V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Forestry and Wildlife

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	15%		15%	
123	Management and Sustainability of Forest Resources	25%		25%	
131	Alternative Uses of Land	30%		30%	
135	Aquatic and Terrestrial Wildlife	10%		10%	
136	Conservation of Biological Diversity	20%		20%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	0.5	0.0	1.0	0.0
Actual	0.8	0.0	6.0	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
47627	0	172921	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
43531	0	325324	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research includes an assessment of the impacts of urbanization on seasonal woodland ponds along a disturbance gradient, with special emphasis on impacts of groundwater withdrawal on pond hydrology and amphibian habitat suitability. Economic analyses of willingness to pay for land conservation or ecosystem services generates new knowledge in relationship to people's willingness to support ecosystems and conservation and to assess the potential for green markets. Investigations on habitat quality in early successional forests explore how management practices affect populations of grouse, woodcock and associated wildlife species. Research on changes in body composition and blood metabolites evaluates the quality of available forest habitats and food sources for migrating song birds at stop over sites in Coastal New England and will provide insights for managing coastal habitats for enhancing biodiversity. Development of subaqueous soils interpretive approaches improves decisions on such issues as eelgrass restoration, dredging and aquaculture. Extension work raises the awareness of forest owners, local decision makers, NGOs and state officials about the values and management of RI's forest resource and to provide our audience with the tools and educational materials to make informed decisions that protect and enhance the state's forests. We provide data and training to planners, conservation groups, and land trusts at the municipal level to increase awareness of vital natural resources and critical habitats, including forest resources throughout the State.

2. Brief description of the target audience

A mixture of public policy personnel (federal and state agencies as well as town conservation, planning and management officials), local nonprofit groups involved in land management, such as conservancies, interested and involved citizens, and private landowners and high school students through training and participation in the Rhode Island Environthon.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	450	1000	100	0
Actual	11590	14075	0	0

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

Patent Applications Submitted

Year: 2010
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total

Plan	0	0	
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer reviewed publications

Year	Target	Actual
2010	4	3

Output #2

Output Measure

- Fact sheets, Bulletins and newsletters

Year	Target	Actual
2010	4	3

Output #3

Output Measure

- Short courses

Year	Target	Actual
2010	4	3

Output #4

Output Measure

- Website development and refinement

Year	Target	Actual
2010	2	4

Output #5

Output Measure

- Books and monographs

Year	Target	Actual
2010	0	0

Output #6

Output Measure

- Abstracts

Year	Target	Actual
2010	3	9

Output #7

Output Measure

- Workshops and Conferences hosted

Year	Target	Actual
2010	2	6

Output #8

Output Measure

- Public presentations

Year	Target	Actual
2010	15	17

Output #9

Output Measure

- Student training

Year	Target	Actual
2010	2	23

Output #10

Output Measure

- MS Theses and PhD Dissertations

Year	Target	Actual
2010	2	9

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increased (%) forest and conservation geospatial information resources and use by towns, agencies, NGOs and the public
2	Increased understanding by wildlife biologists and managers through publications and talks of how habitat quality and forest management practices affect populations of grouse, migrating song birds, amphibians and other wildlife.
3	Increased understanding by wildlife biologists and other habitat managers through publications and talks on the risks of invasive species, with special emphasis on phragmites.
4	Increased understanding by wildlife biologists, NGOs, local and state officials through publications and talks on people's willingness to support ecosystems and conservation.
5	Development and dissemination of new subaqueous soils interpretive approaches through publications, workshops or talks.

Outcome #1

1. Outcome Measures

Increased (%) forest and conservation geospatial information resources and use by towns, agencies, NGOs and the public

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Geospatial research and technology can play an enormously important role in providing decision support for land use decision making. In particular, new GIS, GPS and remote sensing tools are continually being made available which are poised to assist local decision makers to both visualize existing and future land use patterns, and model the various impacts of these patterns. Local governments also play an important role in forest and wildlife management within Rhode Island. Policy makers and professionals need information on which to base their land use decisions, including options for land preservation, identification of sensitive areas, and the management and protection of open space areas.

What has been done
Three introductory GIS classes conducted; assisting with the 2010 Rhode Island Land and Water Conservation Summit. 395,158 data files, constituting 832 GB, were downloaded from the geospatial data distribution websites. Over sixty online map services made available for GIS professionals and general public. GPS equipment loans continued to support conservation work such as evaluating forest health, monitoring invasive species.

Results
Geospatial data were used to support a diversity of projects in Rhode Island and beyond; measuring the extent of early successional forest and supporting land conservation efforts by land trusts. The training repertoire was expanded to offer classes on free and low-cost software to support better informed land-use decisions. Updated resource profiles were developed for each of Rhode Island's 39 municipalities to support the development of customized online maps.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
131	Alternative Uses of Land
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity

Outcome #2

1. Outcome Measures

Increased understanding by wildlife biologists and managers through publications and talks of how habitat quality and forest management practices affect populations of grouse, migrating song birds, amphibians and other wildlife.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Although seasonal ponds in forested watersheds provide essential habitat for a host of organisms, the fecundity of these organisms is highly linked to forest disturbance and management, requiring a careful understanding of the underlying ecology.

What has been done
We monitored surface and ground water levels and water chemistry in control ponds and two sets of wellfield ponds in southern RI. We compared the hydrologic response and characteristics of the control ponds to those of the well field ponds to assess the potential impact of ground water withdrawals on seasonal pond water levels hydroperiod. One Master?s thesis will be completed in May 2011.

Results

We have produced a protocol for evaluating the potential impact of groundwater withdrawals on seasonal ponds. Hydrologic data including surface water level and ground water level monitoring allow classification of the pond regarding degree of impact form pumping. This information is coupled with the results of a drawdown model to predict the degree of impact on the pond and the potential for degradation of breeding habitat.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity

Outcome #3

1. Outcome Measures

Increased understanding by wildlife biologists and other habitat managers through publications and talks on the risks of invasive species, with special emphasis on phragmites.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Increased understanding by wildlife biologists, NGOs, local and state officials through publications and talks on people's willingness to support ecosystems and conservation.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Hayfields and Grassland Birds: Extending Farm Marketing for a New Ecosystem Service Economy. Economic analyses of willing to pay for land for land conservation or ecosystem services is a key factor for generating management schemes and will enable the public and private sector to assess the potential for green markets.

What has been done
Economics laboratory experiments were conducted to test market incentives for 4 different methods of revenue-raising approaches to selling public goods. We also marketed habitat services of farms for grassland nesting birds in Rhode Island and Vermont through direct mail and web advertising, using these incentive mechanisms. We presented results at two conferences and a workshop, nationally and internationally.

Results
Experiments identified the role of balancing the size of a contributing group and its values with the cost of a public good provided; this balance affects the success of incentive mechanisms to finance the public good. Direct mail marketing is proving challenging in state-wide efforts; higher success has been achieved in marketing to households in the specific community where farms are located.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
131	Alternative Uses of Land

Outcome #5

1. Outcome Measures

Development and dissemination of new subaqueous soils interpretive approaches through publications, workshops or talks.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Hydropedology: Genesis, Properties, and Distribution of Hydromorphic Soils. Developing subaqueous soil use and management interpretations is critical to providing coastal managers with tools to make decisions. Of particular interest water quality, aquaculture and restoration of

commercially important shellfish populations, effects of dredging, the role of subaqueous soils in the regional and global carbon cycle, and submerged aquatic vegetation health and restoration.

What has been done
Through experimental mesocosms with dredge materials from four different soil types within four estuaries and a series of experimental plots we studied oyster aquaculture, hard-shell clam growth, and eelgrass restoration relationships relative to soil type; calculated soil organic carbon pools and examined the distribution of heavy metals in these soils.

Results
Subaqueous soils vary in the suitability of their dredge materials for land application; some soils can create acid sulfate conditions in the subaerial environment. Subaqueous soils also varied in their potential to grow shellfish to a marketable size faster and with higher survival rates. Eelgrass transplanted were difficult to re-establish regardless of soil types and restoration; success did not correspond to current eelgrass density. Relatively high soil sulfide and organic matter contents were acting as direct or indirect stressors to eelgrass success. Subaqueous soils in estuaries sequester carbon with carbon pools equal or greater, than most adjacent subaerial soils. Nearly all of the soils had elevated heavy metal levels with highest levels were adjacent to locations of surface water inputs draining an urbanizing area.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

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)

- Time series (multiple points before and after program)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}