

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Climate Change and Natural Resources

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	10%	10%	10%	0%
102	Soil, Plant, Water, Nutrient Relationships	10%	10%	10%	0%
104	Protect Soil from Harmful Effects of Natural Elements	10%	10%	10%	0%
111	Conservation and Efficient Use of Water	5%	5%	5%	0%
112	Watershed Protection and Management	10%	10%	10%	0%
123	Management and Sustainability of Forest Resources	15%	15%	15%	0%
124	Urban Forestry	5%	5%	5%	0%
131	Alternative Uses of Land	10%	10%	10%	0%
133	Pollution Prevention and Mitigation	5%	5%	5%	0%
135	Aquatic and Terrestrial Wildlife	10%	10%	10%	0%
403	Waste Disposal, Recycling, and Reuse	5%	5%	5%	0%
605	Natural Resource and Environmental Economics	5%	5%	5%	0%
	Total	100%	100%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	19.6	0.8	18.9	0.0
Actual Paid Professional	21.2	1.5	24.2	0.0
Actual Volunteer	1103.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
441404	148360	441724	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
624529	180561	993357	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
1853506	70578	5471887	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Primary outputs from this program include the following: developing and delivering educational programs such as short courses, workshops, field days and tours, seminars, conducting applied research and link with extension, develop and maintain demonstration areas, developing collaborative partnerships with government officials, state agencies, non-governmental organizations, developing and disseminating educational materials such as extension bulletins, journal articles, conference proceedings, webinars, trade journal articles, DVD's, and developing and maintaining web based educational materials such as short courses, webinars, web sites, and discussion boards.

2. Brief description of the target audience

Farmers, forest owners, loggers, Christmas tree growers, youth, homeowners, mill owners and workers, private consultants and companies, local governmental officials, private landowners, waste water treatment operators, state and federal agencies, nongovernmental organizations, professional associations and societies, and community groups.

3. How was eXtension used?

The program has three Extension efforts.

1. Forest Farming eXtension Community of Practice - This project uses eXtension to create a national virtual community to synthesize and deliver synchronous and asynchronous forest farming educational programs, encourage and inform forest farming initiatives, compile comprehensive forest farming data, incorporate cutting-edge technology, and equitably address social and biophysical variability. eXtension's optimization metrics capture the community's characteristics, resources, behaviors, and activities.

2. Wood Products Community of Practice- Web site: http://www.extension.org/wood_products
Description: The goal of the Wood Products CoP is to disseminate knowledge on the design, production, management, marketing, and environmental impact of wood products to small and large wood products manufacturers

3. Geospatial: Map@syst - Map@Systis a community of practice devoted to the outreach and education for geospatial technologies and their application to today's world. The Map@syst community provides information on using geospatial technologies and how geospatial technologies are making a difference in peoples' lives. may@syst is responsible for the Geospatial Technology resource area within eXtension.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	482420	105348	49064	547

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2012
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	17	71	88

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of educational programs offered.

Year	Actual
2012	425

Output #2

Output Measure

- Number of educational materials and curriculars developed

Year	Actual
2012	63

Output #3

Output Measure

- Number of applied research projects.

Year	Actual
2012	169

Output #4

Output Measure

- Acres of land exposed to educational programming efforts.

Year	Actual
2012	530000

Output #5

Output Measure

- Identifiable impacts reported by agents/specialists

Year	Actual
2012	174

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increased number of people adopting at least one new or improved land management practices.
2	Improved natural resource industries that contribute to community viability.
3	Number of participants learning about the quality of their private water supply and about private water system maintenance by participating in a county-based Virginia Household Drinking Water Program water testing clinic.
4	Increase in the number of individuals who gain knowledge as certified nutrient management planners in turf and landscape systems.
5	Increase in the number of acres covered by nutrient management plans in turf and landscape systems due to participation in Extension educational programs.
6	Increase in the tons of compost produced from organic wastes typically land-applied (manure, biosolids) or land-filled (yardwaste, biosolids, industrial sludge) as a result of increased knowledge and skills.
7	Increase in the number of people directly impacted by new or improved land management practices
8	Increased public awareness of climate change, biodiversity, and ecosystem services.
9	Increased number of stakeholders involved in community natural resource management and decision-making.
10	Increase program participants understanding of raw material conversion and modern business management practices.
11	The general public, landowners, and loggers use the forest in alternative and traditional ways to increase value and profit.
12	Increase in the number of acres directly impacted by new or improved land management practices.
13	Number of projects assembling transcriptomes for vertebrates and invertebrates from the Southern Appalachian Mountains

Outcome #1

1. Outcome Measures

Increased number of people adopting at least one new or improved land management practices.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	439

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Forests are Virginia's primary land cover. Because 68% of the Commonwealth's forests are privately owned, private forest landowners (PFLs) are an important link to meet the Commonwealth's goal that "Virginia's natural resources will be enhanced." Regionally, "private forestland stewardship" is a priority issue in the Northern District Forestry and Natural Resources Situation Analysis. Extension's Northern District holds 3.5 million acres of these woodlands. Traditionally, PFLs have been difficult to reach because of their sheer numbers and short ownership tenure. As land continues to be sold and divided into smaller pieces, forestland ownership is turning over. On average, a given piece of woodland will have a new owner every seven years or less. As a result, there is a continual need to educate new landowners and acquaint them with professional assistance availability. Research into landowner decision making highlights the importance of planning, professional assistance and peer influence to increase stewardship while meeting society's demands.

What has been done

A variety of educational offerings provide forest landowners with learning and networking opportunities. Annual Landowners' Woods & Wildlife Conferences and Forestry and Wildlife Bus Tours showcase good management practices and connect landowners with local natural resource professionals. Peer-to-peer learning is facilitated through the Piedmont Landowners Association (PLA), a volunteer lead association that offers monthly educational and networking opportunities. Additional outreach targets forest landowners through online and printed media such as the On-line Woodland Options Course.

Results

An average of 500 landowners, representing approximately 20,000 forested acres, participates in at least one educational offering each year. Participants of management related programs indicated an increase in knowledge and an intention to put practices into place. Follow-up evaluations reveal various implementations such as, completed management plans, controlled invasive plants, improved wildlife habitat and conducted successful timber sales. Approximately 30% of program participants contact a natural resource professional following educational events. One landowner, following recommendations from class, increased the value of his timbersale 150% from \$20,000 to \$50,000.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
111	Conservation and Efficient Use of Water
123	Management and Sustainability of Forest Resources
124	Urban Forestry
133	Pollution Prevention and Mitigation
135	Aquatic and Terrestrial Wildlife
403	Waste Disposal, Recycling, and Reuse

Outcome #2

1. Outcome Measures

Improved natural resource industries that contribute to community viability.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	66

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Virginia currently has 5 wood fired electricity generating facilities under construction. These facilities will be operational before the end of 2013. Combined, they will have a generation capacity of approximately 300 MegaWatts (MW) and will have the capacity to utilize approximately 3 million tons of wood per year to generate electricity. Much of this new supply of wood for energy will come from logging residues such as limbs, tops, and previously unmerchantable trees left behind after logging operations were completed. Loggers, foresters, and procurement staff for these new wood to energy facilities are working to determine how these facilities will impact their existing operations, and where the new supply will come from. With much of the woody biomass feedstock expected to come from existing logging operations, many loggers across the state are trying to determine if biomass harvesting will be practical and beneficial for their operations.

What has been done

The SHARP Logger Program worked with industry partners who will be procuring much of the new biomass supply needed for operating these renewable energy facilities. The SHARP logger program developed a continuing education workshop which was offered at 3 locations across VA (New Castle, Chatham, and Franklin). The workshop began with a classroom training and afterwards participants traveled to a field site to see multiple whole tree chippers operating on logging jobs with conditions similar to what they would find if they added a whole tree chipper to their own operation to produce biomass "fuel chips".

Results

A total of 380 participants were able to learn more about biomass harvesting, and gain additional information to help them decide whether or not biomass harvesting will be a good fit for their business operations. Participants were able to view the latest equipment available for biomass harvesting and see it in operation to help determine which equipment they would like to purchase if they decide to harvest biomass. The workshops served as a networking opportunity for loggers to meet with procurement personnel who will be purchasing biomass and to meet with equipment dealers who can provide the equipment needed for biomass harvesting. Participants were provided information which could help them to make a more informed decision about whether or not they want to invest in the equipment needed to produce biomass for these new market in Virginia.

4. Associated Knowledge Areas

KA Code	Knowledge Area
104	Protect Soil from Harmful Effects of Natural Elements
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
124	Urban Forestry
605	Natural Resource and Environmental Economics

Outcome #3

1. Outcome Measures

Number of participants learning about the quality of their private water supply and about private water system maintenance by participating in a county-based Virginia Household Drinking Water Program water testing clinic.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Nearly one quarter (22%) of Virginia's population (1.7 million people) relies on private water supply systems, such as wells, springs and cisterns, for their household water supply. In the US, public water supplies are regulated under the Safe Drinking Water Act by the Environmental Protection Agency, which mandates regular testing and water treatment. Homeowners who use private water supplies are completely responsible for routine testing, system maintenance and addressing any water quality problems, should they exist. Lack of knowledge about private water supply management and water quality issues may lead to system neglect and a lack of regular water testing, which can have serious implications for water quality, longevity of the water supply system, and, ultimately, the health of the families who rely on these systems.

What has been done

Cooperative Extension (VCE) county agents, volunteers, and agency collaborators in private water supply testing, maintenance, treatment, and protection. VAMWON trained VCE agents organize and conduct county-based VAHWQP drinking water clinics with support from on-campus faculty. Trained VAMWON volunteers and agency collaborators provide direct outreach to private water system users and support VCE trained VAMWON agents. Private water supply users can participate in one of the 16-22 county-based VAHWQP drinking water clinics held per year. Clinic participants collect and submit household water samples that are analyzed for 12 chemical parameters, total coliform bacteria, and E. coli. Three weeks later, test results, an explanation of those results, and possible water treatment options are discussed with clinic participants at an interpretation meeting. This interpretation meeting is a critical value-added component unique to VAHWQP drinking water clinics.

Results

A website, www.wellwater.bse.vt.edu, which contains program information, upcoming events, and other resources, receives 800 unique visitors per month. Eleven peer-reviewed Virginia Cooperative Extension household water quality publications were published, with seven more will be completed in 2013. Since December 2008, 50 drinking water clinics, each involving two educational meetings were conducted by VAMWON trained VCE educators in 68 of Virginia's 95 counties, with 2777 samples from systems serving an estimated 6400 individuals being analyzed. Twelve VAMWON workshops were held producing 75 VAMWON-trained volunteers, 54 extension agents, and 17 agency collaborators representing 59 Virginia counties and four cities. The VAHWQP/VAMWON project coordinator, with the assistance of industry experts (well drillers, scientists, and water treatment specialists) fielded more than 1500 detailed private water supply questions (via email or phone) since 2008. Also, more than 7250 educational contacts were generated by the coordinator and volunteers. In-kind donations and sponsorships totaled \$14,590 during the project period, and a partnership was initiated with Southeast Rural Community Assistance Project (www.sercap.org), an organization providing financial assistance to in-need private water supply users.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #4

1. Outcome Measures

Increase in the number of individuals who gain knowledge as certified nutrient management planners in turf and landscape systems.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	42

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

All large animal feeding operations in Virginia, biosolids applicators and many farms that receive cost share money, are required to have nutrient management plans. Nutrient management plans

are designed to assist landowners and operators in the management of land application of fertilizers, biosolids, animal manures, and other nutrient sources for agronomic benefits, and for the protection of the Commonwealth's ground and surface waters. By state law, all of these nutrient management plans must be written by certified nutrient management planners. Individuals who might become certified to write nutrient management plans include representatives of private (e.g. fertilizer dealers, agricultural consultants, biosolids applicators) and public (e.g., Virginia Department of Conservation and Recreation, Natural Resource and Conservation Service) sector organizations and agencies.

What has been done

Twice a year we conduct a two day science-based training on soils and crop production that the planners undergo before taking the nutrient management exam.

Results

This year we trained a total of 42 new nutrient management planners. We also provided continuing education credits to 135 certified planners. These planners and those certified in previous years wrote over 300,000 acres of nutrient management plans for permitted farms in 2012.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #5

1. Outcome Measures

Increase in the number of acres covered by nutrient management plans in turf and landscape systems due to participation in Extension educational programs.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	300000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Nutrient Management Planner training and certification programs administered by the Virginia Department of Conservation and Recreation (DCR). This program, initiated in 2009, was developed through a collaborative effort between DCR, Virginia Cooperative Extension, and Virginia Tech. The parties also collaborated in the development of a state/regional training manual to support the certification process in 2010. This award-winning (recognized by both the American Society of Agronomy and the American Society of Agriculture and Biological Engineers) 13-chapter manual is published through Virginia Cooperative Extension. Personnel from Virginia Cooperative Extension, Virginia Tech, and DCR collaborated on spring and fall training sessions in 2012.

What has been done

Personnel from Virginia Cooperative Extension, Virginia Tech, and DCR collaborated on 2-day training sessions in both the spring and fall of 2012. The audience included green industry professionals, extension agents, and Master Gardeners desiring to become certified plan writers in 2012.

Results

An additional 35 people became certified plan writers in Turf and Landscape Nutrient Management in 2012, raising the total of T&L certified planners to 102 statewide. Through the efforts of these plan writers, Virginia's Chesapeake Bay watershed currently has 39,400 acres under urban nutrient management, with targets of 390,000 Acres by 2017 and 650,000 Acres by 2025.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
111	Conservation and Efficient Use of Water
133	Pollution Prevention and Mitigation

Outcome #6

1. Outcome Measures

Increase in the tons of compost produced from organic wastes typically land-applied (manure, biosolids) or land-filled (yardwaste, biosolids, industrial sludge) as a result of increased knowledge and skills.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Municipal, agricultural, and industrial organic wastes can be sources of excess nutrients, anthropogenic toxic

compounds, and animal and plant pathogens, whose direct application to land may impair soil health and water quality. Composting is a process that biologically converts raw organic wastes into stabilized organic matter with the potential to eliminate pathogens and breakdown organic toxicants to less harmful compounds while generating a value-added soil amendment.

What has been done

We conducted educational programs to train waste by-product managers to properly compost, how to assess compost quality, and how to use the finished compost product in the mid Atlantic region, especially in urban and disturbed soils.

Results

There has been an increased amount of waste composted and finished product being used to amend soils in the mid Atlantic region. Composters have been provided education that has enabled them to become certified.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
403	Waste Disposal, Recycling, and Reuse

Outcome #7

1. Outcome Measures

Increase in the number of people directly impacted by new or improved land management practices

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1426

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Of Virginia's 25 million acre land base, 15.8 million acres, or 63%, is forested. These forested areas generate over \$25 billion annually for the commonwealth's economy, and an additional \$5.1 billion in environmental benefits (e.g., clean air and water, wildlife habitat, carbon sequestration). The majority of these lands, 10.1 million acres, are privately owned family forests. In order to sustain and enhance these economic and ecological benefits, it is imperative that private family forest landowners know how to implement sustainable forestry practices to keep their forests healthy and productive.

What has been done

Public classes were offered in GPS, GIS, Forest Landowner education, invasive specie control, wildlife habitat, logging safety and managing municipal forests.

Results

88 new Forest Stewardship Plans representing 12,300 acres. 82% of participants expressed that knowledge gained would enable them to make better decisions about natural resources management and use. One realtor expressed that knowing the types of trees and timber markets will help them better know what they are selling and how to point their clients on to natural resources professionals for management advice and services.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
124	Urban Forestry

131	Alternative Uses of Land
133	Pollution Prevention and Mitigation
135	Aquatic and Terrestrial Wildlife
403	Waste Disposal, Recycling, and Reuse

Outcome #8

1. Outcome Measures

Increased public awareness of climate change, biodiversity, and ecosystem services.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1500

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Virginia is a rapidly urbanizing state with the vast majority of its citizens living in urban areas. Growth of these urban areas brings social and economic opportunities for the state, but also exacts environmental costs as land cover is changed and human activities are concentrated on the landscape. As a result, cities are faced with issues of stormwater runoff, air pollution, and urban heat island effects. Urban forests and greenspaces are well documented in reducing these negative impacts of urbanization and improving the quality of life for citizens. However, there are numerous challenges to fully realizing these benefits. In Virginia, urban forests are challenged by the loss of tree canopy cover and the introduction of exotic, invasive tree pests. Without healthy, abundant urban forests, our cities fail to realize their potential as desirable, sustainable places for people to work and live.

What has been done

Our faculty and extension staff have worked diligently to create research, educational programs, and technology products to raise awareness of Virginia's urban forests and the threats to their sustainability. In 2012, a four-year investigation of municipal street trees in 23 localities was completed. A website was created to share the research findings and connect citizens with resources to help them with street trees in their communities. A series of workshops were also held at three locations around the state to create a dialogue on the issues and opportunities

surrounding street trees. Also in 2012 came the creation of a new web resource called the urban tree canopy mapper. Based on a multi-year project to measure tree canopy cover in 22 Virginia localities, the mapper is an intuitive web tool that allows users to view and query canopy cover data over a broad geographic scale.

Results

Investigations into Virginia's street trees and tree canopy cover have created unprecedented data about the abundance and composition of Virginia's urban forests. These data raise awareness and understanding of urban forests and also provide resource managers with information to improve planning and decision-making. Over 100 citizens and resource professionals attended our street tree workshops. They reported increased understanding of the benefits provided by street trees and the importance of species diversity for minimizing threats from forest pests. To date, several municipal foresters from around the state have contacted us with praise for the tree canopy mapper and described a range of applications, from education of local leaders to identification of new tree planting locations in their communities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
124	Urban Forestry
131	Alternative Uses of Land

Outcome #9

1. Outcome Measures

Increased number of stakeholders involved in community natural resource management and decision-making.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
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2012

2000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Forestry is the second largest industry in Virginia, with total economic outputs of over \$23 billion annually. Most of the commercial timberland in Virginia is owned by non-industrial private landowners (10.1 million acres or 63%). This landowner population is aging and an unprecedented exchange of forestland is set to occur in the Commonwealth. Continued proper management of these lands will be essential to the future of the forest industry in Virginia; however, many of the new landowners will lack forest management experience.

What has been done

Real estate professionals are typically the first point of contact for many rural land buyers. To capitalize on this, the Virginia Forest Landowner Education Program (VFLEP) developed Real Forestry for Real Estate (RFRE) continuing education classes, which have been offered to real estate professionals throughout Virginia. The goals of RFRE are to increase the awareness of real professionals about the importance of the product they are selling (forest land), and to introduce them to sources of assistance for their clients. Since August 2011, 16 RFRE classes have been offered in Virginia with 454 participants. Fifteen-hundred New Landowner Packets have been distributed to the participants.

Results

Participants increased their level of knowledge by at least one point for all the topics presented in RFRE, with the largest knowledge increases in topics concerning fragmentation, diseases, exotic invasives and sources of assistance.

The real impact, new landowners implementing sustainable forestry practices, remains to be measured. Thus far, several landowners have requested more information from the Virginia Forest Landowner Education Program as a result of receiving the New Landowner Packets. All of these individuals will be surveyed at the end of 2013 to determine what, if any, practices they implemented on their land

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
124	Urban Forestry
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation
135	Aquatic and Terrestrial Wildlife

Outcome #10

1. Outcome Measures

Increase program participants understanding of raw material conversion and modern business management practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	2400

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The forest industry contributes over \$25 billion annually to Virginia's economy. Wood product companies rank first in manufacturing jobs and second in payroll, yet employees and owners in the forest industry cite increasingly narrower profit margins. Efficiency in daily business operations such as mapping and area calculations can improve profit margins. Business decisions such as borrowing money can also negatively or positively impact profitability. A competitive and profitable forest industry is a vital tool for comprehensive forest management resulting in a more sustainable natural resource and economy for all Virginians.

What has been done

Twenty-one hands-on workshops have been delivered to SHARP loggers to teach them how to use hand-held Global Positioning Systems (GPS) throughout Virginia to 361 participants. In partnership with the Virginia Department of Forestry, a cost-sharing agreement has been instituted to reduce the cost of GPS purchase for current SHARP loggers who have completed a GPS training.

Results

GPS participants reported a significant (Average of 2.6 point increase on a 5 point scale) knowledge gain with 95% indicating that this would improve their efficiency. Eighty percent plan to integrate these skills into their current practices, which is expected to increase accuracy and efficiency to boost profitability. To date, 21 GPS units have been purchased by trained SHARP loggers through the cost-share program. These natural resource professionals directly impact approximately 57,000 acres of forestland annually.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
124	Urban Forestry
131	Alternative Uses of Land
403	Waste Disposal, Recycling, and Reuse

Outcome #11

1. Outcome Measures

The general public, landowners, and loggers use the forest in alternative and traditional ways to increase value and profit.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	2550

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Virginia currently has 5 wood fired electricity generating facilities under construction. These facilities will be operational before the end of 2013. Combined, they will have a generation capacity of approximately 300 MegaWatts (MW) and will have the capacity to utilize approximately 3 million tons of wood per year to generate electricity. Much of this new supply of wood for energy will come from logging residues such as limbs, tops, and previously unmerchantable trees left behind after logging operations were completed. Loggers, foresters, and procurement staff for these new wood to energy facilities are working to determine how these facilities will impact their existing operations, and where the new supply will come from. With much of the woody biomass feedstock expected to come from existing logging operations, many loggers across the state are trying to determine if biomass harvesting will be practical and beneficial for their operations.

What has been done

The classroom training provided a brief overview of woody biomass for energy, highlighted the new wood energy facilities coming to Virginia, and included presentations from local procurement personnel who provided more specific details about their local operations and feedstock requirements. The indoor presentation included research results from a survey of loggers currently harvesting biomass in the Southern Piedmont of Virginia. Results included operational

and chipper characteristics as well as owners' attitudes towards biomass harvesting for logging businesses currently harvesting biomass.

At the field demo sites 4-5 different manufacturers had an opportunity to describe the equipment they had available for chipping logging residues, then each manufacturer had the opportunity to demonstrate their equipment and chip approximately 10-25 tons of fuel chips.

Results

A total of 380 participants were able to learn more about biomass harvesting, and gain additional information to help them decide whether or not biomass harvesting will be a good fit for their business operations. Participants were able to view the latest equipment available for biomass harvesting and see it in operation to help determine which equipment they would like to purchase if they decide to harvest biomass. The workshops served as a networking opportunity for loggers to meet with procurement personnel who will be purchasing biomass and to meet with equipment dealers who can provide the equipment needed for biomass harvesting. Participants were provided information which could help them to make a more informed decision about whether or not they want to invest in the equipment needed to produce biomass for these new market in Virginia.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
131	Alternative Uses of Land
403	Waste Disposal, Recycling, and Reuse
605	Natural Resource and Environmental Economics

Outcome #12

1. Outcome Measures

Increase in the number of acres directly impacted by new or improved land management practices.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	530000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Farmers in Central Virginia historically have relied on a limited selection of row crops for profitable production. With new market opportunities and an increasing local foods movement, more opportunities for new crops are being opened.

What has been done

Educational programs and farm visits emphasized methods available to reduce the cost of production and also emphasized other crops offering attractive marketing and profit opportunities. Research based information was provided to producers regarding new crop and/or production opportunities. A canola fieldday was held and multiple individual discussions of a soybean variety comparison and a chickpea/pidgeon pea planting were utilized.

Results

Grain sorghum was planted on approximately 200 acres of cropland in Central Virginia by new producers. Spring oats were planted on approximately 150 acres of recently cleared woodland. No-tillage production of wheat and rye was adopted on many farms throughout Central Virginia. One Appomattox producer reported a diesel fuel savings of over \$2000 related to adoption of no-tillage wheat production.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
124	Urban Forestry
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation
135	Aquatic and Terrestrial Wildlife
403	Waste Disposal, Recycling, and Reuse

Outcome #13

1. Outcome Measures

Number of projects assembling transcriptomes for vertebrates and invertebrates from the Southern Appalachian Mountains

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In spite of federal and state environmental laws, over 40 percent of our assessed surface waters still do not meet the water quality standards that have been set for them. These impaired waters include approximately 300,000 miles of rivers and shorelines and approximately 5 million acres of lakes. The pollutants involved are mostly sediments, excess nutrients, toxic contaminants, and harmful microorganisms that often originate from our use of land for agriculture, silviculture, and suburban development. An overwhelming majority of the U. S. population

What has been done

One of the problems in conducting valid bioassessment with macroinvertebrates in streams is the lack of understanding of what community structure should exist in natural, undisturbed streams. Pristine, undisturbed streams hardly exist today, but some of the most healthy streams occur within National Parks. For this reason, I have a contract with the National Park Service to analyze samples from streams within Shenandoah National Park in Virginia. This information will provide a powerful comparative baseline to determine changes being brought about in watersheds that are subjected to various human activities.

Results

The research in 2012 was primarily devoted to acquiring new field data on the aquatic insects and related invertebrates in the streams within Shenandoah National Park. Laboratory processing and statistical analyses of these data will take place in 2013.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

Numerous external factors affect both the outcomes and the ability to support educational programs behind the outcomes. Virginia forestry has been greatly impacted by the economic downturn and changing climate conditions. Natural disasters such as fire, flood, hurricanes and drought siphon of state and federal funds that help support our programs. New laws and regulations create new opportunities and issues for adjusting programing efforts. One such example is the growth of the bioenergy market in Virginia. This will change how we manage our forest landscape and we are offering new programs to meet this need.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Watershed Protection and Mangement - Homeowners had their lawns soil tested and measured by Master Gardener Volunteers. 281 urban nutrient management plans were written. In 2012 a total of 66.5 acres (or 1,586,610 square feet) of residential turf in Prince William County, the cities of Manassas and Manassas Park were brought under a nutrient management plan which promotes best practices. Master Gardeners volunteered over 759 hours of their time to assist with this project. To date since 1990 when the program was initially started, MG's/staff have assisted in writing over 3,259 nutrient management plans for over 29 million square feet of turf or 671.82 acres within local watersheds.

Management and Sustainabilty of Forest Resources - An average of 500 landowners, representing approximately 20,000 forested acres, participates in at least one educational offering each year. Participants of management related programs indicated an increase in knowledge and an intention to put practices into place. Follow-up evaluations reveal various implementations such as, completed management plans, controlled invasive plants, improved wildlife habitat and conducted successful timber sales. Approximately 30% of program participants contact a natural resource professional following educational events. One landowner, following recommendations from class, increased the value of his timbersale 150% from \$20,000 to \$50,000.

Pollution Prevention and Mitagation - The Virginia Household Water Quality Program (VAHWQP) -

n evaluation completed by 208 (24%) of clinic participants found:

22% will seek additional testing

30% will determine source of water problem

27% will pump out septic tank

24% will perform maintenance on well

8% will reduce herbicide or fertilizer use around well or spring

29% will shock-chlorinate

12% will acquire water treatment equipment

18% will improve functioning of existing treatment equipment

14% plan to use bottled water

89% will test water annually or every few years from now on

83% plan to share information learned. On average each respondent will share with 3 other (650 individuals)

Key Items of Evaluation