

**V(A). Planned Program (Summary)**

**Program # 6**

**1. Name of the Planned Program**

Vector Borne Diseases and Human Health

**V(B). Program Knowledge Area(s)**

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
721	Insects and Other Pests Affecting Humans	50%		50%	
722	Zoonotic Diseases and Parasites Affecting Humans	50%		50%	
	<b>Total</b>	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	1.0	0.0	2.0	0.0
Actual	1.2	0.0	0.2	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
51159	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	82980	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

- Use surveillance data accumulated over a dozen years to develop new tools to pinpoint risk, both spatially and seasonally.

- Use computer models to view disease patterns in Rhode Island and to develop models for disease risk.
- Determine landscape patterns that present the greatest risk for encountering a tick bite.
- Formulate landscape plans to reduce the chances of encounters between ticks and people.
- Create a web-based decision support system. Using this system, people will be able to compile a customized risk index and then follow links that will help them devise short- and long-term disease prevention action plans.
- Reduce tick abundance community-wide by using USDA-designed 4-posters, which are devices that attract deer with corn dispensed in small amounts.
- Study the salivary glands of ticks to find compounds from ticks with potential pharmacological value, formulate novel vaccination strategies to prevent tick-transmitted infections, develop biomolecular assays for tick-borne pathogens, elucidate transmission dynamics of pathogens among tick vectors and vertebrate hosts, and discover and evaluate natural enemies of ticks.

**2. Brief description of the target audience**

The target audience will be diverse and will represent all Rhode Islanders, especially those at greatest risk of contracting vector borne diseases. This audience will include:

Community members

Grassroots agencies

Municipal and State Policy Makers

Home owners

Educational Institutions

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	100	10000	100	5000
<b>Actual</b>	2012	45000	275	10000

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

**Patent Applications Submitted**

Year: 2010

Plan: 0

Actual: 2

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2010	Extension	Research	Total
Plan	0	0	
Actual	0	2	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Peer reviewed publications

Year	Target	Actual
2010	3	2

**Output #2**

**Output Measure**

- Books and monographs

Year	Target	Actual
2010	0	0

**Output #3**

**Output Measure**

- Abstracts

Year	Target	Actual
2010	4	0

**Output #4**

**Output Measure**

- Conference proceedings

Year	Target	Actual
2010	1	0

**Output #5**

**Output Measure**

- Workshops

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	10	0

**Output #6**

**Output Measure**

- Website development and refinement

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	1	168

**Output #7**

**Output Measure**

- Public presentations

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	3	31

**Output #8**

**Output Measure**

- Public service announcements

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	2	3

**Output #9**

**Output Measure**

- Student training

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	2	9

**Output #10**

**Output Measure**

- M.S. theses and Ph.D. dissertations

<b>Year</b>	<b>Target</b>	<b>Actual</b>
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2010	1	4
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**Output #11**

**Output Measure**

- Postdoctoral fellow training

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	1	2

**Output #12**

**Output Measure**

- Fact sheets, bulletins and newsletters

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	{No Data Entered}	12

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Identify areas of high risk for vector borne diseases in Rhode Island
2	Create tick surveillance database
3	Create web-based decision support system to reduce risk to vector borne diseases.
4	Reduce tick abundance community-wide
5	Characterize the salivary glands of ticks to identify compounds of potential pharmacological value
6	Formulate novel vaccination strategies to prevent tick-transmitted diseases
7	Elucidate transmission dynamics of pathogens among tick vectors
8	Increase research funding

**Outcome #1**

**1. Outcome Measures**

Identify areas of high risk for vector borne diseases in Rhode Island

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	1	1

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Knowledge of areas for high risk of contracting vector borne diseases is essential for informing the public of this danger and taking remedial actions.

**What has been done**

The abundance of ticks carrying pathogens has been identified in the state.

**Results**

Information on the prevalence of ticks, their activity and means of contending with this have been placed on a highly visible website: [www.tickencounter.org](http://www.tickencounter.org).

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
721	Insects and Other Pests Affecting Humans
722	Zoonotic Diseases and Parasites Affecting Humans

## **Outcome #2**

### **1. Outcome Measures**

Create tick surveillance database

### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	1	0

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

{No Data Entered}

#### **What has been done**

{No Data Entered}

#### **Results**

{No Data Entered}

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
721	Insects and Other Pests Affecting Humans
722	Zoonotic Diseases and Parasites Affecting Humans

### **Outcome #3**

#### **1. Outcome Measures**

Create web-based decision support system to reduce risk to vector borne diseases.

#### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

#### **3a. Outcome Type:**

Change in Condition Outcome Measure

#### **3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	1	1

#### **3c. Qualitative Outcome or Impact Statement**

##### **Issue (Who cares and Why)**

Relative humidity (RH) is a factor in determining tick activity. If the levels of RH and tick activity can be correlated it would provide the basis for a web based system to determine the risk of tick exposure and potentially contracting vector borne diseases.

##### **What has been done**

A network of 12 relative humidity (RH) data measurement and logger instruments were established in corresponding field sampling sites. Weekly nymphal tick abundance samples and RH logger readings were collected, for a second summer to assess whether a correlation exists and finetuned RH measurements can be utilized to predict tick activity.

##### **Results**

Nymphal tick abundance samples and hourly RH measurements were collected in three state-managed study areas during the summers of 2009 and 2010. A total of 1140 nymphal ticks were collected during the 2009 summer field-work campaign. Overall, average RH at time of sampling was 84.38%. A total of 683 nymphal ticks were collected during the 2010 summer field-work campaign. Overall, average RH at time of sampling was 75.35%. Analysis of data indicates that cumulative hours of sub-82% RH threshold was found to be the most significant factor observed in both years for tick activity.

#### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
721	Insects and Other Pests Affecting Humans

722 Zoonotic Diseases and Parasites Affecting Humans

**Outcome #4**

**1. Outcome Measures**

Reduce tick abundance community-wide

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	1	1

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

A reduction in ticks decreases the potential for residents to contract tick borne diseases.

**What has been done**

Extensive information has been placed on the website providing methods for both local and area-wide reduction of tick populations including the use of "four posters" for treating deer, perimeter spraying, eliminating tick habitat and mouse targeted devices.

**Results**

The website has provided a convenient and easily accesible source of information on reducing tick populations and the risks associated with ticks.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
721	Insects and Other Pests Affecting Humans
722	Zoonotic Diseases and Parasites Affecting Humans

**Outcome #5**

**1. Outcome Measures**

Characterize the salivary glands of ticks to identify compounds of potential pharmacological value

Not Reporting on this Outcome Measure

**Outcome #6**

**1. Outcome Measures**

Formulate novel vaccination strategies to prevent tick-transmitted diseases

Not Reporting on this Outcome Measure

**Outcome #7**

**1. Outcome Measures**

Elucidate transmission dynamics of pathogens among tick vectors

Not Reporting on this Outcome Measure

**Outcome #8**

**1. Outcome Measures**

Increase research funding

Not Reporting on this Outcome Measure

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Appropriations changes
- Populations changes (immigration, new cultural groupings, etc.)
- Other (Human behavior)

**Brief Explanation**

Constraints to the current federal budget could impact the availability of funding for this and related projects in the future. Increased outdoor activities in suburban environments has increased the potential for tick bites and associated diseases. The goal of this project to increase awareness and provide an index for assessing tick activity.

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

### **1. Evaluation Studies Planned**

- After Only (post program)
- Before-After (before and after program)
- During (during program)
- Comparison between locales where the program operates and sites without program intervention

### **Evaluation Results**

### **Key Items of Evaluation**