 2 Training to assess the appropriateness of the training for State and private sector consulting foresters. In follow up discussions, DFPR has indicated it believes there would be value in educating foresters on river processes and he would like to organize a series of Rivers and Roads trainings for foresters. No firm plans have yet been developed on this initiative, but the Rivers Program agrees with the DFPR’s assessment and plans to coordinate on organizing trainings for both State foresters and private consulting foresters as soon as possible.

Tier 3

Now that the Tier 3 training program has been developed, a long-term plan will be developed for Tier 3 training delivery. The Vermont DEC is currently seeking funding to contract for delivery of each of the four Tier 3 modules in 2017 and 2018 which will be open to enrollment by any of the Program’s participant groups. It is estimated that 40 VTrans staff and 50 non-VTrans transportation infrastructure staff will be interested in Tier 3 trainings. Based on experience with the Tier 2 trainings, it is expected that the number of individuals per training will be approximately 15. If all 90 potentially interested individuals decide to take the entire Tier 3 series, then a total of 18 Tier 3 training events will need to be offered. The current plan is to offer at least three Tier 3 trainings each year beginning in 2017 and running through at least 2022. In 2022, the demand for continued Tier 3 trainings will be assessed and conclusions of that assessment will inform further plans to offer additional Tier 3 trainings.

Measuring Success

The best indicator of success will be the change in efficiency and effectiveness of the interactions between training participants and River Management Engineers and how river-adjacent road work is implemented during post-flood recovery. However, sufficient data on this indicator would be difficult to gather and would not be available for several to many years. As a substitute, Tier 2 evaluation forms are completed by each participant at the end of every training session. These evaluations provide information on how participants feel about the training and the extent to which the training has increased the ability of participants.

Evaluation results compiled through 2016 are provided in Figure 4. Ninety-nine percent of participants agree that the training was a good use of their time and that the content will be applicable to their jobs with 54 percent agreeing and 60 percent agreeing strongly with each statement.

The Tier 2 training program is significantly increasing Vermont’s transportation infrastructure technical and operation staff’s abilities to consider and accommodate river stability and aquatic habitat in the design and construction of flood recovery projects. Figure 5 (below) shows that 75 percent of Tier 2 training participants reported a moderate to very large increase (3 – 5 points) in their ability to incorporate river equilibrium and habitat elements into their flood recovery work because of taking the Tier 2 training. Also, shown in Figure 5 is that 72 percent of training participants report a moderate to very large increase (3-5 points) in their ability to communicate with State River Management Engineers. These changes brought about by the Rivers and Roads training program are the types of changes that must be realized if Vermont is going to meet its goals of improving flood resiliency and signifi-

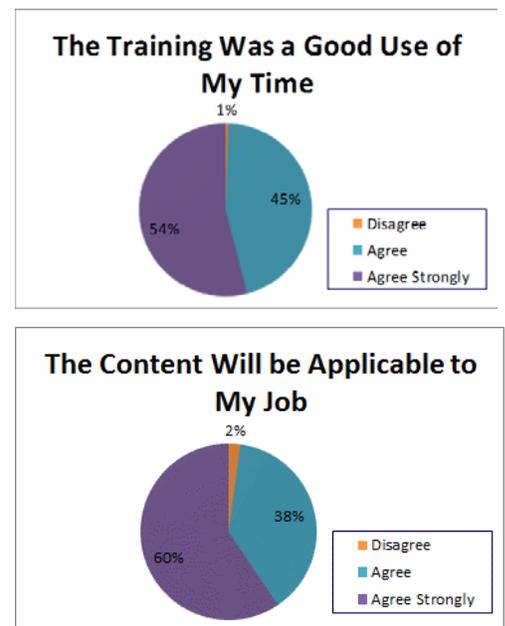


Figure 4. Participant response to Tier 2 training from 2012 to 2016.

cantly reducing the flood vulnerability of its transportation infrastructure statewide. The benefits of these trainings are also seen in the day to day work that the crews do outside of flood recovery. Regular maintenance work involving road projects like culvert and bridge replacement and bank stabilization are being accomplished with the principals and practices taught in the training; making our road infrastructure more flood resilient and improving aquatic habitat.

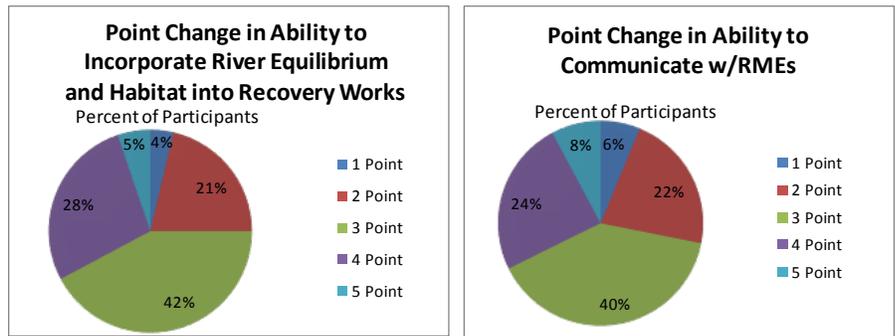


Figure 5. Change in participant’s abilities resulting from Tier 2 training from 2012 through 2016.

Continued Improvements in Training Content and Delivery

The Tier 2 evaluation forms are completed by each participant at the end of every training session to evaluate the sessions on how participants feel about the training and the extent to which the training has increased the ability of participants. A significant number of attendees write comments and suggestions for improvements to the training content and delivery, and these comments and suggestions have been duly-noted and incorporated in the first five years of the training program development and refinement.

The evaluation forms have resulted in continued improvements in training content and delivery that have been successfully incorporated over time. These include notes on the facility (i.e. venue acoustics and lighting), pacing of the class, delivery of the instructors, content and class handout materials.

The additions to content range from the small to the large, and two notable additions include class presentations on: 1) Working Outside of Highway Right-of-Way; and 2) Emergency Protective Measures. The “Working Outside of Highway Right-of-Way” is a brief outline of the 2015 legal opinion from the State Attorney General’s Office on Vermont law addressing State and municipal crews working beyond the established road right-of-way. The Emergency Protective Measures is a brief outline of a longer 2014 Rivers Program webinar that addresses municipal work in the immediate response to flood damage and authorization for the work.

The first versions of the *Vermont Rivers and Roads Field Manual* had been printed on paper and stapled prior to each event to accommodate revisions and suggestions from Evaluations from previous training events. The 2016 major version of the Rivers and Roads Field Manual was further refined (i.e. technical updates and more recent before- and after- flood reconstruction photos, etc.) and sent to a Vermont printer for 1,100 copies funded by the generous support of the Lake Champlain Basin Program.

The 2016 *Vermont Rivers and Roads Field Manual* is printed, laminated and spiral-bound for durability when kept in the vehicles used by road crews. The new field manual has been distributed to participants in the two October 2016 training events and will also be distributed to participants in previous training events. The comments on the evaluation forms have been positive about the manual and attendees have reported a great value in the field manual that will benefit their use in response to the next flood.

The Lake Champlain Basin Program also helped fund an updated printing of the 2010 *Vermont Stream Crossing Handbook* and the updated booklet of the 2012 *Living in Harmony with Streams: A Citizen’s Guide to How Streams Work* in 2016. A comment from the 2015 evaluations suggested that the training events have more printed handouts for future reference by participants. These two updated booklets were handed out in the 2016 training events in addition to the updated Field Manual, and will continue as future handouts while supplies last.

VTrans Vermont Local Roads Program

In 2016, the Vermont Local Roads (VLR) office staff moved into the VTrans Training Center (VTTC) office in Berlin, and VTrans transferred the internal management of the Rivers and Roads Training program from VTTC to the VLR program. The VLR and Rivers Program staff have met in 2016 to transition the training program and plan for future training events in 2017 and to review the training management, operations and schedule for a smooth Rivers and Roads Program transition.

These interagency meetings identified that summer Rivers and Roads training events have been poorly attended in comparison to spring and fall events, as road crews are busiest in both winter and summer periods of road maintenance. The high value of the field visits noted by participants in the Evaluation forms, and the uncomfortable cold weather experienced by trainers and participants in a 2015 winter training event, has resulted in the collective decision to not hold winter training events. These two discussions resulted in an agreement to no longer schedule winter and summer events and to move to only spring and fall training events to accommodate the busy maintenance schedules in winter and summer periods. This revision to future training schedules will hopefully allow for better attendance as the trainings are offered to a broader target audience to include consultants, contractors and other interested segments of Vermont society involved in flood response efforts.

The attendance of staff in the target audience is adversely affected by the travel distances in Vermont. These interagency meetings identified past event venues (northern, central and southern VT) and potential future locations to expand the geographic reach and proximity to a broader audience in the future.

Promotion and Marketing

The need to reach a broader audience inclusive of more segments of Vermont society has been mutually agreed upon as a priority. The purpose in drawing the attention of a wider audience warrants the promotion and marketing of the Rivers and Roads Training program. In addition, the Tier 3 segment of the Rivers and Roads Training program has been developed and, pending funding, the Tier 3 training events will be started in 2017.

The completion of Tier 1 and Tier 2 are a prerequisite for attending a Tier 3 training event. The VLR and Rivers Programs identified that promotion and marketing will be needed to effectively develop a pool of potential attendees who have already completed the Tier 1 and 2 trainings for attending future Tier 3 events.

The Rivers Program will be marketing and promoting the Tier 1 to Tier 3 events to increase attendance in the future. The Rivers Program and VLR will be enlisting the aid of other organizations as this promotion and marketing is now brought to a new level in 2017. The identified stakeholders that might assist in promoting and marketing the training program and future event schedules will include continued outreach through the Local Roads Program and reaching out to Vermont chapters of the American Council of Consulting Engineers (ACEC), Association of General Contractors (AGC), the Vermont League of Cities and Towns (VLCT), Regional Planning Commissions (RPCs) and possibly other organizations for assistance in reaching a broader audience.

A short report has been developed from this full report as a tool for promotion and marketing, and the short report is a narrative of the program development and success to entice new audiences to attend future training events. Likewise, a very brief Rivers and Roads entry will soon be posted on the WSMD Flow blog site.

Appendix

- A. Rivers and Roads Evaluation Comments 2014 – 2016
- B. Rivers and Roads Flyer 2016
- C. Rivers and Roads VLR Flyer Tier II 2016
- D. Rivers and Roads 2016 Short Report

Vermont Rivers and Roads Training Program 5-Year Progress Report December 2016

“Show Me and I’ll Remember the River”

Appendix A – Rivers and Roads Evaluation Comments 2014 – 2016 (grouped by type of participants)

This summary of comments about the Rivers and Roads Training are compiled from the participants exit comments that were written in the margins of the Evaluation Form. Many participants wanted to provide additional feedback in addition to answering the specific questions. Other verbal comments from conversations in the 5-year training have been written down and added to the summary below.

The Rivers and Roads Training program was initiated in 2012 with a pilot-training event the first year and followed with another 19 training workshops in spring 2013 through fall 2016. The success of the 5-year program is captured in the participant’s comments below on how valuable and beneficial they felt their attendance in the workshop would be for their future job performance.

VTrans Technical and Operations Staff

“I’ve worked for VTrans for 16 years now and this is the best workshop I’ve had here.” - engineer staff

“Great course!” - construction staff

“Excellent!” - from both engineer staff and District Project Manager

“Interesting and interactive, wish I had more opportunity to do stream restoration work.” technical staff

“Great mix of theoretical and applied learning.” - technical staff

“Extremely helpful, great group to learn from.” - operation staff

“Building relationships with ANR folks was beneficial.” - operation staff

Municipal Road Crew Staff

“This workshop was great and better than I expected. The field visits really tied together the slide show and river flume table presentations. I always learn more that way – tell me and I forget, but show me and I remember. Thanks”

“I really got a lot out of it. Thanks!”

Consulting Engineers

“Many thanks for all your preparations and hard work.”

“The education of connecting the book learning with what you see in the field, and the design strategies to address river instability.”

“Very friendly and willing to hold discussions/answer questions.”

Regional Planning Commission Staff

“Extremely informative! Well done!”

“Very useful and informative.”

“The information provided can be used on so many different levels.”

“I liked chatting with the ANR folks and sharing thoughts.”

“Nice job! I’ll recommend that my team attend.”

“I liked the mix of field and classroom work, variety of instructors. Good memorable useful course.”

“Very clear, good illustrations, interaction. Thanks! Learned a lot!”

“The theory behind all the techniques and actually seeing the post-project. Had a blast.”

“Knowledgeable. Great class, learned a lot more than I knew.”

USDA NRCD Staff

“This workshop was extremely helpful, relevant and worthwhile information and explanations were delivered in an accessible and clear way, and I felt there was a bridge built between having river expertise and being a new learner. The workshop attendees learned terminology and information that will help us be effective contributors to future projects and help us prevent disastrous ‘solutions’ and fix problems. Thank you!” - from Windham County NRCD Staff



“RIVERS AND ROADS” Training Program
Presented by the VT DEC Rivers Program,
VT DF&W Fisheries Division and
the VTTrans Local Roads Program

Considering the River in the Design, Construction and
Maintenance of Transportation Infrastructure in Vermont

Tier One

Tier One is a short, easy to access, easy to follow and interesting training designed to create an overall awareness and understanding of fundamental river processes: what is meant by river equilibrium, what causes rivers to be stable or unstable, how transportation infrastructure can play a role in river stability and why it is in our best interest in flood resiliency to work towards stability of our rivers and streams. The Tier One training is an online self-guided course for VTTrans, towns, construction contractors, design consultants and regional planning commissions (RPCs) in which the fundamentals of river processes are explained using a combination of text, graphics, photographs and narrated video clips. The online course can be completed in an hour, question and answer sections are not recorded, and Tier One is a prerequisite for taking the Tier Two training and go to <http://dec.vermont.gov/watershed/rivers/river-management#training> to access and view the web training presentation.

Tier Two

Tier Two trainings are offered each Spring and Fall to build on Tier One and create a more in-depth understanding of river processes in one-day and two-day events. The Tier Two events are a combination of classroom, indoor river flume table exercises and field trips to observe rivers and streams at work.



Classroom



River Flume Table



Field Trip

“RIVERS AND ROADS” Training Program
Presented by the VT DEC Rivers Program,
VT DF&W Fisheries Division and
the VTrans Local Roads Program

Tier Two focuses on requirements for river equilibrium with a specific application to emergency flood response and recovery operations when design-level technical support may not be readily available to reconstruct roads consistent with the VT Rivers Program Standards for Stream Alterations. The Tier Two trainings are intended to share ideas and also to forge relationships that will benefit Vermont’s rivers and transportation system well into the future. Attendees will have an opportunity to share ideas of “Irene Lessons Learned” and develop an efficient and effective dialogue with VT ANR River Management Engineers when discussing projects impacting river systems after Irene and in the future.

Tier Three

The Tier Three training program is currently under development with VT ANR, VTrans, NY DEC and a consulting team for presentation to VTrans, towns, RPCs and the consulting community in 2017. The Tier Three training program will be a more in-depth technical understanding of the design of road and river reconstruction techniques in consideration of river processes in four categories of specific techniques for recovery of transportation infrastructure following the next flood.

Training Program and Contact Information

The Vermont Rivers and Roads Training Program has been developed to promote community flood resiliency as a result of our common “Lessons Learned” after Tropical Storm Irene hit Vermont in 2011. The training is for a wide range of state, municipal and private sector transportation staff. Participants leave the training with the knowledge and skills to distinguish between stable and unstable rivers, identify various types of river instability, forecast a rivers response to alternative structural elements and design and build those treatments for more robust repairs to our roadway infrastructure.

The first three years of training events have received unanimous praise and participants have expressed that the afternoon field trips to the river brought home the information from the class room and river flume table exercises indoors. Participants should be prepared for afternoon field classes with sneakers or water proof footwear and raincoats for the opportunity to observe our rivers and streams at work.

Training events will be held annually across the state in Spring and Fall. More information on the Roads and Rivers training opportunities can be found at the following web site:

<http://dec.vermont.gov/watershed/rivers/river-management#training>

Questions, comments and training schedule inquiries can be directed to Todd Menees at (802) 345-3510 and/or email to todd.menees@vermont.gov



Rivers & Roads Tier II Roads Scholar Workshop: 2-Day 16 Environmental hours



Disclaimer: The town acknowledges and accepts that its participating representatives are acting in their scope of employment while attending this workshop.

Cancellation Policy

If you need to cancel your registration, please call us since we often have waiting lists for classes. Someone may substitute for you at any time. We will notify registrants if the workshop needs to be cancelled for any reason. If you have any concerns about the weather or other circumstances that may affect the workshop please call 802-828-3537.

Photos/Videos: By registering for this workshop, you understand and agree that VLR will be taking photos and may publish them in any format or media without additional permission from you if you are in the photo.

2016 workshop series presented by the Vermont Local Roads Program.

Sponsored jointly by the Federal Highway Administration and the Agency of Transportation.



Please register me for the "**Rivers & Roads Tier III**" workshop:

Name _____

Town Address _____

Municipality/District/Agency _____

Area Code/Phone _____

Email _____

- Tuesday & Wednesday - October 4 & 5, 2016 - Rutland Town Garage, 339 Northwood Park Road, Rutland, VT
- Tuesday & Wednesday - October 18 & 19, 2016 - Wilmington Town Garage, 21 Haystack Road, Wilmington, VT

Vermont Local Roads Program | VTrans Training Center | 1716 US Route 302 | Berlin, VT 05633-5002

Instructor

TODD MENEES - RIVER MANAGEMENT ENGINEER

Vermont DEC Rivers Program

Todd has contributed to the authorization of Stream Alteration Permits, providing technical assistance for in-channel activities for private and public landowners, assessing the stability of Vermont's rivers, overseen the design and construction phases of river related projects and river restoration projects, and provided trainings and technical assistance on the topic of river mechanics and the interaction of rivers and transportation infrastructure.

STACI POMEROY – RIVER MANAGEMENT SCIENTIST

Vermont DEC Rivers Program

Staci has contributed to the development of scientific methods to assess the stability of Vermont's rivers, provided technical assistance to geomorphic assessments and river projects, and conducted many trainings on river processes.

RICH KIRN - FISHERIES BIOLOGIST

Vermont Department of Fish and Wildlife

Rich is the coordinator for fish and aquatic organism passage and other aquatic habitat issues. Rich is one of a team of biologists responsible for managing the state fisheries which includes finding ways to minimize impacts of road projects and other development on aquatic habitat and fish populations.

About

Participants will gain the skills needed to develop riverside infrastructure maintenance and repair to increase the stability of rivers and the lifespan of infrastructure. This two-day workshop includes lecture and related field work to help accomplish river infrastructure maintenance and development goals.



IMPORTANT!

A portion of this class takes place outside so you should be prepared for weather events. Wear tall rubber boots, hats, sunscreen, sun glasses; have rain gear available, and make sure you are protected against ticks.

Learning Objective

As Tropical Storm Irene and many floods before have demonstrated, Vermont's transportation infrastructure is highly vulnerable to erosion and inundation hazards associated with river flooding.

Tier Two of the Rivers and Roads Training Program targets a wide range of state, municipal and private sector transportation professionals. Participants leave the training with the knowledge and skills required to distinguish between stable and unstable rivers, identify various types of river instability, forecast a rivers response to alternative structural treatments and build those treatments.

*This course has a prerequisite of Rivers and Roads Tier I. This course can be completed online and takes about an hour. To take the course, follow this link:

<http://dec.vermont.gov/watershed/rivers/river-management#training>

Audience

- ◆ Design & construction oversight engineers
- ◆ Highway Department Staff
- ◆ Road Foreman
- ◆ Road Commissioners
- ◆ Town Administrators

Max 30 students per workshop

Class Running Time

8:00 - 8:30 am: Registration

8:30 am: Workshop Begins

11:30 am - 12:00 pm: Lunch (provided by VLR)

4:30 pm: Workshop Ends

*We will be in the field looking at rivers, please dress accordingly.

Locations

October 4 & 5, 2016 - Rutland Town Garage

October 18 & 19, 2016 - Wilmington Town Garage

REGISTER ONLINE AT:

www.localroads.vermont.gov

MAIL TO:

Vermont Local Roads Program

VTrans Training Center

1716 US Route 302

Berlin, VT

05633-5002

Fax:

802-828-1932

Questions please call:

802-828-3537 or 802-828-3768



Vermont Rivers and Roads Training Program 5-Years of Progress

Show Me and I'll Remember the River

Considering the River in the Design, Construction and Maintenance of Transportation Infrastructure in Vermont

There is a saying "*Tell me and I'll forget, but show me and I'll remember*". This saying has been a common theme heard from folks attending the Vermont Rivers and Roads Tier II Training Program in the first five years of the training workshops held throughout the state from 2012 to 2016.

Vermont mandated the development of a Rivers and Roads Training Program in Act 138 of 2012 as an outcome of the 2011 Irene flood devastation and response in the aftermath. The state Rivers Program, Department of Fish and Wildlife and VTrans took this mandate to heart and developed the training program for three-tiered workshops on how to better achieve flood resiliency when rebuilding devastated roads, culverts and bridges.

Response of Participants

Now five years later, the comments from over 350 attendees have been unanimously positive with many folks saying this "show me and I'll remember" comment in various ways in their own words such as "*the afternoon field trips really brought home the message from the morning class and river flume presentations, and now I have a better understanding of what to do after the next flood hits Vermont.*"

Participants leave the Tier Two training with the basic knowledge and skills to distinguish between stable and unstable rivers, identify various types of river instability, understand a rivers response to alternative structural elements and designs and build those treatments for more robust repairs to our roadway infrastructure. The workshops are open forums for participants to share their experiences in the Irene recovery and other floods and discuss what did work well and what did not work well in reconstruction efforts.

Participants included 183 VTrans staff and 98 Town road crew staff who are our frontline in flood recovery and are working on rivers and roads in daily operations all year round.

A *summary review of Evaluation forms* submitted by participants at the end of each training event was compiled for the 5-year period to assess the recent success and future needs of the Rivers and Roads training program. This summary shows a marked improvement in the message reaching the audience in just 5 years. More people report strong agreement that the event was a good use of their time and applicable to their job, and more people report strong agreement that the content will help them rebuild more flood resilient roads while recognizing the importance of providing for aquatic habitat.

The training program has proven to be very successful in the past 5 years in building good relationships between the River Management Engineers (RME) and the participants who will respond to the next flood. The good rapport established in the training has already improved the working relationship on the ground between the

RMEs and VTrans operations staff as proven in the aftermath of the July 28, 2014 flood in southeastern Vermont. The improved rapport expedited a great road repair project for flood recovery on Route 11 in Andover in 2014.

The participants recognize that the workshops identify the best ways to reconstruct roads, culverts and bridges to better withstand the next flood. The participants can understand that flood resilient repairs meet their budgets and can better stabilize those projects and that they can minimize the consequences and costs of future repairs.



Classroom



River Flume Table



Field Trip

The Vermont Rivers and Roads Training Program has been developed to promote community flood resiliency because of our common “Lessons Learned” after Tropical Storm Irene hit Vermont in 2011. The training is presented in Tier One, Tier Two and Tier Three levels to reach a wide range of state, municipal and private sector transportation staff; and starting in 2017, will also be offered to consultants, construction contractors, Select Boards, Conservation Commissions, foresters and loggers, etc. working with roads and flood recovery work.

Future Training Schedules

The Tier One Training will continue as an online self-guided training that creates a general awareness and understanding of the societal value of rivers, the terms and concepts of physical river processes, the importance of aquatic habitat, the implications of historical river management, and how transportation infrastructure affects and is affected by physical river processes. The web link below provides access to the Tier One information.

The future Rivers and Roads Tier Two Training schedule will be 2 workshops in each spring and fall for a total of 4 workshops per year. The future training schedule will be open for all entities with staff whose job duties are related to transportation infrastructure and flood recovery work. The future workshops will be scheduled around the state giving consideration for driving times to afford a broader participation by those living around the Green Mountains. These Tier Two workshop schedules will be set annually in mid-winter and distributed broadly.

The Tier Three Training began in 2016 as a series of 4 modules addressing stream alteration practices focused on advanced engineering and construction topics in the design and construction of the stream alteration practices outlined in the 2014 *Vermont Standard River Management Principles and Practices* document. These annual Tier Three workshop schedules will also be set mid-winter each year and distributed broadly.

Questions, comments and training schedule inquiries can be directed to Todd Menees at (802) 345-3510 and/or by email sent to todd.menees@vermont.gov. The following web link will bring you to a brief general overview of the Rivers and Roads Training Program informational flyer on the Rivers Program web page where you can read more about how the program is offered to “show me and I’ll remember the river” and see Tier One for yourself.

http://dec.vermont.gov/sites/dec/files/wsm/rivers/docs/Rivers_and_Roads_Flyer_2016-08-29.pdf