V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Natural Resources and Environment

☑ 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	1%		1%	
102	Soil, Plant, Water, Nutrient Relationships	18%		18%	
104	Protect Soil from Harmful Effects of Natural Elements	5%		5%	
111	Conservation and Efficient Use of Water	2%		2%	
112	Watershed Protection and Management	6%		6%	
121	Management of Range Resources	1%		1%	
123	Management and Sustainability of Forest Resources	18%		18%	
125	Agroforestry	1%		1%	
131	Alternative Uses of Land	10%		10%	
132	Weather and Climate	4%		4%	
133	Pollution Prevention and Mitigation	24%		24%	
135	Aquatic and Terrestrial Wildlife	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	1.4	0.0	6.7	0.0
Actual Paid	4.9	0.0	23.7	0.0
Actual Volunteer	0.0	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**
975450	0	525246	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
2605794	0	2808864	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
236660	0	1508986	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

• Workshops •Extension publications •Public service announcements •Research projects •Web site development •Home and farm visits •Displays •IP video programs •Demonstrations and field days •One-on-one consultations •Collaboration with other agencies

2. Brief description of the target audience

• Agricultural producers • Rural and urban residents •Elected officials and other decision-makers •Owners of private and public forestlands and wildlands •Natural resource professionals •Technical service providers •Tree care providers •Right of way managers •Urban planners •Youth

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	51707	163855	24118	8804

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

Patent Applications Submitted

Year: 2014

Actual: 1

Patents listed
4509451 Trademark

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	29	552	109

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of programs offered to producers, land owners, and land managers.
  Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Number of research projects

Year	Actual
2014	19

Output #3

Output Measure

- Number of demonstrations and field days
  Not reporting on this Output for this Annual Report

Output #4

Output Measure

- Number of Extension publications written, new & revised

Year	Actual
2014	6928

Output #5

Output Measure

- Number of K-12 Classroom visits

Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Number of one-on-one consultations

Year	Actual
2014	3155

Output #7

Output Measure

- Number of newsletter or magazine articles written

Not reporting on this Output for this Annual Report

Output #8

Output Measure

- Number of volunteers trained

Not reporting on this Output for this Annual Report

Output #9

Output Measure

- Number of Extension publications distributed

Year	Actual
2014	6928

Output #10

Output Measure

- Number of research publications

Year	Actual
2014	552

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of participants who increase knowledge of practices to protect water resources
2	Number of participants who improve decision making for use of water resources
3	Number of participants who increase knowledge of proper application of fertilizer, manure and waste products to soil and potential for environmental consequences of misapplication
4	Number of participants who increased adoption of proper application of fertilizer, manure and waste products to soil
5	Number of participants who increase knowledge of best management practices for optimal manure nutrient utilization with on- and off-site agricultural lands
6	Number of participants who adopt best management practices for optimal manure nutrient utilization with on- and off-site agricultural lands
7	Number of participants who increase knowledge of the value of ponds in landscapes and methods for installing and managing ponds
8	Number of participants who increase value of landscapes through better installation and management of ponds
9	Number of participants who increase knowledge of on-site wastewater treatment siting and maintenance needs
10	Number of participants who make more informed decisions for on-site wastewater treatment siting and maintenance
11	Number of water quality violations related to animal production and land application in the state of Indiana
12	Number of tree care providers in Indiana who become certified arborists.
13	Number of professional natural resource advisors who have the skills necessary to assess the health of the wildlands
14	Number of wildlands owners who have a relationship with knowledgeable professional natural resource advisors and have developed and implemented a management plan
15	Number of natural resource professionals and wildland owners who have worked with landowners to develop and implement management plans
16	Number of owners of wildlands who will have assessed the health of their lands and developed and implemented management plans
17	Number of landowners with knowledge of proper tree planting and management techniques

18	Number of participants who increased their knowledge of natural resource management
19	Number of participants who increased their knowledge of proper application of pesticides
20	Number of participants who increased their knowledge of topsoil importance
21	Number of participants who increased their knowledge of Indiana's diverse wildlife
22	Number of woodlot owners who improved their management skills
23	Impact on biodiversity resulting from new knowledge related to insects.
24	An impact on urban pests resulting from new knowledge related to new technology.
25	Number of people taking new management actions related to various species impacted by renewable energy development
26	Number of people with new knowledge related to alternative land use management.

Outcome #1

1. Outcome Measures

Number of participants who increase knowledge of practices to protect water resources

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In 2014, we reported on a workshop and ongoing effort by several agronomy faculty to brainstorm, identify and foster beneficial linkages toward a broad goal of standardizing function data in agriculture. Ag data can be collected 24x7, 365 days a year and there exist few standards for aggregating, comparing and analyzing this data. Genetic data, long considered a benchmark for data standards, has been standardized for a long time but it doesn't change in time and space, whereas agricultural data does. How do we get a handle on the various types, quantity and quality of ag data for decision making?

What has been done
The team continues to work inside of a $25 million USDA CAP grant to address data standards for its own program while translating their learnings to as many audiences as possible.

Results
As a result, the team was "on the road" in 2014 and will be in 2015, promoting the need for data standardization and exploring mechanisms for actually getting the data standardized. Working with the National Ag library on data standards, provenance and archiving, met with all of Ag Research Experiment Station directors to inform them, and in 2015 will bring the discussion to the joint meeting of American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #2

1. Outcome Measures

Number of participants who improve decision making for use of water resources

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual

2014	1000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Intensive agricultural practices are critical for providing resources needed to support growing national and global human populations. While agriculture has undeniably altered stream ecosystems, management practices (e.g., crop rotation, 2-stage ditches, no-till agriculture, etc.) have demonstrated some success in moderating these impacts. However, growing demands for biofuel feedstock production may be intensifying agricultural land use effects in some cases. There is thus great need to better understand the potential roles of changing land management practices for compromising or even protecting stream biodiversity and ecosystem services in agricultural landscapes.

What has been done

The project studies the roles of various agricultural land management practices on stream biological community structure and elements of ecosystem function. In addition to in situ fish and invertebrate sampling, laboratory studies reveal fish and salamander responses to elevated sediment levels. Studies were conducted in the field and in laboratories to evaluate how changes in terrestrial energy subsidies affect in stream communities and function.

Results

The studies were able to demonstrate that a much more explicit relationship occurs between many freshwater fishes that occupy these streams and the total suspended solids in stream. Using SWAT modeling, we can make consistent predictions about the distribution of stream fish based on the outputs on the models regarding suspended solids. If there is a land use change causes a change in total suspended solids, the model suggests that we might lose certain fishes over the long term. Conversely, the model shows that a change in the land-use that reduces total suspended solids, could lead to an improvement in biodiversity as the fish negatively impacted by increase in solids return to begin breeding. The utility of this is that the modeling can be done remotely allowing us to run various scenarios to optimize how we manage landscapes to promote stream biodiversity. More data in this model allow us to design landscapes that favor biodiversity.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #3

1. **Outcome Measures**

   Number of participants who increase knowledge of proper application of fertilizer, manure and waste products to soil and potential for environmental consequences of misapplication

   Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

   Number of participants who increased adoption of proper application of fertilizer, manure and waste products to soil

   Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

   Number of participants who increase knowledge of best management practices for optimal manure nutrient utilization with on- and off-site agricultural lands

   Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

   Number of participants who adopt best management practices for optimal manure nutrient utilization with on- and off-site agricultural lands

   Not Reporting on this Outcome Measure

Outcome #7

1. **Outcome Measures**

   Number of participants who increase knowledge of the value of ponds in landscapes and methods for installing and managing ponds

   Not Reporting on this Outcome Measure

Outcome #8

1. **Outcome Measures**

   Number of participants who increase value of landscapes through better installation and management of ponds

   Not Reporting on this Outcome Measure

Outcome #9

1. **Outcome Measures**

   Number of participants who increase knowledge of on-site wastewater treatment siting and maintenance needs

   Not Reporting on this Outcome Measure

Outcome #10

1. **Outcome Measures**

   Number of participants who make more informed decisions for on-site wastewater treatment siting and maintenance

   Not Reporting on this Outcome Measure

Outcome #11

1. **Outcome Measures**

   Number of water quality violations related to animal production and land application in the state of Indiana

   Not Reporting on this Outcome Measure

Outcome #12

1. **Outcome Measures**

   Number of tree care providers in Indiana who become certified arborists.

   Not Reporting on this Outcome Measure

Outcome #13

1. **Outcome Measures**

   Number of professional natural resource advisors who have the skills necessary to assess the health of the wildlands

   Not Reporting on this Outcome Measure

Outcome #14

1. **Outcome Measures**

   Number of wildlands owners who have a relationship with knowledgeable professional natural resource advisors and have developed and implemented a management plan

   Not Reporting on this Outcome Measure

Outcome #15

1. **Outcome Measures**

   Number of natural resource professionals and wildland owners who have worked with landowners to develop and implement management plans

   Not Reporting on this Outcome Measure

Outcome #16

1. **Outcome Measures**

   Number of owners of wildlands who will have assessed the health of their lands and developed and implemented management plans

   Not Reporting on this Outcome Measure

Outcome #17

1. **Outcome Measures**

   Number of landowners with knowledge of proper tree planting and management techniques

   Not Reporting on this Outcome Measure

Outcome #18

1. Outcome Measures

Number of participants who increased their knowledge of natural resource management

Not Reporting on this Outcome Measure

Outcome #19

1. Outcome Measures

Number of participants who increased their knowledge of proper application of pesticides

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Small fruit and grape growers across the Midwest depend on up-to-date information about pests, pest management strategies, pesticide registrations, and pest control recommendations. There are dozens of pesticides registered for use on small fruit and grape crops. Trade magazines are full of adds for products that claim to be the best on the market. Growers need unbiased, research-based information to make sound pest management decisions. There are a number of new pest threats facing growers in the Midwest. Spotted Wing Drosophila and Brown marmorated stink bug are two new serious insect pest threats. Glyphosate resistant weeds, especially mare's tail, is common in fruit plantings. Indiana has a vibrant and growing wine industry that contributes significantly to the economic wealth of our State and enhances the lives and livelihoods of its residents and visitors. Between 1991, when the program started, and 2014, 70 new wineries opened statewide, bringing the total to 80. As wine grape production has increased in Indiana, growers and vintners demand up-to-date information on new grape cultivars, sustainability and pest management, winemaking techniques and marketing strategies.

What has been done
A team of specialists and Purdue researchers from across the region through the Midwest Fruit Workers Group was created. It met in Indianapolis to discuss the current pest situation, share research results, and come to a consensus on recommendations for growers. These new recommendations are incorporated into the annual spray guide updates. The spray guide is revised annually with more than 3000 copies printed and distributed to 13 states. The spray guide is available in electronic form so that growers can access the information from computer, tablet, or smart phone. Over 12,000 downloads were made in 2014. Updated pest management recommendations are presented at conferences and workshops. Growers can get advice for their specific problems by attending these sessions. In addition, growers can get Private Application Recertification Program credits for attending these sessions.

Results
Thousands of small fruit and grape growers across the Midwest make informed pest management decisions because of our educational programs and resources. They are able to manage pests with less expense and reduced negative impact on the environment. By better managing pest problems, fruit quality is improved and losses are reduced. This has a positive economic impact on their operation.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
133	Pollution Prevention and Mitigation

Outcome #20

1. Outcome Measures

Number of participants who increased their knowledge of topsoil importance

Not Reporting on this Outcome Measure

Outcome #21

1. Outcome Measures

Number of participants who increased their knowledge of Indiana's diverse wildlife

Not Reporting on this Outcome Measure

Outcome #22

1. Outcome Measures

Number of woodlot owners who improved their management skills

Not Reporting on this Outcome Measure

Outcome #23

1. Outcome Measures

Impact on biodiversity resulting from new knowledge related to insects.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Preservation of native insect biodiversity is vital to the well-being of humans. These species perform many ecosystem services upon which we depend for pollination, biocontrol of pests, nutrient cycling, and supporting food webs. Insects are an important minority pest species and are influenced by the mosaic pattern of land-use with landscapes. This research determines how to best configure landscapes and plan land-use decisions to preserve biodiversity and ecosystem services while limiting losses from pests.

What has been done
The project examined the effects of humans on land-use patterns on arthropod biodiversity in the Midwestern United States to understand how to balance the needs of native biodiversity with human land-use needs. It's objectives were to: 1)quantify the impacts of various land cover mosaics on the movement and occurrence of both pest and beneficial insect species using GIS and field surveys; 2)use multi-scale techniques to uncover the spatial scales at which different landscape features and processes affect the study species; 3)determine threshold values in the landscape that lead to large changes in the pest or beneficial guilds of insects; and 4) use the information to determine how to structure landscape mosaic patterns to achieve an optimal

balance between preserving beneficial insects and the ecosystem services they provide against the economic losses they cause.

Results
Researchers found that there are "levers" for affecting the pest populations that are critical for balancing insect biodiversity against human needs. Habitat connectivity "studying gene flow through habitats connected across fragmented landscapes" predicted genetic similarity of a species of native longhorned beetle that is an important pollinator. Habitat connectivity was found to predict movement across large regions, not just habitat selection. Circuit theory- like the flows of electrons through a circuit- was used to model the flow of families of beneficial predator insects that feed on invasive soybean aphid. A map of the Midwest was created based on this research that allows farmers to estimate potential benefits to controlling soybean aphids. Recent studies focused on landscape biodiversity relative to function groups (similar roles in environment), which allows better resolution of landscape and management influences than biologically artificial pest-beneficial classifications.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife

Outcome #24

1. Outcome Measures

An impact on urban pests resulting from new knowledge related to new technology.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The German cockroach is a common indoor pest of residential housing as well as commercial establishments. It is one of the most important urban pests in terms of frequency of occurrence and dollars spent on control. Human health, property, food supplies and the environment in which we live, work and play are affected by the presence of this cockroach; thus, our quality of life is impacted. Its cosmopolitan distribution, universally unacceptable aesthetic appeal, and association with filth while cohabitating with man have resulted in the German cockroach being one of the most socially, economically and medically important pests with which man has to deal. Management of the German cockroach still relies extensively on insecticides. The advent of highly effective bait products in the late 1990s significantly reduced the number and size of German cockroach infestations in the U.S., and reduced liquid and dust insecticide use as well. Through many years of pesticide use, the German cockroach developed resistance to virtually every class of insecticide used in its management. Recently, cockroach resistance to gel baits has been reported, with some cockroaches being highly resistant to a variety of current gel baits in the market. Given this history of insecticide resistance, including the recent gel bait aversion, in the German cockroach, it is imperative that more non-chemical control technologies be developed for use in management programs.

What has been done

The project developed green (non-chemical and low-impact insecticide) technologies for use in German cockroach control which evaluates new insecticide chemistries and formulations. Insect growth regulating (IGRs) compounds, pheromones, attractants, and repellents that are used in insect pest management (IPM) programs were identified as well as new exclusion, removal, trapping, and other non-chemical technologies. The project is evaluating and developing biopesticides (such as essential oils, fungi, and other pesticides derived from animals, plants, and bacteria) for cockroach IPM. Of critical importance to an IPM strategy is management and project is developing management strategies through a better understanding of behavioral and toxicological factors that influence insecticide resistance. Technologies and intervention techniques for use in cockroach allergen reduction are also under development.

Results

German cockroach population reductions are usually accomplished using cockroach gel baits (a "targeted" formulation to keep the insectcide away from humans, pets, food, etc.) New bait active ingredients and formulations are constantly entering the marketplace as older baits become ineffective due to cockroach resistance. Proprietary baits were evaluated in field tests conducted in infested apartments, with cockroach populations being evaluated at 0, 2, 4, 6, and 8 weeks after treatment. Cockroach numbers were significantly reduced at all periods following treatment. Integrated pest management (IPM) continues to be a focus of this project. Trapping, exclusion, and biopesticides cannot be relied upon for effective German cockroach population reduction as "stand alone" technologies. Training and education are key to the long-term success of IPM programs. IPM will continue to be stressed in all extension programs to pest management professionals, housing managers, and consumers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
104	Protect Soil from Harmful Effects of Natural Elements
135	Aquatic and Terrestrial Wildlife

Outcome #25

1. Outcome Measures

Number of people taking new management actions related to various species impacted by renewable energy development

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In 2013-2014, several continuing projects were investigating the impacts of land management on Indiana's natural and agricultural landscapes. These projects explored the impacts of bioenergy harvests from natural forests in southern Indiana and wind-energy development in the west-central part of the state.

What has been done
A study was finished that was looking at the response of salamanders to the harvest and removal of downed woody debris from forest ecosystems. Woody debris is critical habitat for organisms found in the forest soil such as salamanders. The debris has been targeted as a possible source of domestic energy as an alternative to fossil fuels. From the broader research, the project contributed to an interdisciplinary study on how timber harvest affects forest ecosystems by examining how breeding birds respond to timber harvest. A study of wind-energy development and its effect on the American Golden-Plover, a migrant bird using agricultural fields where the wind turbines are being built, is ongoing.

Results
The research is designed to educate private forest landowners, state agency professionals and ecologists on the impacts of different land management activities. The impacts can be measured on a wide variety of native species. Current research is primarily on birds and amphibians but associated Purdue research is focused on reptiles, mammals and native plants. The broader project supported field days and other extension events. The shorebird and salamander studies will help determine if there is a conflict between renewable energy development and the needs of native wildlife.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
131	Alternative Uses of Land
132	Weather and Climate
135	Aquatic and Terrestrial Wildlife

Outcome #26

1. Outcome Measures

Number of people with new knowledge related to alternative land use management.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Landowners across Indiana including farmers are looking for ways to manage their resources responsibly and where appropriate, produce income from these resources. Many landowners do not understand the impacts of their actions on the landscape over the long-term when managing and monetizing their resource. The Natural Resource Enterprises Program was created in part to encourage informed decision-making regarding land management and enterprises.

What has been done
Natural Resources Enterprises Program in Indiana Purdue Extension, in partnership with Mississippi State University, Indiana Farm Bureau, and Indiana Agricultural Law Foundation, hosted workshops to showcase outdoor recreational businesses and other income-producing enterprises. Natural resources enterprises include agritourism, lumber production, trail riding, bird watching, hunting, fishing, bed-and-breakfast inns, and more. These can be viable sources of supplemental income for rural landowners that are compatible with existing land uses while

enhancing natural resources.

Results
Prospective entrepreneurs learned about revenue potential, liability, business planning and successful business ventures, and took part in field tours of featured properties, natural resources, and enterprises. They learned the most important aspects of natural resource enterprises, talked with successful business owners, and interacted with local land and wildlife management professionals. Since 2009, 275 prospective entrepreneurs who owned or managed over 33,000 acres, attended Indiana workshops. Expected annual earnings were estimated at $752,000 to $1.4 million, or $22.59 to $42.05 per acre.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
131	Alternative Uses of Land

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

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Outcome 2 - Soil and Water Assessment Tool (SWAT) modeling predictions on sediment levels and fish distribution in streams.
Outcome 19 - Distribution of new, updated recommendations - paper and online.
Outcome 23 - Field study
Outcome 24 - Field testing of several levels of new bio-pesticide treatment of cockroach infected apartments.
Outcome 25 - Field studies

Outcome 26 - Post program survey on plans for natural resources operations.

Key Items of Evaluation

Outcome 2 - Modeling can be done remotely to run various scenarios to optimize how landscapes managed to promote stream biodiversity.
Outcome 19 - Over 3000 printed/distributed over 13 states; over 12,000 online downloads.
Outcome 23 - Mapping helps understanding of habitat connectivity (gene flow through habitats connect across fragmented landscapes) predicting: 1) similarity of species, 2) movement across large regions not just habitat selection.
Outcome 24 - All levels of treatment resulted in reduced cockroach numbers. New bait helped in overall IPM strategies.
Outcome 25 - Identified impact on species from renewable energy development.
Outcome 26 - Tools for effective business and preservation of natural resources along with connection to network of natural resources experts in community beneficial to the implementation of new businesses.