

Is the Thornton Re-Leaf Cost-Sharing Program a cost/effective and scalable model for increasing Best Management Practices on non-agricultural riparian lands in Rappahannock County?



**RappFLOW volunteers on planting day at the Old Schoolhouse buffer site, March 2007.
(Photo by Ray Boc)**

**Technical Report for DCR Minigrant
01-TAPP-2005-RTE
June 2, 2007**

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Project Title: Residential and Commercial Best Management Practices for Nutrient Reduction in the Thornton River Subwatersheds: The Thornton River Re-Leaf Project

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This report presents activities and outcomes of a small project, Thornton River Re-Leaf, conducted from March through May 2007 in Rappahannock County, VA, supported in part by a minigrant from the Virginia Department of Conservation and Recreation (DCR) and the Chesapeake Bay program. For a complete list of partner organizations please see <http://rappflow.org/about/partners.html> In this project we developed and tested a cost-sharing and education program for residential and commercial landowners to improve and protect riparian buffers in order to reduce nutrients and sedimentation in our streams. Our focus in this report is on the project's cost/effectiveness and scalability as a model for countywide implementation.

Background

Among the Rappahannock Tributary Strategy goals for improving water quality and habitat by the year 2010 is reduction in nutrient and sediment loading. The Rappahannock County allocations for the Tributary Strategy "Input Deck" provide us with useful provisional goals for 2010 for forestry, agricultural, and urban/suburban Best Management Practices (BMPs) with respect to riparian forested buffers and hence reductions in erosion, sedimentation, nutrients, biological impairments and other contamination. The Tributary Strategy for our County calls for an increase, by 2010, from 972 to 1,704 acres of forested buffer area in agricultural BMPs, and the establishment of 908 acres of forested buffers in urban/suburban BMPs.

Individual landowners have the power to make and implement decisions concerning land use and management practices that affect water quality and riparian corridors. Volunteers, landowners, community leaders, and our partner organizations have discussed at length the issues, mechanisms, incentives and strategies needed to overcome challenges that confront landowners when they consider making changes in land use and management associated with conserving and restoring vegetative riparian buffer areas.

Several tools and incentive programs are available from state and federal agencies to assist agricultural landowners. However, as our Tributary Strategy Input Deck shows, we also have the new challenge of implementing riparian buffers on 908 acres of non-agricultural or "suburban" land by 2010. The concept of a vegetated riparian buffer as a Best Management Practice on non-agricultural land is a new idea to landowners in this rural county. Our challenge is to help landowners learn why and how to conserve or restore vegetative riparian buffers on non-agricultural use parcels, manage stormwater runoff, and follow other practices to reduce nutrients, preserve water quality, and enhance wildlife habitat.

Purpose of this project

Our goal is to design and implement a county-wide cost-sharing and education program for suburban residential/commercial landowners. Within that goal, the purpose of this Thornton River Re-Leaf project is to develop and test a pilot program and evaluate its cost/effectiveness as a model for countywide implementation. We developed and tested the model in one subwatershed in the area around Sperryville. (See Attachment A Map 1: Thornton River and Map 2: Thornton River land cover).

Sperryville was selected as the test area for the following reasons:

- A downstream segment of the Thornton River was recently designated 303d "impaired" by the VA DEQ; (See Map 1)
- RappFLOW's organizational headquarters is located in Sperryville;

- Sperryville area includes a large proportion of residential and commercial land uses; (See Map 2)
- RappFLOW has conducted extensive watershed assessment studies in the Upper Thornton River subwatershed. (See <http://www.rappflow.org/upper-thornton-watershed/index.html> and http://www.rappflow.org/my_watershed/index.html).

Essential components of the model program “Thornton Re-Leaf”

The work in this project was to develop and implement six main components of a model program, assess the outcomes, and evaluate the model. The six main components include the following:

1. Targeted audiences. The primary audience for this Thornton Re-Leaf project are landowners in the Upper and Lower Thornton River subwatersheds whose lands are adjacent to streams, and who do not qualify for agricultural BMP cost-sharing programs. The secondary audience is similar landowners elsewhere in the county, as well as county leaders, who will learn from the project through our outreach activities.
2. Assessing riparian sites. Scientifically-sound and practical methods by which nonprofessional volunteers can assess riparian buffers and recommend improvements in land management.
3. Volunteers. People to conduct site assessments, interview landowners, recommend land management practices, prepare sites, plant buffer vegetation, conduct public outreach activities.
4. Riparian sites’ buffer characteristics. Residential and commercial properties along streams; opportunities for improved management practices.
5. Cost-sharing program. Design of the program itself. Criteria for selection of sites, and list of incentives offered to landowners.
6. Program administration. Coordination, scheduling, record-keeping, database management.

In the sections below we report the outcomes for each of these components, including lessons learned and questions for further investigation. Based on those outcomes, we estimate costs of an ongoing operational program under this model.

1. Activities and Outcomes Relative to Targeted Audiences

We conducted the following activities to inform the target landowners about this program.

- Using GIS and a parcels database, we identified 214 parcels intersecting upper and lower Thornton.
- We checked the owner database with county offices for accuracy and made corrections.
- Letters were sent to these landowners, inviting them to learn about the program and come to an Earth Day activity at RappFLOW headquarters.
- RappFLOW volunteers who are residents of Sperryville identified certain sites they thought may be candidates for site evaluation.
- Articles were published in the local newspaper about riparian buffer vegetation and Earth Day.
- We conducted an Earth Day event for demonstrations and consultations with experts on topics related to buffers vegetation and water quality.
- Flyers were placed in local eateries.
- We posted project information on our web site.
- We made a presentation to the Planning Commission about the program and received a formal commendation from that body for the work.

- The Old Schoolhouse buffer restoration project, our first buffer vegetation implementation, is highly visible in the village and has attracted attention of local residents to the subject of riparian buffers.
- Eagle Scouts are designing signage for our buffer sites to educate the public.
- Volunteers have acquired copies of several brochures on topics related to riparian buffers and low impact development and these are being disseminated in various ways in the community, including a display in the public library.
- We discussed a powerpoint presentation by Tim Bondelid at a regular monthly RappFLOW meeting concerning the science and practicality of riparian buffer improvements.

Outcomes: To date, some level of personal contact beyond the mailed letter has been made with 15 landowners in the targeted subwatersheds regarding their interest in the program. The number of conversations per individual landowner has ranged from one to six. Some regularized method must be created for scheduling follow-up to a landowner inquiry. More challenging is the number of conversations needed to work out an agreement with the landowner regarding his/her commitment to particular land management practices.

2. Activities and Outcomes Relative to Methods for Achieving Reductions in Nutrients and Sedimentation

We conducted the following activities to identify methods for achieving reductions in nutrients and sedimentation in the targeted subwatershed.

- With technical assistance from Greg Wichelns of the Culpeper Soil & Water Conservation District, we identified characteristics of land use and land management on non-agricultural lands in this specific watershed that are most likely to help reduce NPS pollution, especially nutrients and sedimentation.
- We learned from recent scientific literature regarding performance of various vegetative cover in relation to nutrients in surface and subsurface runoff. [1, 2]
- We discussed with several landowners their own objectives with respect to their land use and management.
- Based on the above, we developed a site assessment form to use in guiding assessments, interviewing landowners, reporting results to landowners, and communicating among the buffer volunteer team. This form will need to be further tested and revised through use by volunteers with a range of background knowledge, on a greater variety of sites. (See attachment F).
- Our Master Gardeners prepared a list of native trees, shrubs and grasses tailored to riparian lands in our locality. (See <http://www.rappflow.org/stream-buffers-2007/riparian-buffer-plants.html>)

Equally as important as restoring and improving riparian buffers, is protecting against future losses of buffer vegetation. With increasing gentrification and changes in land uses, a major danger is in loss of existing protection of the streams. Potentially the most effective method for achieving protection of riparian areas from future development will be through new provisions of the county ordinances. We are working with the county stormwater ordinance development committee to help establish that protection.

3. Activities and outcomes relative to volunteers

The pilot program relies upon volunteers to perform all aspects of the work, from program administration to review of scientific literature to education to site evaluation and planning to implementation of buffer restoration plantings. We depend upon technical and scientific guidance from the Culpeper Soil & Water Conservation District and the Virginia Department of Forestry to assist in

training our leaders and volunteers. Some of our volunteers bring special expertise as well, such as Master Gardeners, professional horticulturalists, a hydrology modeling specialist, and a GIS specialist. We conducted the following activities to recruit, train, and coordinate volunteers:

- We defined needed roles for volunteers: project planning and coordination; public outreach; site assessment; site planning; site preparation; planting trees, shrubs and grasses; identifying sources of plant materials. (See example volunteer job descriptions at <http://www.rappflow.org/join.html>).
- We hired a part-time Volunteer Coordinator to recruit and coordinate volunteers.
- We recruited volunteers through personal networking at meetings such as Garden Club, Biodiversity Task Force workshops, Master Gardeners and Master Naturalists meetings, RappFLOW meetings, and other community events.
- We trained volunteers in the field, with the assistance of experts from our partner organizations.
- We built a database of volunteer contact information and kept records of hours spent on individual activities.

Outcomes. In this project we found it possible to recruit some number of volunteers for all facets of this work. Altogether about fifty volunteers have contributed about 1500 hours to this project over the past four months. (Please see photos of volunteer activities in Attachment I to this report.)

The primary challenge to sustaining this program as a model is that of building a dependable, well trained cadre of volunteer leaders capable of conducting the site assessments, interviewing landowners, making land management recommendations, and writing site assessment reports. In the short time of this project, we were able to develop a site assessment form and engage six persons at some level in these site assessment activities. We estimate that to sustain the program within the Thornton subwatersheds over time, we would need a cadre of at least six fully trained persons each of whom can take the lead role in site assessment. Another group of 6 volunteers at any given time would be in some stage of training and would accompany a lead person on a site assessment. Site assessment leaders would each work an average of two to four hours per week on these tasks.

One lesson learned in this project is the importance of having residents of the subwatershed area under study as part of the assessment team. Their ability to talk neighbor-to-neighbor with the landowners adds important credibility to the program. Thus if a program along this model were to be scaled up county-wide, we would need to recruit and train site assessment teams appropriate for each targeted subwatershed.

4. Activities and outcomes relative to sites assessed

An understanding of the characteristics of the “urban” sites and landowner interests is essential to design of a cost-effective program. To help build such understanding, we conducted assessments on 11 separate landowner sites in the Sperryville area. Please see Attachment A Page 4 for map of the sites assessed. These included seven commercial and four residential use sites. We developed a GIS database to track landowners, sites, and status of the work for each site. (See attachment G). The following summarizes results of those assessments:

- For one of the commercial sites, both the site itself and the landowner objectives allowed for a full buffer vegetation restoration project, the Old Schoolhouse buffer restoration. This site is serving as a training ground for volunteers as well as public outreach and education site. See Attachment A page 5 for aerial view and page 6 for site plan of the Old Schoolhouse buffer site.

- For three of the commercial sites, the site itself does allow for improvement in the buffer vegetation. At the time of this writing negotiations are in process to see exactly what changes in land management practices the landowners will agree to under what conditions.
- For three of the commercial sites, neither the site itself nor the landowner objectives will allow for any improvement or restoration of vegetative buffers or changes in the land use. Typically, the reason is that all of the riparian buffer zone is currently being used for commercial purposes and there is no space to add vegetation.
- One of the four residential sites is ideally buffered and the landowner is fully supportive of maintaining the land in that condition.
- One of the residential sites would benefit from additional vegetation in the buffer area, and negotiations are underway with the landowner.
- The other two residential sites would benefit from additional vegetation and the landowners do not want to change the land management practices. These cases are important because they reveal challenges to the landowner in considering any changes in their existing practices.

Based on these results, we estimate that approximately one-third of sites to be assessed will result in decisions to improve the buffer vegetation to at least some extent. One type of residential site that has not yet been evaluated is the larger suburban-type residential property of 5 – 10 acres. We expect that landowners on these sites may be more interested in changing land management practices than are those in the smaller town lots.

5. Activities and Outcomes relative to the cost-sharing model

We developed a provisional set of criteria for selecting sites for cost-sharing implementation. These include the following:

- opportunity for reductions in nutrient and sedimentation runoff based on site characteristics;
- landowner interest and commitment;
- opportunity to use as educational site;
- cost/benefits of interventions;
- not eligible for agricultural cost-sharing programs.

Table 1 below shows the results for 11 sites evaluated in the pilot program according to these criteria. None of the sites are eligible for agricultural cost-sharing programs.

Site Number (C)ommercial (R)esidential	Site Improvable (0 – 5)	Landowner commit. (0 – 5)	Educational site (0 – 5)	Cost/benefit (0 – 5)
1 C	4	4	5	4
2 C	4	3	4	4
3 C	3	3	3	3
4 C	0	0	3	0
5 C	0	0	4	0
6 C	0	0	4	0
7 C	4	2	4	3
8 R	0 (Ideal now)	5	1	1
9 R	3	3	2	3
10 R	3	0	2	0
11 R	3	0	2	0

Table 1: Cost-sharing criteria values for eleven sites evaluated.

We developed a provisional list of items the program can offer to the landowner either at no cost to the landowner or on a cost-sharing basis. These include:

- Evaluating streams, drainage, buffer vegetation on the site
- Testing soil or water
- Suggesting buffer and land management improvements based on landowner objectives.
- Drawing up a site plan, schedule of activities, and budget;
- Choosing and acquiring native trees, shrubs & native grasses;
- Preparing the ground; removing invasive vegetation;
- Planting;
- Maintaining the buffer area.

One lesson learned is that the landowner must commit to maintaining new plantings in the buffer area. We learned that it is not practical to expect volunteers to monitor the ongoing requirements of new plantings for watering and other care.

Table 2 below shows our estimates of the number of volunteer hours that would be required per site, on average, under an operational program based on this pilot model.

Planning Tasks per landowner site	Estimated volunteer hours per site
Scheduling contacts with landowner & volunteers	1
Maintaining database and GIS mapping	1
Evaluating site	2
Interviewing landowner	1
Testing soil or water	.5
Suggesting buffer and land management improvements	1
Writing report on assessment	1
Negotiating agreement with landowner	2
Drawing up a site plan, schedule, and budget	5
Total cost for assessment and planning	14.5 hours
Implementation Tasks per landowner site	Estimated total hours for implementation by volunteers and landowner
Choosing and acquiring native trees, shrubs & grasses;	2
Preparing the site (assume one-half acres per site)	30
Planting; (assume one-half acres per site)	30
Maintaining the buffer area one year.	30
Total cost for implementation	92 hours

Table 2: Estimated average volunteer and landowner hours per site in an operational program

Preparing a detailed site plan sometimes requires skills and knowledge typically possessed by a landscape gardener. A budget of \$100 per selected site is allocated to this component in order to obtain their services on a contract basis.

Is there a more cost/effective method for achieving the goal of establishing better riparian buffers on more sites in this subwatershed? One idea would be to place more emphasis on creating broad public awareness of the program and then place more of the responsibility on the landowner to initiate the

assessment and planning activities. Albemarle County, for example, in April 2007 announced a cost-sharing program. “This innovative cost share program will reimburse qualifying property owners for 50% of the cost of new riparian plantings on their property, including materials and labor, and is available to any property owner of non-agricultural riparian land within impaired watersheds in the county. This program places all the responsibility on the landowner to initiate the activity and implement the buffer. See <http://www.albemarle.org/departments.asp?department=planning&relpage=9382> for description of the program. However, that program does not take advantage of volunteer expertise and labor as the form of the cost-sharing. Another approach is to target specific landowners whose sites appear to be good candidates for buffer restoration.

6. Activities and Outcomes relative to program administration

The primary administrative tasks accomplished during this pilot program included the following:

- Collecting and maintaining records of landowner inquiries and contacts.
- Scheduling site visits, landowner interviews, and volunteer activities including training
- Maintaining records on volunteers and volunteer hours
- Designing, creating and updating database and maps of landowner sites, assessments, status
- Developing and updating information on sources of native plants and contacts with providers

Outcomes. The project team was able to accomplish the needed administrative tasks for purposes of a pilot project. However, to administer an efficient operational program over time, additional administrative processes will need to be established and regularized to receive requests from landowners, respond in a timely manner to landowner inquiries, schedule the activities, and establish efficient flow of information among the team and landowners. It is likely that a paid program coordinator will be needed in order to accomplish this.

Summary and Conclusions

Six main components of a model program were designed, developed and evaluated. The following summarizes lessons learned regarding each component and recommends next steps for an operational program.

Targeted Audiences. A public education outreach campaign will be needed in order to create awareness and interest among candidate landowners. The most effective methods are personal networking within the locality. Volunteers can accomplish this if they are provided with appropriate materials to use in making contacts with neighbors and acquaintances. Packets of brochures are in preparation for this purpose.

Site Assessment. The draft site assessment form needs further testing and revision through training of volunteers with varying backgrounds on a wide range of site conditions.

Volunteers. There is an adequate pool of volunteers available to conduct all facets of this program. A well-trained cadre of volunteer leaders needs to be built, capable of conducting the site assessments, interviewing landowners, making land management recommendations, and writing site assessment reports. Residents of the targeted subwatersheds are a necessary part of that cadre.

Sites Assessed. Five out of eleven sites assessed in this pilot project were judged to be potentially eligible for some intervention and cost-sharing. We fully implemented one site and four are in the site planning and landowner negotiations stage.

Cost sharing program. On average, given an ongoing operational program operating according to the model developed in this pilot project, it will require about 14.5 hours of volunteer time per site for assessment and planning. For implementation of a half-acre buffer site it will cost approximately 92 hours to be cost-shared between landowner and program. The project steering committee intends to

hold further evaluation sessions to consider changes to the model that would achieve greater benefits at lower cost in terms of volunteer time for site evaluation, landowner negotiations, and planning.

Program administration. To administer an efficient operational program over time, regularized administrative processes will need to be established to respond to landowner inquiries, schedule the activities, and establish efficient flow of information. It is likely that a paid program coordinator will be needed in order to accomplish this.

Other Actions. For protection of riparian buffer areas in future residential development, we would like to see a riparian buffer overlay zone in the county ordinances. We are working with the county stormwater ordinance development committee to assist in that effort.

References

- 1) Alexander, Richard B., Elizabeth W. Boyer, Richard A. Smith, Gregory E. Schwarz, and Richard B. Moore, 2007. The Role of Headwater Streams in Downstream Water Quality. *Journal of the American Water Resources Association (JAWRA)* 43(1):41-59. DOI: 10.1111/j.1752-1688.2007.00005x
- 2) Mayer, Paul M., Steven K. Reynolds Jr., Timothy J. Canfield, Marshall D. McCutchen, 2005. Riparian Buffer Width, Vegetative Cover, and Nitrogen Removal Effectiveness: A review of Current Science and Regulations. EPA/600/R-05/118. October, 2005.
- 3) USEPA, 2007. <http://www.epa.gov/nps/toolbox/>