V(A). Planned Program (Summary)

Program # 11

1. Name of the Planned Program

Climate Change

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
<th>%1862 Extension</th>
<th>%1890 Extension</th>
<th>%1862 Research</th>
<th>%1890 Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>133</td>
<td>Pollution Prevention and Mitigation</td>
<td>50%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>403</td>
<td>Waste Disposal, Recycling, and Reuse</td>
<td>50%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>605</td>
<td>Natural Resource and Environmental Economics</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>100%</strong></td>
<td><strong>0%</strong></td>
<td><strong>100%</strong></td>
<td><strong>0%</strong></td>
</tr>
</tbody>
</table>

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

<table>
<thead>
<tr>
<th>Year: 2009</th>
<th>Extension 1862</th>
<th>Extension 1890</th>
<th>Research 1862</th>
<th>Research 1890</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Extension</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smith-Lever 3b &amp; 3c</td>
<td>Hatch</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1862 Matching</td>
<td>1862 Matching</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1862 All Other</td>
<td>1890 All Other</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

V(D). Planned Program (Activity)

1. Brief description of the Activity

This is a new Planned Program for Virginia. We are only reporting on unplanned state defined outcomes this year.

2. Brief description of the target audience

This is a new Planned Program for Virginia. We are only reporting on unplanned state defined outcomes this year.

V(E). Planned Program (Outputs)

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

Patent Applications Submitted

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

<table>
<thead>
<tr>
<th>2009</th>
<th>Extension</th>
<th>Research</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- This is a new Planned Program for Virginia. We are only reporting on unplanned state defined outputs this year.
- Not reporting on this Output for this Annual Report
## V(G). State Defined Outcomes

### V. State Defined Outcomes

<table>
<thead>
<tr>
<th>O. No.</th>
<th>OUTCOME NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Improve Virginia citizens understanding of natural resource conservation and recycling</td>
</tr>
<tr>
<td>2</td>
<td>Increase citizen's understanding of Ecosystem Services Markets</td>
</tr>
<tr>
<td>3</td>
<td>Improve the understanding of the environmental and economic effects of alternative GHG emission reduction targets</td>
</tr>
</tbody>
</table>
Outcome #1

1. Outcome Measures

   Improve Virginia citizens understanding of natural resource conservation and recycling

2. Associated Institution Types

   ● 1862 Extension

3a. Outcome Type:

   Change in Knowledge Outcome Measure

3b. Quantitative Outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantitative Target</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>{No Data Entered}</td>
<td>161</td>
</tr>
</tbody>
</table>

3c. Qualitative Outcome or Impact Statement

   **Issue (Who cares and Why)**
   Climate change according to the Environmental Protection Agency (EPA) is an increase in global temperatures and change in rainfall patterns, snow and ice cover, and sea level due to increased amounts of heat-trapping greenhouse gases (GHG) in the atmosphere. Industrial processes (such as the production of cement, steel, aluminum), agriculture, forestry, waste management, and other human activities are major sources of GHG emissions in the United States. The manufacturing, distribution, and use of products, as well as management of the resulting waste, all result in GHG emissions. Sources of reduction, pollution prevention, and recycling programs are an important part of reducing or eliminating GHG emissions (EPA, 2008).

   **What has been done**
   The Tour De Trash was designed as part of the Waste Watchers Committee of the Hampton Clean City Commission. The six hour school bus tour visits eight different sites. Each site teaches how different wastes can be recycled to reduce the use of natural resources in their production. At the Hampton Yard Waste Transfer Site the attendees learn how they can dispose of their yard waste for recycling. At the Bethel Landfill they learn how a landfill is created layer by layer and how the Hampton site uses the methane produced to create electricity. At the VPPSA Composting Facility the attendees see how Hampton, York County, and Poquoson recycle their yard waste on site into composted mulch and soil. The Hampton's Steam Plant is a waste to energy site where the attendees learn how waste is burned for steam and processed into energy with advanced filtering to eliminate toxic gases released from combustion. The Hampton Golf Course teaches the attendees how land can be recycled and reused, that was once a landfill. At Branscome Construction they learn how asphalt and concrete can be re-used in construction and how the oils emitted can be used for fuel to run the process. The ARC Recycling Facility shows attendees how disabled citizens can deconstruct computers and other electronic equipment to recycle virtually all the parts. At the TFC Recyclables Transfer Site they learn how recyclables are separated and bailed for transfer to business for use in manufacturing.

   **Results**
   Short Term: Through six separate tours 161 Adults and Children were able to demonstrate that they learned 15 different facts about how to reduce, reuse, and recycle waste to reduce the strain on raw materials.
   Medium Term: The attendees will have the ability to physically reduce the amount of waste that enters the landfill which will extend the life of the landfill keeping the City of Hampton from outsourcing its waste and therefore reduce the potential cost of waste management for the citizen's.
   Long Term: The added skills and values learned from the tour will give the attendees the knowledge and ability to reduce their carbon foot print and add value to their view of natural resources in their immediate community and globally.

4. Associated Knowledge Areas

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
</tr>
</thead>
</table>

Report Date 06/08/2010
Outcome #2

1. Outcome Measures
   Increase citizen's understanding of Ecosystem Services Markets

2. Associated Institution Types
   ● 1862 Extension

3a. Outcome Type:
   Change in Knowledge Outcome Measure

3b. Quantitative Outcome
<table>
<thead>
<tr>
<th>Year</th>
<th>Quantitative Target</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>{No Data Entered}</td>
<td>547</td>
</tr>
</tbody>
</table>

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Ecosystem services are part of the solution to social, environmental, and economic challenges to our natural resources. The Southern Group of State Foresters, Governor's Climate Change Commission, industry representatives, consulting foresters, landowners, and local decision-makers expressed the need to know how new ecosystem services initiatives will impact their operations and profitability.

What has been done
In 2009, a forestry and natural resources agent coordinated three landowner-focused seminars, two professional society meetings, and one national conference to provide research-based ecosystem services information to 547 participants.

Results
Evaluations from the broad-based ecosystem services educational program illustrated the following: at least 2 consulting foresters are now offering carbon credits, 3 attendees formed a new group to collaborate on a grant proposal, and 1 professor began incorporating ecosystem services into his teaching and research, among other impacts. One sponsor has contributed $1 million to protect the ecosystem services generated by working forests in southeast Virginia. An additional $1.2 million was estimated by participants as the cumulative value of knowledge gained.

4. Associated Knowledge Areas

   KA Code   Knowledge Area
   133       Pollution Prevention and Mitigation

Outcome #3

1. Outcome Measures
   Improve the understanding of the environmental and economic effects of alternative GHG emission reduction targets

2. Associated Institution Types
3a. Outcome Type:
Change in Knowledge Outcome Measure

3b. Quantitative Outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantitative Target</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>(No Data Entered)</td>
<td>1</td>
</tr>
</tbody>
</table>

3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Global annual emissions of anthropogenic greenhouse gases (GHG) increased by 70% between 1970 and 2004, with emissions of carbon dioxide (CO2) increasing by 80% (Intergovernmental Panel on Climate Change - IPCC). Atmospheric concentration of CO2 has increased from a pre-industrial value of 280 ppm to 379 ppm in 2005, due mainly to fossil fuel use. This concentration level is much higher than any time in the past 650,000 year. Increases in atmospheric GHG concentrations lead to increased concerns about future increases in global surface temperatures. In order to limit the predicted increase in global surface temperature to 2°C, the IPCC recommends that GHG emissions need to be reduced by at least 50-85%, compared to their 2000 level, by 2050.

**What has been done**
A collaborative research project with Joachim Schleich from Fraunhofer (ISI), a research institute in Karlsruhe, Germany that specialized in energy and environmental economics research, was begun. The objective of this research is to compare the environmental and economic effects of alternative GHG emission reduction targets for developed and developing countries for the period 2010 through 2030.

**Results**
Preliminary results for scenarios where Annex I countries decrease their emissions by 30% from 1990 levels while developing countries decrease their emissions by 15% from 1990 levels indicate that achieving these targets is not costly in terms of reductions in GDP growth rates. For most countries, GDP growth rates would be no more than 0.1% lower from adopting emission reduction policies compared to not adopting these policies. However, for some fast growing and carbon intensive developing countries, like China and India, the reduction in GDP growth rates would be about 0.2% per year. These results were presented to the German Environmental Protection Agency and were used by the German delegation to the UNDCCC climate conference in Copenhagen, Denmark in December 2009.

4. Associated Knowledge Areas

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>605</td>
<td>Natural Resource and Environmental Economics</td>
</tr>
</tbody>
</table>

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**
V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned
   - After Only (post program)
   - Retrospective (post program)
   - Before-After (before and after program)
   - During (during program)
   - Time series (multiple points before and after program)
   - Case Study

Evaluation Results

Key Items of Evaluation