

People, land and streams of the Upper Thornton River Watershed: A model for countywide watershed management planning

Proposal submitted to the National Fish and Wildlife Foundation by RappFLOW in January 2005

I. Project Abstract:

A. RappFLOW (Rappahannock Friends and Lovers of Our Watershed), a grassroots watershed protection group in Rappahannock County, Virginia, requests support for Phase II of a multi-year process to develop and implement a model watershed management plan. Our approach combines rigorous analytic and scientific methods with broad stakeholder participation, focus on individual landowner responsibility for land management, and close coordination with local government. A grant from NFWF will help us launch a strategy to improve water quality protection tools to meet the goals of the Chesapeake 2000 Agreement, the Rappahannock Tributary Strategy, and the local County Comprehensive Plan. The proposed work builds upon accomplishments of Phase I, funded in part by NFWF. We will leverage financial and in-kind support from thirteen organizations and many individuals to complete a pilot watershed plan in one subwatershed of the County. Our methodology and model will provide the foundation for watershed planning not just for Rappahannock County, but for partner groups working across the upper Rappahannock watershed.

B. Final product(s) - Outcomes will include:

- a comprehensive geographic information system (GIS) database for the Upper Thornton River watershed (one hydrogeologic unit and a subwatershed of the Rappahannock);
- field and desktop assessments of the current and future vulnerability of subhydrologic units, using well-documented methodology from the Center for Watershed Protection;
- selection of one subhydrologic unit for a pilot project;
- a management plan for the selected subhydrologic unit including individual landowner management decisions;
- a community-based, volunteer-driven assessment process;
- training of 15 + volunteers who learn the scientific methodology to support the first and subsequent assessments in the County and surrounding areas;
- three stakeholder meetings to solicit community input;
- two education and outreach events for the general public in Rappahannock and surrounding counties;
- at least three projects that protect or enhance water quality through voluntary landowner actions; partnership with Rappahannock County's Water Quality Advisory Committee (established in early 2005 through efforts by RappFLOW and Rappahannock County);
- a plan for mid-project assessment and evaluation of final outcomes;
- a plan for county-wide watershed assessment in Phase III; and
- dissemination of the model to local community, partners, and agencies and watershed protection groups in the Upper Rappahannock watershed.

II. Proposal:

A. Project need. *Background and Impact on Local Community*

In summer 2002, interested citizens and representatives from local and regional stakeholder groups founded *RappFLOW*. Our mission is to help preserve, protect, conserve and restore water resources and Rappahannock County's watersheds. Phase I was funded in part by the NFWF and over \$31,000 in matching support from local organizations and volunteers. Phase I established a foundation for future watershed protection efforts through broad stakeholder involvement, community education and outreach, an atmosphere of inclusiveness and openness, strong ties with experts in government, business, and nonprofit organizations, and identification of high priority watershed protection issues. RappFLOW planned, promoted, conducted, and reported on five public education events on air and water quality in the Shenandoah National Park; riparian buffers; erosion/sedimentation/stream protection; sustainable forestry; and the effect of agriculture on water quality and mitigation strategies. Attendance increased at

each public event, from 75 to 300 participants. Partners include citizen volunteers, state and federal agencies, local government, and local and regional conservation organizations. See <http://www.RappFLOW.org> for more information.

RappFLOW attracts community leaders and a wide range of stakeholders. Participants include excavators, construction contractors, fishermen, farmers, educators, local artisans, woodworkers, sawyers, forest landowners, foresters, homeowners and other land-owners. Members of the board of supervisors and planning commission and the county administrator served as lead participants and speakers. Each event successfully raised awareness through publicity and features stories in the local paper, exchanges in the press and a County list serve. Through direct participation and briefings by RappFLOW coordinators, the Board of Supervisors, Planning Commission, and citizens are now better prepared to use watershed protection tools at the individual landowner and county level.

Phase I culminated in a strategic planning workshop of 25 participants representing key stakeholder groups. They expressed overwhelming affirmation that RappFLOW should facilitate the citizenry and leaders through a scientifically-sound process to determine the steps for protecting its watersheds.

Current Project Status and Need

Strategic planning workshop participants identified the following issues as central to future watershed management and water quality protection:

- Lack of detailed data on water quality and related land cover/land use in a usable form to support landowner/local leader decision-making on watershed assessment and water-related priorities.
- Increasing fragmentation of land holdings, land cover and land use due to development, gentrification, and shifts in agricultural economics and practices.
- Need for additional landowner awareness and education regarding best management practices and associated cost sharing programs such as CREP.
- Need for deeper awareness/understanding among citizens and civic leaders of watershed and water quality concepts, facts, and issues. "People see our streams as clean and plentiful."
- Need for stronger and more detailed implementation of the policies and principles of the Rappahannock County Comprehensive Plan and enforcement of existing ordinances.

RappFLOW organizers worked in the fall and winter of 2004 to prioritize and decide how to meet these needs. Each volunteer's interests and passions are reflected in the objectives and tasks we undertake. We chose the Rapid Watershed Assessment methodology for identifying and analyzing key information because we desire to establish a scientifically defensible knowledge base for this work. We will use this analysis to support individual and community participation in decision-making in a multi-year watershed planning effort. RappFLOW has a five-year goal of facilitating the County leaders and citizens through a process to develop and implement additional local plans and incentives (perhaps ordinances) and volunteer efforts to support watershed protection. The proposed project will support this goal by

- 1) creating a systematic database and analytic framework;
- 2) establishing the methodology for county and regional watershed planning;
- 3) implementing immediate on-the-ground projects that protect water quality and serve as demonstration projects; and
- 4) build community support for future efforts and adoption of watershed managements plans.

Since Phase I was completed, RappFLOW organizers already initiated the following tasks:

- **Obtain funds to begin Phase II.** A mini-grant from the Rappahannock-Rapidan Planning District Commission and Virginia DCR was awarded in January 2005. This grant may serve as matching funds to a grant from NFWF.
- **Collect all data currently available in digital form for the County's watersheds** from state and federal agencies, conservation groups, stream monitoring sites, and other sources. We have assembled an extensive collection of geo-referenced digital files for such variables as topography, land cover, streams, and geology. In addition, biological, chemical and physical data are available. **(see Attachment C for a list of in-hand and data known to be available at this time).**
- **Obtain training for RappFLOW core volunteers** and key partners through the Center for Watershed Protection's five-day Watershed Protection Institute. We have been awarded scholarships and other cost-sharing funds to support this training for three leaders. Leaders will finalize methodology for assessment of the Upper Thornton subwatershed and management planning on one subhydrologic unit.

- **Strengthen communications and coordination with local government and agencies.** RappFLOW is represented on the Water Quality Committee reporting to the Board of Supervisors, and regularly updates state and federal agencies on our progress. Please see letter of commitment from the County of Rappahannock in Attachment B.

B. Goals and Objectives –

- The long-term goal of this initiative is the incorporation of watershed management plans in the 2009 revision of the County’s Comprehensive Plan. In addition, the project will work to address the goals of the Chesapeake 2000 Agreement, and the Rappahannock Tributary Strategy, which recognizes that although the river was long considered one of the cleanest rivers on the East Coast, it now suffers from significant degradations in water quality. Our goals for Phase II of this project are to:
 - Preserve, protect and restore the water quality in the Upper Thornton River subwatershed.
 - Create, test, and evaluate an approach to community-based watershed assessment and planning for Rappahannock County that is applicable elsewhere in the Upper Rappahannock watershed.
 - Use the project findings to develop a management plan in one subhydrologic unit of the Upper Thornton subwatershed;
 - Design Phase III to complete assessments/management plans in other areas of Rappahannock County.
 - Support local decision making regarding watershed protection for riparian lands.
 - Help citizens prepare for 1) future TMDL implementation processes in areas surrounding the five category 5 impaired stream segments identified by the Virginia Department of Environmental Quality; 2) meeting goals in the Rappahannock Tributary Strategy; and 3) meeting the goals of the Chesapeake Bay 2000 agreement.

The objectives of this pilot project are to:

- Integrate scientific, social, educational, economic, engineering, and political aspects of watershed management in ways that work for our people, topography, geology, cultures, land uses, land cover, economy and political processes; and utilize a rigorous scientific method which evaluates geospatial, biological, chemical, and physical data to characterize a stream and its subhydrologic unit, then determines its vulnerability;
- Engage the full range of stakeholders, with support of local, state and regional government and other organizations; and train volunteers in scientifically rigorous methods of conducting such assessments;
- Work with landowners/other stakeholders to analyze and understand the health and vulnerabilities in small watershed areas; present information to landowners/ stakeholders in ways useful for decision-making; and help landowners to decide upon and implement best management practices for improving our watersheds;
- Help Rappahannock County’s governing bodies understand public policies and tools best suited to addressing our watershed’s vulnerabilities; and
- Evaluate the environmental, economic, and political effectiveness of our model approach.

What we learn from this project will greatly enhance our community’s ability to develop an effective county-wide watershed management plan over the next five years. At the same time, we intend for our model to be useful to other similar localities in rural Virginia.

C. Overall context:

From a biological standpoint, the Rappahannock is now considered the most degraded of the three lower Chesapeake Bay tributaries. Steep slopes in the upper basin make soil and nutrients susceptible to erosion. Among the Rappahannock Tributary strategy goals for improving water quality and habitat by the year 2010 are: reduction in nutrient and sediment loading, addressing chronic erosion and stream bank instability in the western Rappahannock basin and implementing the Conservation Reserve Enhancement Program (CREP) basin-wide.

Rappahannock County is an ideal location to test and implement a model watershed management planning process that would help meet the Tributary Strategy goals. The project will address specific commitments in the *Chesapeake 2000 Agreement*: 1) Preserve, protect, and restore those habitats and natural areas that are vital to the survival and diversity of the living resources of the Bay and its rivers; 2) Achieve and maintain the water quality necessary to support the aquatic living resources of the Bay and its tributaries and to protect human health; 3) Develop, promote, and achieve sound land use practices which protect and restore watershed resources and water quality, maintain reduced pollutant loadings for the Bay and its tributaries, and restore and preserve aquatic living resources; and 4) Promote individual stewardship and assist individuals, community-based organizations, businesses, local

governments, and schools to undertake initiatives to achieve the goals and commitments of the agreement.

The County is at the headwaters of the Rappahannock River watershed, and covers an area of about 267 square miles. The county seat is about 65 miles southwest of Washington, D.C. and 120 miles northwest of Richmond. The northwestern boundary is in the Blue Ridge Mountains. The Rappahannock River forms the northeastern boundary with Fauquier County. Altitudes range from about 3,700 feet above sea level in the Blue Ridge, to the lowest point at 360 feet near the Culpeper County border. Most of the County can be classified as steep hillside, and it includes portions of six hydrologic units, including the Upper Thornton River (**please see maps provided in Attachment A**). The watershed is dissected by over 2,000 stream segments and 96 % of drinking water comes from private wells, springs or streams.

Criteria for Choosing the Upper Thornton Subwatershed for Study in Phase II

In the winter of 2004, RappFLOW chose the Upper Thornton sub-watershed, an area of approximately 93 square miles, as its main study area for the pilot project. The following criteria helped identify that area:

- Includes properties owned by large land owners and is undergoing changes in land use
- Represents a mix of land uses (varied vegetative cover types, forestal, agriculture, residential, commercial)
- Includes some of Rappahannock's impaired water segments
- Contains some growth areas with planned future residential and commercial growth
- Includes examples of CREP implementation and several examples of BMPs
- Begins in the upper reaches of the Rappahannock River watershed and lies entirely within Rappahannock County (helpful for management planning)
- Includes the Shenandoah National Park, one of our key watershed protection assets
- Represents a topographic mix from steep slopes to flood plains (see map).

The Upper Thornton subwatershed also:

- provides an opportunity to address gentrification as it pertains to water quality;
- is represented on the Board of Supervisors by the current Chairman and Vice-Chairman.

It includes:

- at least three examples of CREP and some BMPs;
- two water segments designated as impaired by VA DEQ; two of the County's major growth areas, the Town of Washington and the village of Sperryville.

Sperryville has the county's only treatment plant (in addition to one in the SNP) and Washington is planning to build a new treatment plant. Residential and commercial development are expected in both locations.

Rappahannock is a scenic, rural county dominated by forestal land uses. Including the Shenandoah National Park (SNP), which represents 31,700 acres of the county's land area, nearly 69 percent of land cover is deciduous, mixed, or evergreen forest. About 74,000 acres are in commercial forestland. Pasture, hay, and crops account for nearly 30 percent of land cover, and less than one percent of land cover is low density residential.

The County's population in 2000 was 6,983. While the economy of the County has historically been based upon agriculture, the decade of 1990-2000 saw the most precipitate decline in agricultural employment in the County's history. One of the 10 main goals of the County's Comprehensive Plan is to "encourage and maintain a viable rural agricultural and tourism-based economy compatible with the County's size and character." A complementary goal is to "discourage the continuing conversion of land from agricultural uses to other uses that challenge our ability to stabilize and balance our local tax base." One important focus of RappFLOW is on helping to preserve the agricultural economy and land use in ways that protect and enhance the water resources and watersheds.

As of 1994, there were approximately 20,000 acres in Agricultural and Forestal Districts. Over 14 percent of privately owned land in the County is under conservation easement. Several organizations, including the County government, have proactive programs to encourage conservation through easement and purchase of development rights. The Board of Supervisors adopted a down-zoning of approximately 90 percent of the County's land area in 1986, thereafter allowing a maximum development density of one dwelling unit per 25 acres. Much of the Comprehensive Planning justification for this legislation was based on natural resource conservation imperatives.

D. Methodology:

The project's overall framework will be based upon a merging of two primary watershed planning methods. This unique framework incorporates all dimensions of the assessment and planning, including community participation, individual landowner decisionmaking, public policy, and scientific analysis. We derive steps for education,

outreach and community involvement from the book published in 2004 by VA-DCR entitled *Local Watershed Management Planning in Virginia: A Community Water Quality Approach*. For the environmental inventory, data analysis, and goal setting components of this framework, we will adapt, test, and evaluate methodologies that have been previously tested and documented by the Center for Watershed Protection (CWP).

RappFLOW as an organization has not previously undertaken a watershed management planning project, but its members and core volunteers have been involved with related projects. Please see brief bios for Jill Keihn, our Science and Education Coordinator, and Beverly Hunter, GIS specialist and coordinator, in the letters of commitment in Attachment B. Experience of key participants includes site design for low impact development, conservation planning, GIS analysis and mapping, erosion and sediment control permitting, BMP and CREP implementation, forest management planning, large-scale watershed management planning in a 385-square mile watershed with comparable land use, and environmental education. Training through the watershed protection institute for project managers will supplement this expertise. No permits will be required.

Three project leaders (Coordinators Keihn, Hunter, and Gannon) will attend the Center for Watershed Protection's (CWP) 5-day Watershed Protection Institute in March 2005. As part of the tuition, each participant will receive six hours of hands on consultation with CWP. These consultation hours will be divided between assistance in tailoring the methodology to our study site, and peer review at key stages of the project. Final methodology will be designed by the time NFWF makes its grant awards, and at that time a refined version of the planned methodology described below will be provided. Proposed methodology includes the following:

Task 1. Upper Thornton subwatershed Vulnerability Analysis to determine which subhydrogeologic units are most vulnerable to current and future land development.

We will apply image analysis and spatial analysis techniques with digital orthographic images and other digital data for our study area to quantify factors such as streamside vegetative buffers and slopes. We will delineate subhydrogeologic unit boundaries; characterize the biological, chemical, and physical environment utilizing GIS-generated and field measurements of indicators such as: stream flow; current and future stream quality from a water chemistry profile; composition and diversity of aquatic community; streamside vegetative community (canopy cover); erosion potential; covertype percentages (including vegetative and impervious surfaces); habitat potential; rare, threatened or endangered species; estimates of future impervious and erosion-prone surfaces such as new roads due to development build-out under current zoning; topography; and wetland types and approximate acreage.

This characterization will form the baseline for a ranking system, as applied in the "Rural Quality Point Method" used in the Goose Creek watershed. The ranking system will assign favorable points based on a high fraction of forest cover, high coverage of land protected with conservation easements, and extensive streamside forest cover, and unfavorable points based on poor in-stream and factors including designated impaired waters, water quality violations, poor to fair IBI (Index of Biotic Integrity) scores, presence of fish barriers, unusual non-point source areas, septic and animal density, bacteria level, and high animal bacteria density. We will use the net favorable point score to determine the Rural Quality Point total for each subhydrogeologic unit and to identify most vulnerable areas.

Task 2. Engage Key Watershed Stakeholders

We will engage public input, especially from local landowners in the study area, and train volunteers for each task. The Culpeper Soil & Water Conservation District and the USDA NRCS will provide expert staff at these meetings. The group will solicit public input to the selection of which subhydrogeologic unit will be the focus for the demonstration management plan. The plan will be a community-driven effort. This process will be driven by DCR's *Local Watershed Management Guide* referenced above.

Task 3. Assess Current Watershed Protection Capability in Rappahannock County

The partners will review current land use planning, land conservation, buffers, better site design, erosion and sediment control, storm water management, non-storm water discharges and watershed education, and conduct a critical review of these programs in conjunction with county officials and the Water Quality Advisory Committee.

Task 4. Watershed Analysis in Priority Subwatershed

RappFLOW will undertake a detailed assessment of land use, land cover, stream conditions, point sources, and priority conservation areas in one subhydrogeologic unit identified in task 2, using CWP's methodology and public input. In addition to expert partners and trained volunteers, students from public, private schools, and home-schooled students and teachers will participate in this process. This will include:

- 1) a conservation area assessment to inventory/map major conservation areas;
- 2) build-out analysis based on current zoning, with scenarios based on alternative future land use change and especially construction of new private roads;
- 3) a Rapid Stream Assessment, to include a survey of the headwater streams using the Rapid Stream Assessment Technique (RSAT) to measure factors that can help to identify locations and designs for riparian reforestation, stream restoration, and bank stabilization; and
- 4) create a report and maps documenting results and assessments.

Task 5. Conduct Small Watershed Planning in Priority Subwatershed

We will lead the community through the development of the plan, in consultation with local government and agencies, and with the participation of land owners and other watershed stakeholders. CSWCD and NRCS staff will work individually with landowners. The plan will include a map that illustrates to the extent that it is economically/politically feasible the proposed land use plan for the subhydrogeologic unit, conservation areas boundaries, stream buffers, reforestation areas, and other management actions. Recommendations will be made with respect to more protective criteria including land conservation, better site design, erosion/sediment control, storm water treatment practices, septic systems and landowner stewardship. The plan will include draft overlay districts and ordinances.

Task 6: Disseminate the plan

The partners will prepare and distribute a summary of the plan to watershed residents as part of an overall strategy described in the Dissemination section of this proposal.

D. Evaluation

Results will be measured in the following ways:

- Quantitative evaluation, including: number of acres of riparian lands protected, through implementation of BMPs, conservation easements, etc.; number of landowners participating in open meetings at the subhydrogeologic unit level; number of landowners initiating contact with RappFLOW and its partner organizations; number of public meetings in Rappahannock County held to discuss water quality issues; number of citizens attending RappFLOW community events.
- Plans for ongoing monitoring and evaluation of water quality changes in the study area.
- We will consider whether final products/outcomes are completed, including all those mentioned in the abstract of this proposal.
- Because this project is meant to further the goals of the C2K agreement and the Rappahannock Tributary Strategy, as well as the local comprehensive plan, RappFLOW will hold bi-annual peer review meetings that include local government and agencies partners that help implement these plans, including Rappahannock County, USDA-NRCS, DCR, and Culpeper Soil and Water Conservation District.
- Because this is a community-based project, we will want to provide an open forum for the citizens of Rappahannock to provide feedback. We will publicize this opportunity county-wide. RappFLOW's website will provide an ideal spot to collect information in the form of general e-mail, or use of a standardized feedback form. This feedback opportunity will be publicized at each event, training, or gathering. It will also be publicized in articles submitted by RappFLOW to the local media.
- Because this is a long-term, volunteer-based effort, we will want to hear from volunteers about how well they are trained, and whether the training excited them about participation in the planning process. RappFLOW will develop a questionnaire for volunteers to glean feedback after trainings, and will use information gained to assess how volunteers are recruited, and how they are trained. Coordinators will produce a similar questionnaire for use following volunteer work in the field.

E. Dissemination –

We will: establish a formal steering committee that represents diverse interests; expand and maintain current website and publish all materials/data; provide quarterly updates of progress to the Board of Supervisors; provide status reports at each meeting of the county's Water Quality Advisory Committee (RappFLOW is a member); submit articles on water issues and assessment findings to the press to help shape discussion; involve the community in assessment/demonstration plan development; invite representatives of groups in Rappahannock and surrounding counties with a stake in watershed protection to participate in trainings/outreach events; and complete/distribute summary of Phase II findings/methodology/replicability for partners and other groups in surrounding areas.

G. Partner Justification and Community Involvement

Letters of support, including documentation of commitment, are provided as attachment A. Primary partners include: *RappFLOW* with Rappahannock County as fiscal agent.

Hearthstone School, Rappahannock High School and Home School Students. Participation in field assessments, coordinated by Jill Keihn. See letters from Hearthstone and Beth Gall, Rappahannock High School Environmental Science Teacher. Beverly Hunter helped establish a new GIS class at Rappahannock High School, will involve GIS students.

Shenandoah National Park - will share data with RappFLOW and provide peer review.

Rappahannock County Health Department - involvement in events as they relate to public health, volunteer support

*Culpeper Soil and Water Conservation District** - project peer review, support for CREP and BMP consultation and implementation, assistance in education and outreach, and consultation for leadership and direction

*USDA Natural Resource Conservation Service** - project peer review, support for CREP and BMP consultation and implementation for farmers, assistance in education and outreach, and consultation for leadership and direction

Virginia Department of Forestry - education and outreach, expertise and consultation in forest management planning

Virginia DCR –mini-grant funding; education and outreach, peer review, and guidance on watershed management planning

Virginia Agricultural Extension (local office) – guidance on targeted landowner outreach, particularly in agriculture

*Rappahannock-Rapidan Regional Commission** - funding support and consultation for leadership and direction

*Piedmont Environmental Council (PEC)** - core volunteers, grantwriting, communications, conservation outreach, and expertise from watershed management planning exercises like that in the Goose Creek Watershed

*Piedmont Research Institute** - core volunteer support, mapping, GIS assessment and analysis, and website development

*Rappahannock League for Environmental Protection (RLEP)** - cash cost sharing, core volunteers, event planning

Please also see letters of support from: *Targeted Learning Corporation; Mount Vernon Farm; Krebsler Fund; Rural Madison; Rappahannock County Conservation Alliance (RCCA)*; Jill Keihn.*

* indicates substantive review of project and methodology