

## **Supplementary Documentation**

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### **Support correspondence from education and outreach specialists**

- Elizabeth Allee\* - Ithaca City School District
- Rick Bonney\* - Cornell Laboratory of Ornithology
- Lori Bushway\* - Cornell Garden-based Learning Program
- Carolyn Klass - New York 4H Coordinator for Entomology
- Milford Muskett – Natural Resources and American Indian Studies Program
- Karen Oberhauser\* - University of Minnesota

### **Partners in development and implementation of informal science programs**

- Ann Bartscher & Alice Nickelson - Beaver and Hanson County After School Programs
- Shawn Burke - Pine Ridge Extension Office
- Dayna Burlee - Sodus Central School After School Program
- Mary Jo Dudley - Cornell Migrant Program
- Kris Kaschak\* - ONC BOCES, CROP After School/Summer Programs
- Martin Lemke - Meade 4H Coordinator
- Kelly Mason - Seneca Nation Early Childhood Learning Center
- Audrey Pazour - Waubay After School Program, Day County
- Lori Quigley – Department of Elementary Education and Reading, Buffalo State
- Barbara Schirmer\* – Statewide 4H Director: New York
- Karla Trautman\* - Statewide 4H Director: South Dakota
- Doug Weeks – Cayuga Nature Center
- Lawrence Wheeler\* - Seneca Nation Education Department
- Frieda Zuckerberg - Onondaga Nation After School/Summer Programs

### **Support correspondence from researchers**

- Sam Droege\* - United States Geological Survey
- Robert Gordon - United States Department of Agriculture
- Kristopher Giles - Oklahoma State University
- Robert Kieckhefer - United States Department of Agriculture
- Robert Koch - University of Minnesota
- James Nichols\* - United States Geological Survey
- Mace Vaughan - The Xerces Society
- Annie Simpson – National Biological Information Infrastructure

\* Denotes advisory board member

**Subcontractor Information**

Bruce Lewenstein, Project Evaluator, letter of commitment, and SEAVOSS information..  
Joseph Ellington, image analysis and classification technology developer, letter of commitment.

## Collaborations

### **Ladybug Project Team.**

**John E. Losey - Overall Project Director.** Associate Professor, Entomology, Cornell University, Ithaca, NY

**Leslie L. Allee - Project Leader.** Research Associate, Entomology, Cornell University, Ithaca, NY

**Louis Hesler – Project Director South Dakota.** Research Entomologist. USDA ARS, Brookings SD.

**Michael Catangui – Extension Entomologist,** Assoc. Professor, Plant Science, SDSU, Brookings SD.

**John Pickering – Biodiversity and information specialist,** database and website developer. Discoverlife, Polistes Foundation. University of Georgia.

**Education and Outreach Specialist** - To be recruited from target audience communities.

**Graduate students** - To be recruited from our target audience communities.

**Consultant.** Bruce Lewenstein, SEAVOSS Associates, Ithaca, NY, is our external evaluator.

**Contractors.** Drs. Joe Ellington and Jeffrey Drake, New Mexico State, **Las Cruces, NM.** Will develop image-capture, transfer, analysis, and classification technology to identify ladybugs through our web site.

### **Ladybug Project Advisory Committee.**

Elizabeth Allee. Staff Developer. Elementary education and curriculum specialist. Ithaca City School District, Ithaca, NY.

Rick Bonney. Director, Program Development and Evaluation. Project FeederWatch and other citizen science projects. Cornell Laboratory of Ornithology, Ithaca, NY

Lori Bushway. Senior Extension Associate. Leader of Adult Outreach Garden-based Learning Program, Department of Horticulture, Cornell University.

Samuel Droege. Biologist. Population monitoring, online identification keys and guides. USGS, Patuxent Wildlife Research Center, Laurel, MD.

H. David Greene. (Retired Natural Resources Specialist and Extension Associate.) Native American plant and fisheries resource conservation, outreach to Native communities. SeaGrant and American Indian Programs, Buffalo, NY.

Kris Kaschak. Program Manager. (CROP), After School and Summer Programs. Otsego Northern Catskills BOCES, Oneonta, NY.

Milford Muskett. Visiting Assistant Professor. Native American environmental history, Native American natural resource development and policy, Natural Resources, Cornell University, Ithaca, NY.

Jane Mt Pleasant. American Indian Program Director and Associate Professor in the Department of Horticulture, Cornell University, Ithaca, NY.

James Nichols. Wildlife Biologist. Population dynamics, analysis, modeling, and management. USGS, Patuxent Wildlife Research Center, Laurel, MD.

Karen Oberhauser. Assistant Professor. Monarchs in the Classroom and Monarch Larva Monitoring Citizen Science Program Director. Department of Fisheries, Wildlife and Conservation Biology, University of Minnesota, St. Paul, MN.

Lori V. Quigley. Associate Professor. Literacy Center Dir., Stabilizing Indigenous Language Symposium Chair, Native American Education Initiatives in NY, and Culturally Appropriate Literature Dept. Elementary Education & Reading, Buffalo State University, Buffalo, NY.

Linda Rayor. K-12 Outreach specialist. Director of the Speakers and Community Outreach Service and instructor for: 'Naturalist Outreach in Biology'; Entomology Department, Cornell University, Ithaca, NY.

Diane Richerl. Office of Diversity and Multi-culturalism. College of Agriculture and Biological Sciences and Professor in Plant Science Department, South Dakota State University, Brookings, SD.

Barbara Schirmer. State Program Leader, 4-H Youth Development, Cornell University, Cooperative Extension Service, Ithaca, NY.

Karla Trautman. State Program Leader, Family and Youth/4-H, South Dakota State University, Cooperative Extension Service, Brookings, SD.

Doug Weeks. Executive Director. Cayuga Nature Center. Ithaca, NY

Larry Wheeler. Education Research. K-12 Curriculum. Seneca Nation Education Department. Irving, NY



**Partnerships.** All partner organizations serve one or more of our target groups: Native American, rural, farming, disadvantaged children.

**Partners in Program Development and Long-term Program Use.**

**These organizations have agreed to facilitate us conducting ladybug projects with the children in their programs, to have us train their youth educators in conducting ladybug projects, and to participate in evaluation and provide feedback to aid in the development of the program.**

**New York**

**NY State 4H** - Barbara Schirmer

**ONC BOCES, Creating Rural Opportunity Partnership (CROP)**, 16 school districts, after-school/summer – Kris Kaschak

**Onondaga Nation Afterschool** - Frieda Zuckerberg

**Migrant Workers Children's Summer Program** – MaryJo Dudley

**Seneca Nation Early Childhood Learning Center** – Kelly Mason

**Seneca Nation Education Department** – Larry Wheeler

**Sodus Central School Afterschool Program** – Dayna Burlee

**Cayuga Nature Center** – Doug Weeks

**South Dakota**

**SD State 4H** - Karla Trautman

**Pine Ridge Extension Office** – Shawn Burke

**Beaver and Hanson County Afterschool Programs** – Ann Bartscher and Alice Nickelson

**Meade 4H** – Martin Lemke

**Waubay After School Program, Day County** – Audrey Pazour.

**Partners in Outreach and Publicity**

**Cornell News Service** – Blaine Friedlander

**Dr. Lori Quigley** – Native American education program developer and outreach advisor

**Ladybug Project****Biographies of Current Candidates for Education/Outreach Position**

**Frieda Zuckerberg**, coordinator for the Onondaga Nation youth development and enrichment after-school and summer programs, has experience developing educational and cultural activities and initiating collaborations between community groups. She developed recruitment and marketing plans to address the needs and attract participants for both Onondaga programs and previously for Girl Scout programs in underserved Hispanic communities. She is bilingual in Spanish and English with verbal and written translation skills and has worked with elementary age children in Head Start, Battered Women Shelter, and runaway and homeless programs in the US and in Mexico. She has a BA in Psychology Based Human Relations with a minor in Hispanic Studies.

**Lawrence Wheeler**, the Education research/K-12 program coordinator for the Seneca Nation Education Department, creates and coordinates educational programs and has extensive teaching experience in Mathematics and Computing including activity and mentoring based work with at-risk and gifted youth. He developed and teaches Native America: History and Pop Culture that incorporates film and literature, piloted it separately to teachers from multiple disciplines, Seneca community members, and students, and developed a teacher manual with a team from different communities. He speaks and writes Seneca, has national leadership positions in two Native American educational organizations, and participates in Native American dancing and singing contests. In addition to an MS he has done Doctoral Studies in Mathematics Education, and has an MS and BS (summa cum laude) in mathematics.

Timeline for Development of Deliverables				
Deliverable	Year 1	Year 2	Year 3	Year 4
Traveling exhibit	Existing exhibit will be enhanced and begin touring New York and South Dakota.	The tour of South Dakota and New York continues.	The exhibit will be refined, duplicated and sent on a national tour.	The tour continues and feedback is evaluated.
Publicity/ recruitment	Publicity (see supplementary documents) primarily in NY and SD to recruit participants for live interactions.	Publicity (see supplementary documents) primarily in NY and SD to recruit participants for live interactions.	Publicity shifting to national level to recruit participants for web-based program.	Publication of discoveries in technical and general forums
Educational activities package – including text and other media on: <ul style="list-style-type: none"> <li>• Biodiversity</li> <li>• Conservation</li> <li>• Reconnecting science and culture</li> </ul>	Activities will be delivered primarily (but not exclusively) to target audience through live interactions in New York and South Dakota. Feedback from these live interactions will drive development of web-based activities.	Delivery will still be primarily through live interactions but with a shift towards more integration of the web as part of the presentation. Feedback will drive final refinement of web-based educational activities.	Delivery of educational activities will shift from primarily live to primarily web-based and coverage will shift to national. By the end of year three an independent autonomous program will be available via the web.	Activities will be maintained and evaluated.
Data submission portal for ladybug survey	Ladybug images and data can already be submitted through Discover Life. Tailor and simplify the user interface to make it simple enough for young scientists to use independently.	A fully functional portal will be online early in year two. Modifications will continue based on feedback from live interactions.	Modifications will continue based on feedback from web-based participants.	The portal will be maintained and evaluated.
Ladybug database	A small amount of ladybug data already exists in Discover Life. In the first year we will work on expanding this data set with historical records and investigating any structural changes necessary to promote future submission and utilization.	By the end of year two the ladybug database will be fully tailored for our use while maintaining full integration with Discover Life. The database will be usable by scientists and have “youth” functions in place (except those newly identified in this year).	The ladybug database will be fully functional and accessible for both scientists and the general public. Features developed will allow youth and other non-specialists to query the database and produce a range of simple (e.g. pie charts) to complex graphics.	The ladybug database will be maintained and positioned for long-term utilization. As part of Discover Life which has detailed plans for long-term maintenance the data will remain available in perpetuity.
Automated ID system (AIS)	Initial research and development.	AIS brought online, utilized and tested	AIS fully functional	AIS maintained and evaluated

### **New York's Honored State Insect**

The nine-spotted lady beetle, *Coccinella novemnotata* (C-9), was once the most commonly collected member of the family Coccinellidae (also known as ladybugs or ladybird beetles) in the United States. This native predator was once so common in New York and so respected for the great job it does controlling pests that it was proposed as the state insect by a fourth grade student in 1985. Unfortunately, by the time C-9 was honored in 1989 it had already begun a precipitous decline in numbers. There have been no confirmed collections of this beetle in the Northeast since 1992 and collections throughout the U.S. have been very sporadic. Less than 10 individuals are known to have been collected anywhere in the U.S. this century!

### **A Connecticut Yankee in Latvian Hearts**

What do Latvia and Connecticut have in common? They both chose the two-spotted lady beetle, *Adalia bipunctata*, as their official symbol. This beetle is native to North America and Europe where it has been one of the most easily recognized and abundant lady beetles. Lady beetles as a group were given their name because farmers believed they were sent to deliver them from the ravages of pests by the Virgin Mary. The "Beetles of Our Lady" became "Lady Beetles". In Latvia what we call the two-spotted ladybeetle is called 'marite' after the Latvian goddess Mara, who embodies earth's power. Although this beetle is still occasionally collected in the Northeast it is rapidly declining and we fear it may soon be gone from large portions of its former range.

### **Unanswered Questions**

What happened to these key components of our local ecosystems? Were they displaced by other lady beetles introduced to control pests? How will the loss of these native predators that were adapted to local conditions affect the control of pests? Can we reestablish these predators (like the wolves of Yellowstone)? What can we learn from the demise of the nine-spotted and the two-spotted lady beetles that will help us to prevent the loss of other species?

### **What Can I Do To Help? - Find 'em and Shoot 'em**

To be able to help these and other lady beetle species scientists need to have detailed information on which species are still out there and how many individuals are around. Entomologists at Cornell can identify the different species but there are too few of us to sample in enough places to find the really rare ones. We need you to be our legs, hands and eyes. If you could look for these rare lady beetles and send us pictures of them on Email we can start to gather the information we need.

Heres how the program will work:

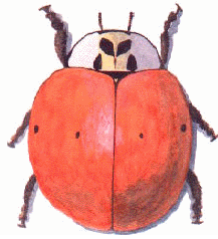
1. Go out and look for lady beetles.
2. If you find a rare species - shoot it! (see guide for photo tips).
3. Send the digital image to Ladybeetle@ento.cornell.edu

### **How to Shoot a Ladybeetle**

1. Chill out! Your lady beetle will be too active to get a good image unless you slow it down a little. You can do this in a freezer at home or in a cooler in the field. Lady beetles can be chilled in a freezer safely for 5 minutes (over six may kill them) and this will quiet them for 2-4 minutes. Coolers are not as cold as freezers so it will take 30+ minutes to get 1-6 minutes of quiet time. They will survive for days in a chilled cooler.
2. Shoot your lady beetle. Place your chilled out beetle on a gray background and take the largest shot you can while maintaining focus. Glare or reflection off the beetle is often more of a problem than not having enough light. Shield the beetle from bright light and use the flash only if there is very little light.

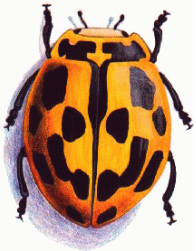
## Are you a nine-spotted lady

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**No!** My name is *Harmonia axyridis*, the multi-colored Asian ladybeetle. As you guessed from my name I come in different patterns and I was introduced from Asia. I have either too many spots or two few. I'm probably the most common lady beetle you will find - sometimes inside houses!

**Sorry - not me.** My name is *Coleomegilla maculata* and I am native to the US but I'm not a nine-spotted. I am too long and thin and my pronotum is black with red edges - not white.



**Checkers anyone?** I have 14 spots and I'm from Europe. My spots are more like squares so although my official name is *Propylea quatuordecimpunctata* most folks call me the checker spot ladybeetle.



**'Not spots'** My distinguishing feature is not a spot at all but the two paired marks that look like parenthesis. I'm called *Hippodamia parenthesis* or the parenthesis ladybeetle and I am a native.



**Not a nine-spot.** I am a native with similar features but the wrong number of spots. Also, I take my name, *Hippodamia convergens*, from the two converging white lines on my pronotum.



**Close - but no.** I am the seven-spotted ladybeetle, *Coccinella septempunctata*, a close cousin of the nine-spotted introduced from Europe. I have seven spots instead of nine.



**Almost!** I'm the two-spotted lady beetle, *Adalia bipunctata*. I don't think you will confuse me with a nine-spot but I am also a rare native. If you see me please shoot me and send in my image.



**Yes!!** You found me - congratulations! I have 4 spots on each elytra and one split in the middle to make 9. My pronotum is black with pale white marks on front. So, I am *Coccinella novemnotata*, the nine-spotted ladybeetle. Please "shoot" me immediately

The following essay was written by a 6th grade student at Boynton Middle School in Ithaca New York (student name withheld). This assignment was the result of a presentation on the value of insects by John Losey and Carolyn Klass. This is a key component of what we propose to share with students. Although expressed in simple terms the essayist clearly understands the salient points which are not apparent to a casual observer who could well miss the work done by such small creatures. The message, which included dollar values of several services such as pollination and the conversion of kilograms of manure to pounds (processed by dung beetles), resonated very well with three classes of 6th graders. The same program was slightly too complex for a separate audience of first graders even when simpler language was used. The younger students related better to talking about specimens as they saw them and expressing what they knew about “jobs” and “tools”.

Insects are very important to the economy. Insects can be good, but they can be bad.

Insects are bad because they can sting or bite you. If people are allergic to these insects such as bees, it could cause severe illness or death. Also if an insect bites you, that insect could transmit a deadly disease into your body. Insects also eat a lot of things we don't want them to eat, like plants that we grow.

Even though insects are sometimes bad, they have more good qualities than bad ones. If we did not have insects we would not have a lot of the food we have right now, because insects pollinate the flowers that have the food on them. Also, insects are food for other animals, if we didn't have insects we wouldn't have other animals and that would lead to even bigger problems.

Insects decompose unwanted corpses of dead animals. If we didn't have insects the whole world would suck.

Insects have bad qualities about them, but their good qualities overcome their bad ones. Its better to have insects then to not have insects.

## Evaluation Plan

### Have You Spotted Me?: Learning Lessons Looking for Ladybugs.

As the project begins, we will conduct quantitative surveys to assess baseline existing attitudes and knowledge among the students. Attitude questions will be based on those used in earlier citizen science projects at the Cornell Lab of Ornithology and other Seavoss Associates clients; knowledge questions will be based on material developed by the project team and pilot tested on local groups. For the younger students, we will probably use "draw a scientist" tests which will be coded for later comparison; for the older students, we will try both text and more symbolic surveys. These assessments will be repeated regularly throughout the project; because kids tend to fall in and out of the project, the data will likely not direct assessment of changes in particular individuals, but will allow for group comparisons. Control groups will be recruited from similar youth groups not participating in the project.

In addition to these quantitative measures, we will also assess attitudes and knowledge through observation and interviews, both formal and informal. Because of the nature of the project and the target audiences, we anticipate that this qualitative data may provide much richer understanding of how the project is being received by the primary and secondary target audiences.

### Project Goals

1. For children, their families and community to feel more comfortable and familiar with doing science. By creating concrete connections between the children's cultural community and science, children will also realize they already do science.
2. For children to directly experience authentic science, with opportunities for meaningful achievement and mastery, through active participation in a national survey of ladybugs.
3. For children to increase their understanding of the importance of preservation through biodiversity and conservation through these activities.

### Overall schedule

Evaluation for the Ladybug project will span four years, to provide time for fully developing and implementing materials.

Key stages in the evaluation will include:

Year 1: Front-end assessment, formative evaluation of project materials during development

Year 2: Formative evaluation during field test of full projects, with pilot test of summative evaluation and comparison

Year 3: Summative evaluation of projects, data gathering for comparison

Year 4: Analysis and dissemination of results

### Evaluation methods

This section of the proposal details the activities needed to accomplish the in depth evaluation of the Ladybug projects. Many of these activities will be accomplished through traditional evaluation techniques: interviews (both in person and over the telephone), focus groups, observations, and (when appropriate) pop-up surveys on the Ladybug web site. In accordance with standard human-subjects protocols, participants

will always be free to choose not to respond to evaluation questions without affecting their activities in the projects themselves.

A significant goal of the assessments is to compare participants' knowledge and attitudes to national standards. Thus, the observations and surveys (on paper, online, or in person) will be keyed to the National Science Education Standards, as well as to existing databases of knowledge of and attitudes toward conservation and science (such as data from the biennial *Science & Engineering Indicators* series published by NSF). Previous evaluations of citizen science projects (Trumbull et al. 2000, Evans et al. 2003, Brossard et al. 2005) have led to the development of scales and evaluation tools that can be validated and published in the peer-reviewed literature. The evaluation of the Ladybug project will continue our use and further development of standardized scales that allow individual informal science education projects to be compared against other, similar projects. Developing standardized tools is not intended to define some projects as "better" than others, but rather to help project managers understand how the opportunities and challenges of particular projects compare, so that appropriate projects can be implemented in particular instances. Only with standardized scales can those direct comparisons be made.

#### A. Front-end assessment (year 1)

1. Interview/survey to determine what concepts informal educators would most like to be covered (eg biodiversity, invasive species biology).
2. Interview/survey potentially participating educators and youth specialists to determine what would lead them to participate in the program.
3. Interview/survey target participants (youth) to learn what kinds of guided activities would be most appealing to them.
4. Interview/survey, past (eg from the pilot program) and potential future participants to determine existing levels of knowledge about insect biology, biodiversity, etc.
5. Begin developing summative evaluation scales based on interview findings and educational goals of projects

#### B. Formative evaluation (years 1 & 2)

1. Ladybug Web site: Usability testing (through focus groups).
2. Ladybug online Guide and Key: Usability testing (through focus groups and targeted phone interviews).
3. Activity Pilot Runs: Site visits to afterschool, summer, and 4H groups.
4. For all projects: test summative evaluation scales.

#### C. Summative evaluation (analysis in year 4)

1. Use surveys, site observations, and interviews to assess satisfaction, interest, etc.
2. For all projects, use pre- and post-tests to assess:
  - a. Knowledge of insect biology, biodiversity.
  - b. Attitudes toward preservation and conservation (using standard scales such as the "New Environmental Paradigm")
  - c. Motivation for participating (which may prove useful as a variable for assessing knowledge and attitude outcomes)

Although ultimate assessment of the scientific value of data collected through the project must await their use by the scientific community, the summative evaluation also will document publication and dissemination of the data via scientific meetings and publications.



## V. Dissemination

Results from all of the evaluations will be published both in the peer-reviewed literature and in newsletters widely read in the ISE community (such as *Informal Learning Review*), and disseminated through talks to both research audiences (for example, at Entomological Society of America or Ecological Society meetings) and practitioner audiences (for example, at AAAS meetings).

## VI. Evaluation team

The evaluation will be directed by Bruce V. Lewenstein, Ph.D., president of Seavoss Associates Inc. and associate professor of science communication at Cornell University.

Lewenstein is an international expert on informal science communication and is the former editor of the journal *Public Understanding of Science*. Among his other activities, he serves on the advisory boards of the Sciencenter, a hands-on science museum in Ithaca, New York, and of Cornell Plantations, the university's botanic gardens, arboretum, and natural areas. He has published widely, including on the ways in which exhibitions are seeking to address broader issues of public engagement in science beyond simple "science literacy." Seavoss Associates will assign an educational evaluator as the primary staff person for this project. At this writing, we expect that staff member to be Stephanie Thompson, Ph.D. Dr. Thompson's training is in developmental psychology, and includes work on research methods and experimental design. Thompson has worked for Seavoss Associates for three years, specializing in evaluation of citizen science and museum exhibitions. She has worked extensively with staff at the Cornell Lab of Ornithology on their 'citizen science' projects .

## ***Additional Information on How the Ladybug Project Supports Educational Standards***

The broad scientific concepts contained in our learning goals support the **Unifying Concepts and Processes Content Standard: K-12** of the **National Science Education Standards (NRC 1996)**. Specific ladybug program modules and survey activities contain learning and skills goals that support **Content Standards, A: Science as Inquiry, C: Life Science, E: Science and Technology, F: Science in Personal and Social Perspectives, and G: History and Nature of Science**, of the National Science Education Standards.

**Standard A: Science as Inquiry:** Ability to do scientific inquiry. Understanding scientific inquiry. Ladybugs are organisms children can easily observe. By participating in an actual scientific inquiry about ladybugs, children will develop abilities necessary to do scientific inquiry. They will be guided to investigate ladybugs in their “backyard”, gather data to answer a basic scientific question about ladybugs, and be encouraged to also pose their own related questions. The observations they make through surveying ladybugs will enable them to construct explanations for these questions. Communicating about their investigations through the website and to other children in their area they will also be able to construct explanations based on their peers investigations and explanations. Through participation in ladybug project activities and interacting with the website, children will gain in their overall understanding of scientific inquiry as a process. **Standard C: Life Science:** (K-4) Characteristics of organisms. Life cycles of organisms. Organisms and environments. (5-8) Populations and ecosystems. Diversity and adaptations of organisms. Gain understanding of the characteristics of ladybugs as organisms, the life cycle of ladybugs, how insects are classified: starting with mutually exclusive categories (what is a living thing and what is not, what is an insect and what is not, what is a beetle and what is not, what is a ladybeetle and what is not) and progressing to comparing between ladybeetles and recognizing common ladybug species. Understand there is more than one kind of ladybug. Understanding of how to measure species richness and evenness. Gain understanding of the environments in which ladybugs live, how they depend on their environments, and what their functions or jobs are in their environments, how the environment of ladybugs can change, and can influence their survival, how one group of ladybugs can influence the environment and the survival of another group of ladybugs, how insects “travel” or are transported around the world.

**Standard E: Science and Technology:** Abilities of technological design. Understanding about science and technology. Abilities to distinguish between natural objects and objects made by humans. Gain understanding of how technology can be used in science to extend our senses and facilitate our ability to investigate ladybugs. Gain understanding of how science can be used to improve and benefit our environment (importation of Asian ladybug) and still may have negative effects as well, how technology can be used to communicate the results of our investigations and observe the investigations of others.

**Standard G: History and Nature of Science:** Science as a human endeavor (K-4). Nature of scientific knowledge. (Historical perspective) (5-8). Throughout our project activity materials and on the website the things children do everyday (asking questions, investigating their world, getting explanations and finding answers) will be validated and labeled as science. Children will be encouraged to see themselves as scientific thinkers and citizen scientists. Video interviews and biographies of ladybug project scientists (and

other past and current scientists) will also put the ladybug project in a human context and communicate some of the history and nature of science. Children will hear how each scientist works, what questions they ask, what tools and procedures they use, what contributions they've made, what their contributions mean to the world, how someone else used or built on their contribution to make their own contribution, and what they hope future scientists will discover. By including information from scientists of diverse backgrounds and disciplines about how they became scientists and why they enjoy their work, we will strive to make science inclusive and approachable and perhaps inspire future scientists.

**Additional Information on how our citizen science project participants will contribute to estimating the density of rare ladybug species.**

Table 1. Predicted proportions for ladybug species not found based on the total number of ladybugs observed.

<b>If this many Citizen Scientists participate:</b>	<b>And they find this many ladybugs:</b>	<b>Then any ladybug species <i>not</i> found make up this proportion (or less) of all ladybugs<sup>1</sup></b>	<b>Proportion as number per 10,000</b>
1	25	12%	1198
2	50	6%	599
3	75	4%	399
4	100	3%	300
5	125	2%	240
10	250	1%	120
20	500	0.6%	60
40	1000	0.3%	30
60	1500	0.2%	20
80	2000	0.15%	15
100	2500	0.1%	12
300	7500	0.04%	4
400	10000	0.03%	3

<sup>1</sup> Conversely, we have a 95% chance of observing any species that exists above the proportion associated with each total ladybug catch.

## Activities about Biodiversity and Conservation

John Losey and Leslie Allee, Dept. Entomology, 4126 Comstock Hall, Cornell University, Ithaca, NY 14853 [Jel27@cornell.edu](mailto:Jel27@cornell.edu), 607-255-7376, [LLA1@cornell.edu](mailto:LLA1@cornell.edu), 607-533-4914.

These activities are the first segment of the larger ladybug project: Have You Spotted Me?: Learning Lessons Looking for Ladybugs. They introduce the ideas of biodiversity, conservation, and invasive species. These activities can be done in succession or on different days, and the order is flexible. If done at a fairly fast pace and your collecting site is close by, the main activities (without the coloring) could be done in about an hour. However, sweep netting can easily be done for longer or repeated another day. Children often return to the insect box during or after other activities. An alternative plan: The insect box and sweep netting could be done together and the games could be done on a separate (perhaps rainy) day. For pilot runs we supply most of what you need, see lists at end. *Evaluation materials for children and leaders are being formulated and will be added soon.*

**To prepare for going outside and collecting ladybugs:** Locate a collecting site(s). In general the best sites will be areas of more than 100 m<sup>2</sup> (120 yards) that contain herbaceous (not woody or tough) plants that are at least 20 cm (8 in) high. Plants that are too tough cannot easily be swept through and plants that are too short do not host many of the prey insects ladybugs need and thus do not usually support very large populations of ladybugs. Specific collecting site possibilities would include:

- Any area that has not been mowed recently, preferably with some weeds.
- The plants at the edge of a wooded area, mowed area or field (e.g. a hedgerow, these long thin strips can be excellent sites if they are wide enough to sweep or search visually).
- An orchard – sweeping is possible if not too recently mowed, trees themselves are excellent habitat for ladybugs and while they clearly cannot be swept lower branches can be shaken or beaten vigorously onto sheets. Note that many orchards are treated frequently with insecticides so be sure to check on the treatment schedule.
- Many agricultural fields including alfalfa, clover, small grains (e.g. wheat), potatoes, and soybeans can make fruitful collecting sites. As with orchards, be sure to check with the grower first.

### To prepare room or outside gathering area:

Put large felt “world” up on corkboard or wall, reserve all of one color and place them all one continent, place one of each color of small felt square on each of the other continents. (Alternatively, you can have children do this part.) Place the box of insect specimens in central location on low table.

\*\*\*Additional language activity: Particularly if any children speak languages other than English, write out the words for ladybug and some popular food plants grown in your area and post them or place them near the insect box. If appropriate, have the children do this, using dictionaries.

## Insect Box and Ladybug Poster

As the children enter the room have the Box of Insects and Ladybug Poster out for them to look at and crowd around. Talk about what each insect does.

Specific Notes for Insect Box (*Discussion points still under construction, will be expanded*) : All the insects in this box help us, they are “good” insects. Ladybugs help us by protecting our food plants, they eat the aphids that feed on our food plants. There are many different kinds of ladybugs (point into box). (Then refer to poster and point out C9 Ladybeetle), This ladybug is the NY State Insect but it is missing – no one can find it! We think this ladybug may have crowded it out, (point to Asian Lady beetle). Later on today we are going to our side and see if we can find this missing ladybug! (Point again to C9).

Bees make honey, wax for candles, and pollinate important food crops like apples. Dung beetles breakdown and eat poop or dung, without dung beetles poop would really build up and be everywhere, cows wouldn’t be able to eat the grass or walk around in their pasture. Many insects are food for birds, 1 out of 9 birds rely on insects for food. So if for some reason we lost lots of insects, lots of birds would go hungry or die.)

### **Drawing Activity**

Have children pick a ladybug from the poster and insect box to draw freelance or fill in on ladybug outline sheets, or model with clay or play-dough. Engage discussion on observing how your particular ladybug looks: identify body parts; colors of wings, head, antenna; color, size, shape, number and placement of spots. Then compare to other ladybugs.

### **Games**

#### **Concept Introduction for Games**

Biodiversity (Say and write on a board or have written on large papers.)

Bio/diversity, Bio=life and diversity = many different kinds.

So biodiversity means many different kinds of life.

The earth needs to have many different kinds of life forms because each animal, plant, and insect has a special job that keeps our world alive.

#### **Quick Demo of Jobs Concept for Games:** Toolbox or bag with different tools.

Here are different tools that people use to do different jobs.

Here’s a hammer for , here’s a screwdriver for, measuring tape for.....

(Hold up a hammer) So the hammer is good for pounding nails, why don’t we just have lots of hammers, why don’t we fill our toolbox with just hammers? Why do we need all these different tools?

Each tool does a different job, we need all the tools in order to do lots of different things. Just like each insect in the box we looked at does a different job so we need different kinds of insects, not just bees or just beetles.

Alternatively ask participants to think of different jobs that people do in their community.

So if you go somewhere, like a forest or a corn field, how could we find out if we have enough different kinds of insects?

Scientists go out and count the different kinds of insects, this is called sampling.

We're going to play a game that shows how this is done and what you might find.

### **Bead Game about Sampling**

We have different color beads in each bowl, we can pretend each color is a different kind of insect. We can take a scoop or sample from a bowl and find out if the bowl has enough different kinds of pretend-insects.

Divide children about equally next to bowls of beads and have each child take one spoonful of beads and put it on their plate.

Have each child divide their beads by color and count each color.

A data taker or each child writes down their data on data sheet provided on a clipboard.

A data taker or whole small group adds up how many of each color they have found.

Leader or small group reports their data to the black board or large paper. (Put bowls as columns and colors as rows.)

Direct entire group to look at results as they are being put up.

What do you notice about these numbers? How many different kinds of insects are in bowl A? bowl B? bowl C?

Each groups bowl will have a very different ratio of colors, one with equal numbers of all colors, one with lots of one color and very few of the other three colors, one with only two colors.

Discuss how the numbers of different kinds of pretend –bead -insects differed between the bowls, always connecting with different kinds of insects have different jobs.

If you have equal numbers of each then all the jobs are getting done. If you have lots of one kind and just a few of another kind maybe all the jobs are getting done but something could happen to the insects with low numbers and jobs would not get done. If you have lots of insects but only two kinds then those jobs are getting done very well but others are not. *(Discussion points still under construction, will be expanded.)*

Final questions for group: what would bowl B and bowl C need to do to get all the jobs done? Older students could work this out on paper.

What if another color was added to one bowl? What if another kind of insect suddenly arrived?

Let's see what would happen to the other insects.

In this game let's pretend the different colored squares are different kinds of ladybugs. Bring group over in front of the felt world.

### **Felt World Game about Invasive Species (refer to set up instructions above)**

Hand out cards, one per child. If you have extra cards give some to class helpers or have some of the early players play again later.

Cards have a Continent Number and a sample of one felt color on the front, on the back is a drawing of one of the ways insects travel.

As you are handing out cards, ask and have children shout out ideas:

How might a new kind of ladybug get from it's home to a new place? How do insects travel???

Explain the cards, point out the continents on felt world and their inhabitants, Then have the children take turns going up to felt world, going to the continent number that matches their card and removing the color felt square that matches the swatch on their card. Collect these squares as they are removed. Then the child takes a felt piece from the continent with all one color and moves it to the continent number on their card, replacing the square they removed. Finally the child shows and tells the group how their "invader" traveled to the new continent by describing and holding up the back of their card. Some cards are wild cards with a ?, so the child can make up how their invader ladybug traveled to the new continent.

When all the cards have been played have the children talk about the new mixture of colors or ladybugs on each continent and the world: on one continent some colors will be totally missing, on another other colors will coexist with many invaders. *(Discussion points still under construction, will be expanded.)*

Refer to the poster again and point out C9, remember this ladybug C9? The one that seems to be lost, that no one can find anymore?

We need your help! It's your turn to be scientists and try to find C9!

Let's go outside and see what we find.

### **Sweep Netting for Ladybugs**

Bring sweep nets, clipboards, field guides, and poster. Alternate plan: bring plastic deli or yogurt containers and bring ladybugs and other insects back inside.

Demonstrate sweeping the net through the plants in front of you as if you were sweeping with a broom about a foot off the ground. Take ten sweeps, five to each side and then close the net by either turning the net and folding the canvas around once or just grasping the net just below the ring.

Children may need to work in pairs and share nets.

Have children keep a record of what they found, then make a class list.

At another time the group could make a large illustrated poster reporting what they found.

### You will need to supply:

Some tools to hold up and talk about, hammer, screwdriver, pliers, whatever is on hand or can be borrowed. Put in a box or bag of some kind so you can easily end the quick demo.

Place to hang up a ~6x4 piece of felt with thumbtacks or tape.

Paper, pencils for clipboards.

Blackboard or large paper, chalk or markers.

Crayons, colored pencils, markers, or paints. Colored clay or play-dough.



The word for ladybug in the language(s) your children speak.

Optional: field guide to insects, language dictionaries, books, or posters.

We Will Supply:

Box of insects

Ladybug Poster and small field guide with pictures.

Ladybug outline sheets.

Beads in Bowls with spoons – Each container has a different pre-counted ratio of colors.

Small Paper Counting Plates

Clipboards and data sheets

Felt “world” and “species” pieces with velcro

Playing cards for felt world

Sweep nets.

## Publicity Plan

### Phase 1 – Years 1 and 2

-

- in each state make contact with 15 major organizations that are likely sources of participants
- for web and print (mostly magazine/newsletters) aim for 10 "publications" in each state and 10 outside NY/SD preferably national in scope

### Phase 2 – Years 3 and 4

- publicize nationally with the specific organizations contacted in phase 1 and national organizations
- aim for 10 new web, and 10 new national print outlets

Note that Xerces has already agreed to publish an article in the national magazine, Wings.

### Model Press Release:

The search for undiscovered animal species (like Bigfoot) or species thought to be extinct (like the Ivory Billed Woodpecker) has captivated people throughout history and continues to spark our imaginations today. Unfortunately, the search for rare species called “cryptobiology” has been almost exclusively the realm of trained scientists. Very few private citizens have the means and equipment to penetrate the dense northwestern forests to look for Bigfoot or the swamps of Arkansas to search for the Ivory Billed Woodpecker.

The good news is that there is one group of rare animals that may (and recently have!) turn up in someone’s back yard. On October 2<sup>nd</sup> 2006, parents of a Cornell Entomology student collected the nine-spotted ladybeetle, *Coccinella novemnotata*, in Arlington Virginia. This collection is remarkable because the nine-spot is the rarest ladybug in North America and although it was common until twenty-five years ago (so common and respected it was named New York’s State Insect) it has not been collected in the Eastern US for over fourteen years.

The nine-spot is one of several native ladybeetle species that were until recently common but are now quite rare. Our program will provide educational materials and activities to educate the public about biodiversity and conservation. We will also provide a framework for citizens to search effectively for these ladybeetles in their own yards and communities. Through our program every citizen will have the opportunity to join the exciting search for rare species and make a tangible contribution to the conservation of these beautiful and useful creatures. For more information on how to participate in our program please see our website.

## Features of Web Site for Ladybug Project

- Informational web site
  - o Project description
  - o Data collection protocols and instructions
  - o Introduction to staff and grad students
  - o “Canned” analysis/results
  - o Link to online dichotomous key
- Data entry and editing for participants
  - o Links to evaluation surveys
  - o Captures data about collection events each containing observations of specimens.
  - o Collection event is:
    - Date/time
    - Location
    - Habitat
    - Effort measures (time, area, #people)
    - Observer list
    - Age/experience classification of observers
    - All/partial data flag – do specimens submitted represent totality of specimens collected?
    - # specimens
    - list of specimens
  - o Each specimen is:
    - One or more images
    - Preliminary genus/species assignment
    - Confirmed genus/species assignment
  - o User registration
  - o User profile and preferences
  - o Password reminder
  - o Login/Logout
- Administration features
  - o User search
    - Users are primarily groups/organizations or individuals
  - o User participation statistics
- Scientific review features
  - o Download raw data
  - o Manual classification
  - o Classification review
  - o Data quality assessment and participant blacklisting
- **Reporting features for participants to work with data and interact with project.**
  - o Top “ten” lists

- Top reporting participants (most reports, most images, most data points)
- Most diverse species collection
- Collector of the month
- o Participation statistics (totals of X participants, Y images, Z species)
- o Maps/charts/tabular reporting by state/county/multi-site aggregations
  - Comparison of species distributions
- o Browse interface (not form-based) to individual data points primarily to allow Google to index data and images
- o Data download with URL links to images (not the images themselves)
- o Publish specimen data via DiGIR/DarwinCore2
- o Quiz showing images with known species assignment, asking user for which species.
- o Discussion forum
- o Interactive page to construct and submit Research Report
- o Page to construct and submit articles for Ladybug Webzine
- o Page to submit and view legends and stories about ladybugs, insects, crop plants, and foods.
- o Page to submit and view the words for ladybug, other insects, crop plants, and foods in another language.
- o Toolbox for youth educators

#### Language Notes

- Web site and features are under development and presented initially in English, we will add Spanish, Seneca, Mohawk, Onondaga, Lakota, and others as translations by partners take place. Also Note language translator page above.

### **Additional Information on *Bridging the digital divide***

Concerns regarding a digital divide stem mainly from a 1995 Department of Commerce report showing that these groups were far behind in access to and use of the internet (USDC 1995). While a disparity still exists for home internet access, in the last decade great progress has been made in schools and communities (Meer 2003, Monroe 2002, Prieger 2003, Wheeler & Amiotte 2005). For example, an estimated 90%-100% of Native American public schools have access to the internet, and most tribal community centers and libraries now provide internet access (Personal Comm. L. Quigley). Since the youth programs we are targeting are connected to schools and communities, access to the internet will not be an impediment. In those few cases where access might be limiting we are committed to help provide that access.

Availability of high quality stimulating web-related activities with challenging and culturally appropriate content is now more of an issue for youth educators of our target audience than access. The Ladybug project will provide youth educators with a valuable resource that uses the internet to deliver cutting edge scientific content and activities. As we discuss, we are targeting a segment of the population for whom finding a critical mass of other youth who share an interest in science can be challenging and finding specialists who can direct and foster this interest can be nearly impossible. The internet affords the opportunity to break through this isolation and allow participation in a common effort on a scale that no other media can even approach. A web-based program can reach two or three orders of magnitude more participants than a traditional “visiting scientist” and the difference in active communication can be partially addressed by streaming video, podcasts, electronic newsletters and discussion boards.

Another digital divide exists for people with visual, hearing, or other physical disabilities, who have problems accessing the internet. We are committed to bridging these problems by incorporating the suggestions of researchers such as Zimmerman et al. 2001 into our web site and general program development.

### **Additional Information on *Media features for training and outreach.***

Features targeted at youth will include: “Science Rocks: How/Why I became a scientist”, and “Bizzare Biology: How I decided bugs are cool”. We will offer several versions of both these features with different scientists in each. Features including NA and Hispanic scientists will be especially important for our target audience because a lack of role models often impedes youth from these communities from even considering a career as a scientist. Features for adult mentors will include “Biodiversity: An active learning guide” which will describe how to utilize activities we have developed and “Looking for Lost Ladybugs: Participating in Citizen Science” which will detail how to participate in our program by sampling ladybugs and sending us the images. If we develop a sufficiently large library of features we will also make the set available as a DVD.

### **Additional Information on *Outreach Materials*.**

We propose to develop a traveling mini-exhibit based on a successful exhibit we utilized at Cornell Department of Entomology's Insectapalooza event in October 2006 attended by over 2300 people. This exhibit consisted of a large colorful poster, 8.5" X 11" two-sided color handouts (see supplemental documents), live specimens of adults, larvae and pupae, of several ladybug species, and a wide range of pinned specimens. The poster and the handout were both illustrated with color drawings of common ladybug species and both featured descriptions on why we needed additional observations and on how citizens could participate in the program. We have received a great deal of positive feedback from this exhibit and while the timing of this event did not lend itself to immediate participation (most local ladybugs were already hibernating) many attendees have expressed their interest in participating. Particularly gratifying were encounters with youth as young as four years of age who during the course of conversations reminded their parents which species of ladybugs we were particularly interested in (e.g. the two-spotted and the nine-spotted). This demonstrated that concept of rare ladybugs resonates even with very young children.

One piece of constructive criticism we received after Insectapalooza was that our exhibit while educational was not interactive and that it is often the interactivity that captures youth attention. Based on these valuable comments we have committed to integrate some of the activities that we use in our visits to youth groups into our traveling exhibit. One activity that we believe can transition well from a supervised activity to a self-directed learning experience at an exhibit is our "bead survey". As described in detail elsewhere this activity consists of participants "sampling" containers of various combinations of colored beads. Each color stands for one species of ladybug (or more generally a species of any group). By pre-setting the combinations of colored beads we can use this hands-on exercise as tool to teach about concepts of species richness (how many different species) species evenness (how equal are the numbers in each color group) and diversity (a combination of richness and evenness). Unfortunately, the small beads that work well in a supervised activity would be too easily lost (or even swallowed) in a self-directed setting. For the traveling exhibit we envision shifting to 4" plastic balls (ball pit balls) decorated to look like several of the common ladybug species.

The traveling exhibit will consist of a poster or posters, pinned and live ladybugs (as available), color handouts, and the "Rare ladybug hunt" activity. For the activity we envision youth reaching into a large bin of 1000+ ladybug balls and withdrawing several individual balls. Participants will then identify the ladybug ball by matching with pictures provided. One clear tube (possibly coiled in a helix to save space) will be designated for each ladybug species. By counting the number of balls in each tube participants will be able to determine the rarity of individual species and the overall diversity of the community. A series of questions and comments will help participants put these numbers into context. After most or all of the balls have been sampled exhibit staff can open the ends of the tubes and allow the balls to roll back into the sampling bin. Based on past experience with exhibits and interactions we are confident this combinations of interactivity and educational materials will both educate participants and encourage a significant proportion to progress to surveying real ladybugs in and around their communities. We are developing an itinerary for the exhibit's travels, it will include

The Cayuga Nature Center, The Ithaca Science Center, the annual Entomology exhibits at the New York State and SD State Fairs, and Insectapalooza 2007.



***Additional Outreach Information: Organizations for direct contact through ladybug project advisory board members and partners to recruit participants.***

**National Johnson O'Malley Association** ([www.njoma.com](http://www.njoma.com)) a nonprofit, educational organization dedicated to advocating for the rights of Indian children from 3 years old through twelfth grade; facilitating communication between educators; and maintaining collaborative efforts with other public, private, tribal and federal educators and educational programs. Formal liaisons National Congress of American Indians, National Indian Education Association. (Ladybug Project Advisory Board member Larry Wheeler is Vice President).

**Tribal Education Department National Assembly (TEDNA.org)** (Ladybug Project Advisory Board member Larry Wheeler is a member of the nine-member board of directors).

**Society for Advancement of Chicanos and Native Americans in Science** ([www.sacnas.org](http://www.sacnas.org)) presentation of training workshops for informal educators and others at the annual meeting (Ladybug Advisory Board member, Milford Muskett is a member).

**21<sup>st</sup> Century afterschool and summer programs** (Ladybug Project Partner Frieda Zuckerburg, is the Onondaga coordinator and has contacts state-wide).

**Nature Interpreters Association** (Ladybug Project Partner Doug Weeks, Director of Cayuga Nature Center is a member).

**Events** where we will publicize the ladybug project by participating as exhibitors and leading ladybug surveys include state and county fairs, environmental festivals, earth days, farm days, specific crop days/festivals and pow-wows. For example:

Earth Day Ithaca, NY - held annually in third Sunday in April since 1998, with over 40 exhibitors, sponsored by the Center of Environmental Sustainability, P.O. Box 53 Spencer, NY

Earth Day Festival, Brookings, SD, third Sunday in April, a variety of educational and fun activities for all ages. Organized by Dakota Rural Action, 605/697-5204 or email [action@dakotarural.org](mailto:action@dakotarural.org).



# ITHACA CITY SCHOOL DISTRICT<sup>30</sup>

Beverly J. Martin Elementary School  
302 W. Buffalo Street, Ithaca, NY 14850

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Dear Leslie,

I am writing to confirm that I will be an advisor for your Lady Beetles project. Having already participated in an advisory board meeting, I am excited to be a part of this cutting edge work.

With my experience in primary literacy instruction and curriculum development, I see great potential not only to involve children in informal science, but also to build their life long literacy skills in all areas. The focus on tying local culture and tradition to the scientific standards being covered will make this project a watershed experience in the lives of the children you reach.

I look forward to working with you to develop lessons that bring science to life for rural and Native American children. Thank you for including me in this project.

Sincerely,

Liddy Allee  
PreK-2<sup>nd</sup> Grade Literacy Staff Developer  
Email: [allee@icsd.k12.ny.us](mailto:allee@icsd.k12.ny.us)  
Office: (607)274-2362  
Fax: (607)274-2141



June 19, 2006

John Losey  
Associate Professor  
Dept. of Entomology  
Cornell University

Dear John:

Thanks for the invitation to serve as an advisor on your project, "Have You Spotted Me? Learning Lessons Looking for Ladybugs." I have enjoyed working with you as you develop this idea. I think that the project will provide excellent learning experiences for rural and Native American audiences and will expand the concept of citizen science in many important ways.

While citizen science has previously been shown to help increase public science literacy, most of the large-scale informal science projects developed thus far—including many of the projects developed here at the Lab of Ornithology--have recruited participants who already have some interest or knowledge about biology and natural history. Your project, by focusing on participants who are less likely to have engaged in scientific investigation, will help to expand our current citizen science model by carefully considering cultural diversity and strategically integrating cultural issues into project design.

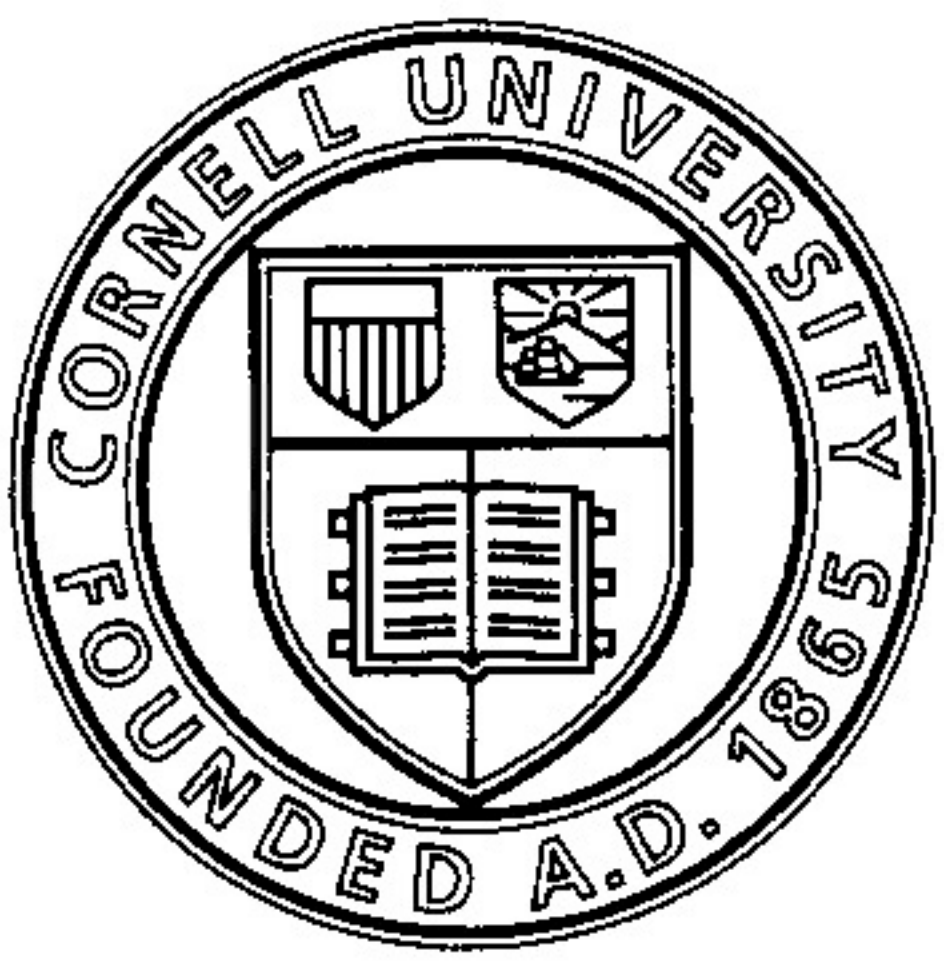
In addition, the Ladybug project expands many of the ideas and concepts that we have developed for the study of birds into a whole new taxonomic realm. In some ways insects may be easier to study than birds, because they sit still and can be photographed! Your data suggesting the reliability of the information collected by 1<sup>st</sup> graders is impressive. Furthermore, the infrastructure that you will build to handle digital images will be important to the ISE field as similar projects get under way with different organisms.

I look forward to providing advice throughout the duration of your project gleaned from findings from 15 years of developing citizen science projects for birds.

Sincerely,

Rick Bonney  
Director, Program Development and Evaluation





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June 14, 2006

Dr. John Losey  
Associate Professor  
Department of Entomology  
Cornell University  
Ithaca, NY 14853

Dear John,

This letter is to confirm my willingness to serve as an advisor on the Ladybug project. I was particularly pleased to attend the advisory group meeting you held prior to submitting the final proposal. It is clear you truly want us on board from the beginning to help create the best quality program.

I am confident that this project will not only provide children and youth with an opportunity to be genuine partners with researchers on a real science issue, it will also contribute to the informal science education field as you evaluate approaches to build science skills while linking to a participant's community to increase the probability that the program impact reaches beyond the length of the program.

I look forward to helping to connect the Ladybug project efforts with the Cooperative Extension network of educators and volunteers. Thanks for the opportunity to participate in what I believe will be an innovative project.

Sincerely,

A handwritten signature in black ink that reads "Lori J. Bushway".

Lori Bushway  
Leader of Adult Outreach  
Cornell's Garden-based Learning Program





**Cornell University**  
**College of Agriculture**  
**and Life Sciences**

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[www.entomology.cornell.edu](http://www.entomology.cornell.edu)

April 17, 2006

To whom it may concern:

I am pleased to write in support of the project submitted by John Losey, Leslie Allee, Louis Hesler and Paul Allen.

**Title: Have You Spotted Me?: Learning Lessons Looking for Ladybugs**

The citizen science model is a way that we can involve young people and interested adults as well in a "real science" experience. Many of the audience this project is aimed at will have had no contact with scientists such as entomologists, and will probably have had no experience in directly participating in research to help answer some unknown questions. I am a firm believer in involving young people in such activities – they are our future. It can really help them to develop a sense of worth and start them on a road of life-long learning. First graders have usually not developed negative attitudes about insects, are often very observant, and have the time to dedicate to careful observation and data collection. Fifth graders are able to understand a little more about insects and their place in the food web, as well as to know about their biology including life cycles, food preferences and habitat. In a project such as this, starting in two states as a pilot project, I think it could easily develop into a nationwide effort and be of use to many scientists and policy makers as well. By asking the correct questions, researchers can gain base data on distribution, gain a better understanding of the human agricultural practices impact on beneficial insects, and learn about distribution and biodiversity of ladybug species across the nation.

I work with New York State 4-H youth program as the entomology leader for the state. I am very interested in working with the group in helping to develop this project and to deliver it to 4-H youth and leaders in New York State. Through other efforts I am part of a team putting together curriculum on IPM for schools in which we have some information on ladybugs. I believe we can have a good collaborative working relationship and the data gathered will be of interest to all of us.

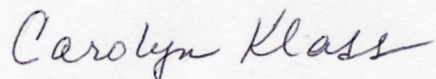
While the target of this project is 1<sup>st</sup> and 5<sup>th</sup> graders, I can see that a number of older youth, especially junior leaders, would embrace this type of project, and could then share their knowledge and skills with young people. The junior leaders would be able to enhance their own knowledge and skills as well, especially with the use of digital images and their transmission to the researchers. We might be able to combine those youth with an interest in entomology along with those with an interest in photography to show that



science is not all numbers or chemistry. Many skills can be developed and enhanced with this project.

As with any project, the plans for impact evaluation are a critical part. I think this project evaluation has been well thought out, and that it should be able to help us understand if we are having an impact on young people by exposing them to some aspects science at an early age. They will be learning new vocabulary throughout the project which will help them increase science literacy now and in the future.

Sincerely,

A handwritten signature in cursive script that reads "Carolyn Klass".

Carolyn Klass  
Sr. Extension Associate  
Department of Entomology



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College of Agriculture and Life Sciences

June 22, 2006

Dr. Leslie Allee  
Entomology Department  
4128 Comstock Hall  
Cornell University  
Ithaca, NY 14853

Dear Dr. Allee:

The Informal Science Education: Ladybug Project is a unique program that could possibly change and influence many children's lives. I am excited to serve on the Advisory Board for the project.

A significant aspect of this program is that it can bridge cultural and generational gaps. In the past, science may have been seen as more a hindrance. This program hopes to provide the opportunity to not only bring the children to do science, but also family members and the community; and also, the program can provide a setting where the natural landscape and the cultural landscape can meet and develop a place to do constructive learning.

This program has the potential to educate the younger generation in conservation and biodiversity, and in turn the children can educate their community in which they live. The knowledge of conservation and biodiversity is important in understanding preservation; the science of conservation and biodiversity will connect with their cultural ideals of preservation, which can be a significant development in bridging science and culture. In this process, cultural values and science processes are bridged, and hopefully, will bring a stronger collaboration that will make this program significant and exciting.

The Ladybug Project has great potential. It will bring underrepresented groups together with scientists in a setting where cultural understandings are connected to science activities and learning.

Sincerely,

A handwritten signature in black ink, appearing to read "Milford Muskett", with a stylized flourish at the end.

Milford Muskett Ph.D.  
Visiting Assistant Professor  
Department of Natural Resources  
American Indian Studies Program



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*College of Natural Resources*

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612-624-3600  
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<http://www.fw.umn.edu/>*

John Losey  
Associate Professor  
Department of Entomology  
Comstock Hall  
Cornell University  
Ithaca, NY 14853

June 9, 2006

Dear John,

I am writing to express my support for your proposed Citizen Science Project: **Have You Spotted Me?: Learning Lessons Looking for Ladybugs**, and my willingness to serve as a scientific advisor for the project.

I have been studying monarch butterflies for 22 years, and for the past 15 years have been involved in a variety of outreach programs that use monarchs as a venue for teaching children, teachers and other adults about the process of science, conservation and biology. Additionally, I have directed a Citizen Science Project, the Monarch Larva Monitoring Project, for the past 10 years. So, while the most important thing I know about ladybugs may be the fact that they eat monarchs, I feel that my experience with Citizen Science and K-12 education will be useful as you design this project. I am extremely convinced that Citizen Science has important educational and scientific potential, and my reading of your pre-proposal convinces me that this project will do an excellent job in both areas.

As a member of the advisory board for this project, I will be able to attend meetings that you have in Ithaca, and would also be willing to advise the project via phone or e-mail conversations.

I wish you the best of luck in obtaining funding for this project, and appreciate your invitation to serve on your advisory board.

Sincerely,



Dr Karen Oberhauser





➤ **A brief statement of interest**

The Beaver Island After School Program at Hanson School in Alexandria, South Dakota, in cooperation with the Hanson County Extension Service, is interested in becoming a part of this research based grant program to study lady bugs.

➤ **A short description of the targeted youth audience that would be reached – including a statement if minority children would be included (Native American children, Hispanic, etc).**

The youth targeted are ages 5-12 in an afterschool program that provides enrichment educational activities. Special needs students (ADHD, Down's Syndrome) and low-income students are included.

➤ **A rough estimate of the number of children that would be targeted in this outreach effort**

The Beaver Island After School program has up to 35 youth participate.

➤ **How you feel youth in your community would be impacted by inclusion in the project**

The community would be impacted by the encouragement of the awareness and the importance of ladybugs within our community. The project would provide a means of educating the community and students about the specific facts, counts, and needs. It would also provide a learning experience that is otherwise not available to this group of students- which is what our program strives to do as far as providing educationally enriching opportunities.

➤ **Documentation that this program will be delivered to a Native American or rural low income audience (basic demographics outlining population, income, etc. for your area/region or community).**

The Beaver Island After School Program offers benefits, services and education to all youth without regard to gender, race, creed, disability or income status. Rural low income families take advantage of the after school program.

In Hanson County .5% of the population are minority. Of that .5% only .1% are Native American. There are 16.7% of the families with related children under 18 years of age who live in poverty. There are 23.9% of the families with related children under 5 years living in poverty.

**Questions can be directed to:**

Ann Bartscher, Beaver Island After School Director, (605) 239-4387

Alice Nickelson, Hanson County Extension Educator, (605) 239-4542

*Creating Opportunities for a Lifetime*





## SOUTH DAKOTA STATE UNIVERSITY

Cooperative Extension Service  
College of Agriculture and Biological Sciences

38

### Pine Ridge Extension Office

HCR 49, Box 185

Porcupine, SD 57772

Phone: 605-455-1362

FAX: 605-455-1356

E-mail: [pine.ridge@ces.sdstate.edu](mailto:pine.ridge@ces.sdstate.edu)

June 16, 2006

Coordinator, Informal Science Education Grant  
National Science Foundation

To Whom It May Concern:

I'm writing to express support for the Cornell University grant proposal to study ladybugs, with collaborative research through South Dakota State University. In my role as Extension Educator on Pine Ridge Indian Reservation in South Dakota, I work regularly with schools and youth programs in providing enrichment activities in agriculture and environmental education. This grant would enhance our youth outreach activities, and provide an opportunity to encourage youth the application of everyday science, in their roles as observers of ladybug populations and behaviors. This should encourage some youth to take advantage of additional opportunities in science exploration as they enter middle school and high school. Those in our 4-H programs can also use these activities as 4-H projects, thus encouraging their peers to participate in the learning process as well.

This program would likely be implemented with one or two schools as part of the afterschool program, and may also involve local 4-H clubs as additional collaborators. It is likely that the program would include about 75 elementary age youth; the vast majority of youth I work with are Native American. This is a rural area; and the majority of residents are at or below federal poverty levels. Any opportunity to encourage and empower youth is very welcome, indeed.

Thank you for your consideration of this proposal.

Sincerely,

Shawn Burke, Extension Educator  
Agriculture and Youth Development  
Pine Ridge Extension Office

#### Creating Opportunities for a Lifetime

South Dakota State University, South Dakota counties and U.S. Department of Agriculture Cooperating, South Dakota State University is an Affirmative Action/Equal Opportunity Employer (Male/Female) and offers all benefits, services, education and employment opportunities without regard for ancestry, age, race, citizenship, color, creed, religion, gender, disability, national origin, sexual preference, or Vietnam Era veteran status.

----- Original Message -----

Subject: RE: Ladybug Project  
From: "DBurlee2" <DBurlee2@Soduscsd.org>  
Date: Tue, June 20, 2006 7:49 am  
To: "Leslie L Allee" <lla1@cornell.edu>

-----

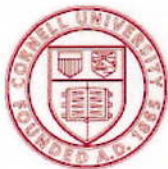
Leslie,

I apologize for not meeting the June 16th deadline for response to the Lady Bug Project. I hope it is not too late to express an interest in being a part of the project. This would be a great addition to our after-school program. Currently, our 21st Century Community Learning Center grant provides programs for students in grades 3 to 9. This year we had approximately 150 students participating in our 'Homework Club' after-school program at 2 building levels, Intermediate for 3-6 and Middle for 7-9. Additionally we run an after-school childcare program for students in grades K - 6. This program is supported by the parents and is a partnering program with the 21st Century CLC grant programs.

Again, I apologize for my tardiness in response to your email. I understand if our programs will be unable to be a part of the project this year. Thank you for the opportunity to work with you and your Lady Bug Project. Please feel free to contact me with any questions.

Thank you,

Dayna Burlee  
Community School Director  
Sodus Central School  
315\*483\*5249



Cornell University

**Cornell Migrant Program**  
Department of Development Sociology  
College of Agriculture and Life Sciences  
Cornell University 40  
321 Warren Hall  
Ithaca, NY 14853  
Telephone: 607 254-5194  
Fax: 607 255-9710

June 16, 2006

John Losey  
Leslie Allee  
Entomology Department  
Comstock Hall  
Cornell University

Dear John and Leslie,

I am writing in support of your proposed Informal Science Education Project: ***Have You Spotted Me?: Learning Lessons Looking for Ladybugs***, and to express my willingness to have the Cornell Migrant Program participate in the development of the project.

I see this as a great opportunity to bring together the efforts of the Cornell Migrant Program, the Cornell Entomology Department, and your collaborators to contribute to the programming of various summer educational programs for farmworker children. We share similar goals of empowering children to explore new experiences and preparing them to reach their highest potential. The hands-on activities and opportunity to take part in an actual science experiment as well as the obvious agricultural connection make your project a natural fit. Since many of the children who participate in summer instructional activities through the Migrant Education Programs move from state to state throughout the school year, they have limited extended exposure to a single scientific project, so this effort will likely be very beneficial. Your project will spark curiosity and expand the children's understanding of science and technology, and they will enjoy this unique chance to be citizen scientists.

The Cornell Migrant Program works closely with the NYS Migrant Education Summer Program for Migrant Children and currently several of our interns are directly involved in developing new programs. This year we have 13 undergraduate and 3 graduate student interns engaged in research and education throughout New York State. Our collaboration with Migrant Education programs address educational needs in Genesee, Wayne, Tompkins, and Cortland counties. We are always looking for new projects to widen the children's horizons. The interns can assist you to run pilot tests of the ladybug project and would like to be part of the development process. We can also explore ways to advise you on culturally appropriate pedagogical approaches as well as possibly help to translate some materials into Spanish. My experience with migrant children's education will be useful as you design this project because I can provide feedback on what has been pedagogically successful to date.

I look forward to working with you, and I appreciate your invitation to take part in this exciting project. I hope you are successful in obtaining funding for this project.

Sincerely,

Mary Jo Dudley  
Director of the Cornell Migrant Program



## Creating Rural Opportunities Partnership

21st CCLC Afterschool and Summer Program  
Room 101W, Alumni Hall, SUNY Oneonta  
Oneonta, New York 13820  
607-436-3247 • FAX 607-436-2760



Leslie L. Allee  
Department of Ecology  
Comstock Hall, Cornell University  
Ithaca, NY 14853

Dear Ms. Allee,

Thank you for the opportunity to participate in the project, "Have You Spotted Me?: Learning Lessons Looking for Ladybugs". Otsego Northern Catskill (ONC) BOCES is the Lead Educational Agency for our local 21<sup>st</sup> Century Community Learning Center (CCLC) afterschool and summer program entitled Creating Rural Opportunities Partnership (CROP). Currently, we operate afterschool programs in sixteen of our nineteen component school districts and provide programming to over 1200 children in kindergarten through eighth grade in rural Otsego and Delaware Counties of upstate New York. The main goal of CROP is to provide academic enrichment through experiential, hands-on activities after school. Because our primary focus is on academic enrichment, this project will definitely enhance our after school and summer programs.

Because of our rural setting and due to the economic hardships connected to the decline of the agriculture industry, our communities have an extreme need for after school and summer programs. According to the US Census Bureau in 2003, the per capita income of Delaware County was ranked 59<sup>th</sup> and Otsego County was ranked 54<sup>th</sup> of 62 counties statewide. Furthermore, in our participating school districts, the rate of free and reduced lunches hovers around 50% (free and reduced lunch percentage is the primary indicator of poverty among school districts). Keeping our children safe and providing them with enriching experiences after school is critical to combating rural isolation and realizing academic improvement.

When the grant is approved through the National Science Foundation, we would like to implement the Ladybug program as soon as possible. Since we operate summer programs in the months of July and August, this would be a perfect project for our summer students and would be offered on a yearly basis. An initial training with scheduled follow-up meetings would be very helpful to our staff so that program leaders could discuss scientific techniques, equipment, recording, reporting, and the experiment results with our Activity Leaders. I strongly believe that this hands-on project will stimulate scientific discovery and reinforce the scientific process of predicting, observing, and experimenting for all of our enrolled students.

If there is anything further I can do to assist in the implementation of this project, please contact me at 607-436-3247. I look forward to serving on the Ladybug Project Advisory Board and I look forward to hearing from you soon.

Sincerely,

Kris Kaschak, ONC BOCES  
CROP Program Director

Sole Supervisory District of Otsego, Delaware, Schoharie and Greene Counties



**Trautman, Karla**

---

**From:** Martin Lemke [yd4h@meadecounty.org]  
**Sent:** Friday, June 16, 2006 2:34 PM  
**To:** Trautman, Karla  
**Subject:** Letter of Intent  
**Importance:** High

June 16th, 2006

RE: Letter of Intent

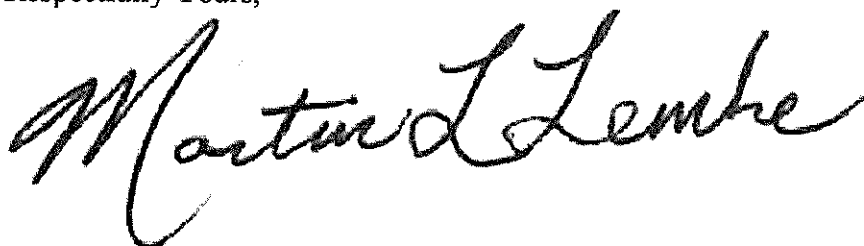
To: Karla Trautman

I am the Youth Development/ 4-H Coordinator for Meade County, South Dakota. My job description includes facilitating new non-traditional youth activities and maintaining the traditional 4-H program in Meade County. Under the guidance of the SDSU Cooperative Extension Service I provide quality learning opportunities to youth of all ages.

I plan to utilize the learning tool kit component of the Lady Bug research project in the Piedmont/ Stagebarn schools. Piedmont School is located in Piedmont and Stagebarn is located in Black Hawk on the growing I-90 corridor between Rapid City and Sturgis, South Dakota. There are 373 students enrolled in grades PK-6 in these schools. There are 58 youth in grade one and 49 in grade four. The schools are right on the edge of the Black Hills providing a unique environment for collecting lady bug specimen. Piedmont/ Stagebarn is currently not being served by the CES and is wanting youth programming. By using this "Citizen Science" program we can help meet the research goals desired as well as fulfill our local needs-based goals.

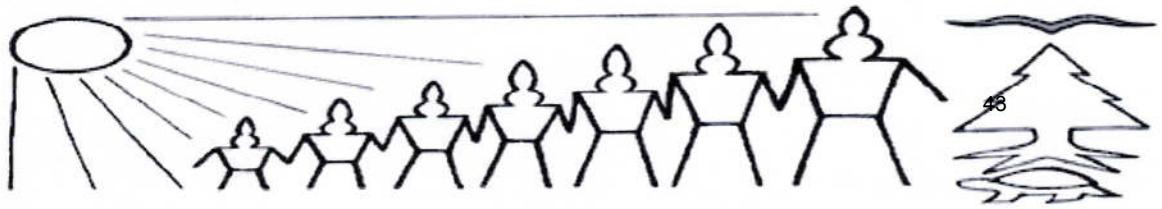
I look forward to working with you in the future.

Respectfully Yours,

A handwritten signature in black ink that reads "Martin L. Lemke". The signature is written in a cursive, flowing style with a large, prominent 'M' and 'L'.

Martin L. Lemke  
Meade County Youth Development/ 4-H Coordinator

6/16/2006



**SENECA NATION OF INDIANS**  
**Early Childhood Learning Center**

Cattaraugus Indian Territory  
Early Childhood Learning Center  
12857 Rt. 438  
Irving, NY 14081  
(716)532-0505 Fax :( 716)532-0515

Allegany Indian Territory  
Early Childhood Learning Center  
983 R. C. Hoag Dr.  
Salamanca, NY 14779  
(716)945-5035 Fax :( 716)945-5453

**Mission Statement**

*"To provide equitable, quality early childhood development and care services to our communities based upon a standard of excellence and cultural integrity."*

Dear Leslie,

I'm sorry it took me so long to get back to you! I received a letter from you explaining the project about ladybugs. I am the coordinator for the After School Program for the Seneca Nation of Indians Early Childhood Learning Center (ECLC). I have four classrooms, three here in on the Cattaraugus Reservation with 62 children and one on the Allegany Reservation with 25 children. I think it would be great to participate in this project. Please keep me updated with information about this program and what the next step is. Thank you for thinking of us!

Sincerely,

*Kelly Mason*

Kelly Mason

After School Coordinator

**From:** Pazour, Audrey  
**Sent:** Wednesday, June 14, 2006 3:59 PM  
**To:** 'TRAUTMAN, KARLA'  
**Subject:** Ladybug Project

Karla~

I am interested in working with Afterschool Program at Enemy Swim Day School, Waubay in Day County on the ladybug project. They have approximately 80 kids K-8th grade and are classified low income and a very large percentage are minority students. I have established a partnership with the Director Becky Bergquist to bring 4-H Projects and Art based lessons this past school year, as well as the upcoming one. The children are very interested in science based lessons and love nature. If you have any further questions, do not hesitate to call or email me back.

Thanks

Audrey Jo Pazour

\*\*\*\*\*

Day County Extension office  
711 West 1st Street - Courthouse  
Webster SD 57274-1359  
605-345-9504  
fax# - 605-345-9507  
[day@ces.sdstate.edu](mailto:day@ces.sdstate.edu)

[daycoces@itctel.com](mailto:daycoces@itctel.com)

[audrey.pazour@ces.sdstate.edu](mailto:audrey.pazour@ces.sdstate.edu)

Audrey Pazour - Day County Extension Educator  
Nila Christensen - Administrative Assistant

**Creating Opportunities for a Lifetime**

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## **LORI V. QUIGLEY, Ph.D.**

82 Jefferson Street  
Salamanca, NY 14779

Email: quiglev@buffalostate.edu  
Phone: h) 716-945-5402

***Associate Professor, Department of Elementary Education and Reading, Buffalo State College/S.U.N.Y., 1300 Elmwood Avenue, Buffalo, NY 14222, 2000-Present.***

Tenure-track faculty member. Undergraduate course taught: EDU 314: Teaching Reading and the Other Language Arts in Elementary School, 6 cr. hrs. (at the Native American Magnet School #19/Buffalo Public Schools PDS); 3 cr. hr. Graduate courses taught: EDU 513: Survey of Basic Concepts of Elementary Reading Instruction; EDU 613: Diagnosis and Prescription for the Classroom Teacher; EDU 642: Reading Assessment & Evaluation; EDU 643: Teaching Strategies for Children with Reading Difficulties; EDU 645: Teaching Strategies for Children with Reading Difficulties-Adolescence; EDU 647: Practicum in Reading; EDU 690: Masters Thesis.

Graduate Reading Program Coordinator; Literacy Center Director; Member, President's Council for Equity & Diversity; PDS Advisory Council Representative; Member, Institutional Review Board (IRB); Faculty Member, College Judicial Review Board; Coordinator, EER Literacy Council; Faculty Advisor, Native American Student Organization; Chair, CEURE Curriculum Task Force; former PDS Co-Director; Former Chair, EER Assessment Committee; former Faculty Advisor, ACEI Chapter; Member, Academic VP/Provost Review Committee (2004); Member, Search Committee, Dean of the School of Education (2005).

***Project Director and Co-Principal Investigator, Seneca Language Research Grant Program, Seneca Nation of Indians, Irving, NY 14081, 2001-2004.***

Principal grant writer of \$1.2 million grant funded by U.S. Dept. of Education Office of Educational Research and Improvement (OERI). As project director, responsibilities included supervision of project staff, development of Seneca language/culture curriculum intervention materials for preschoolers and their teachers and families, organization of teams of consultants for teacher trainings and parent workshops, management of budget. Purpose of grant was to examine the effects of teaching Seneca language and culture on preschoolers' cognitive and social development.

***Interim Education Director, Seneca Nation of Indians, Irving, NY 14081, 2000-2001.***

Responsible for a staff of 27 Education Department employees from the following programs: Seneca language, Higher Education, Johnson O'Malley, Media Production, Education Administration. Duties also included direct collaboration with school administrators and Native American education personnel from three local school districts at which Seneca children attended off-reservation; reporting to the Seneca Nation Council and Executives; and representing the Seneca Nation at NYS Education Department Commissioner meetings with tribal leaders. While serving as Interim Director, wrote a total of \$2.7 million in education grants awarded to the Seneca Nation (the OERI grant, an ANA grant, and a federal Even Start grant for AI/AN tribes).

EDUCATION

*Fordham University, Graduate School of Education, Division of Curriculum and Teaching, 113 West 60 Street, New York, NY.*

Granted **Doctor of Philosophy** degree in **Language, Learning and Literacy**, May 1997. Doctoral dissertation examined the effects of a peace maintenance system on high school teachers' and students' communication, affirmation, cooperation, and conflict resolution interactions.

*Fordham University, Graduate School of Arts and Sciences, Bronx, NY.*

Granted **Master of Arts** degree in **Public Communication**, Rose Hill Campus, September 1983.

*St. Bonaventure University, St. Bonaventure, NY.*

Granted **Bachelor of Arts** degree with major in **Mass Communications**, May 1981.

## PROFESSIONAL MEMBERSHIPS and SERVICE

*National Advisory Council on Indian Education. U.S. Presidential Appointment. April, 2004. Five-year term. Currently serving as Chair.*

*SNI Library Board of Trustees. Treasurer, member of Executive Committee, chair of Collections Committee. 2001-Present.*

*Seneca Nation Head Start Policy Council. Community Representative for Allegany Indian Territory. 2001-2004*

*Association for Childhood Education International (ACEI). Member of the Multicultural and Diversity Issues Committee, ACEI Folio Reviewer. 1998-2005.*

*St. Bonaventure University Chapter of Phi Delta Kappa. Member, 1997-Present; Young Authors Conference Committee member; Executive Board President, 1998-2001.*

*National Council for the Accreditation of Teacher Education. Trained institution reviewer. 1998.*

*New York State English Language Arts Bias and Sensitivity Review Committee. NYSED in conjunction with CTB/McGraw-Hill. 1997-Present.*

*New York State Association for Supervision and Curriculum Development (ASCD). 1997-Present; IMPACT journal editor, 2003.*

*Fordham University Chapter of Phi Delta Kappa. Executive Board Member 1995-1996, 1996-1997, 1997-1998.*

*Native American Indian Education Association of New York (NAIEA/NY). Member, 1992-Present; Chairperson, Executive Board, 1996-1998; association newsletter editor/producer; Annual Conference Chair, 1996.*

## AWARDS OF RECOGNITION, CERTIFICATES

Nominated, Buffalo State, S.U.N.Y., *President's Award for the Promotion of Equity and Campus Diversity*; pending approval for September 2006.

Awarded S.U.N.Y. Chancellor's Award for Research and Scholarship, Albany, NY, May 2006.

Awarded "10-Year Service Award" by the Native American Indian Education Association of New York (NAIEA/NY) for dedication and service to the Indian Education, October 2002.

Honored as *Native American Woman of the Year for Education Service* at the annual Native American Women's Recognition Event, Friends of Ganondagan, Inc., April 2000.

Awarded "Service Award" by the Native American Indian Education Association of New York (NAIEA/NY) for commitment to the goals and mission of the association, July 1998.

Awarded for "Outstanding Contributions to Reading Council Activities" by the New Jersey Reading Council Chapter of the International Reading Association, 1996.

Awarded "Superior Rating" on Ph.D. comprehensive examination Fall 1994, Fordham University Graduate School of Education, Division of Curriculum and Teaching.

Certified Trainer/Facilitator in Conflict Resolution, Bias Awareness and School-Based Mediation, obtained in 1992 from Children's Creative Response to Conflict (CCRC), Nyack, New York.

Awarded "Outstanding Journalism Educator" from the Quill and Scroll International Honorary Society for High School Journalists, May 1992.

## PUBLICATIONS

Quigley, L. (2006). "Weaving Common Threads," *Rural Special Education Journal* ( article accepted for publication in Spring 2006 issue).

Quigley, L. (2004). "Revitalizing the Seneca Language Program: Utilizing Constructivist Strategies and Technology to Effect Change," in Kalantzis, M. and Cope, B.'s (eds.) *NEW LEARNING: Proceedings of the Learning Conference 2002*, Melbourne, Australia: Common Ground Publishing. (also first published in the *International Journal of Learning*, Vol. 9, 2002)

Quigley, L.V. (2004). "Managing conflict: An imperative in today's schools." *Impact*, (33)1.

Quigley, L.V. (2003). "Finding a Healthy Balance Between Two Worlds," in SCUTREA proceedings. Bangor, Wales: University of Wales Publishing.

- Quigley, L.V. (2002). "Revitalizing the Seneca Language Program: Utilizing Constructivist Strategies and Technology to Effect Change." Melbourne, Australia: Common Ground Publications.
- Chicola, N.A. & Quigley, L.V. (2002). "Teaching for Success in High-Need Urban and Rural Settings with Diverse Populations." Melbourne, Australia: Common Ground Publications.
- Chicola, N.A. and Quigley, L.V. (1999). "A collaborative model: Implementing standards in a professional development school." *Impact*, (28)1, 7-14.
- Quigley, L. J. (1997). Effects of a Peace Maintenance System on Secondary School Teachers' and Students' Communication, Affirmation, Cooperation, and Conflict Resolution Interactions. Published doctoral dissertation, #9809013. Ann Arbor, MI: UMI.
- Zakierski, M. and Quigley, L. (1996). Peace maintenance observational category system. U.S. Copyrighted educational testing instrument.

## GRANTS

### Grants Awarded 2004-Present:

CDHS Mini-Grant Project: Family Literacy Model for Foster/Adoptive Parents.  
 Equity & Diversity Mini Grant for 15<sup>th</sup> Annual Native American Heritage Celebration (\$1K), Provost Incentive Grant Award (\$1K)  
 Individual Development Award for scholarly activity (\$1K)

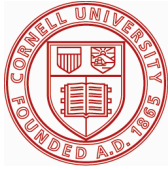
Principal Writer. Mt. Morris Central School District: NYS Reading First Grant. Awarded \$900,000 grant by the NYS Education Department, February 2004.

Principal Writer. Seneca Nation of Indians: Even Start Family Literacy Grant for Federally Recognized American Indian/Alaska Native Tribe. Awarded \$1.2 million four-year grant by the U.S. Department of Elementary and Secondary Education Office, Washington, DC, April 2002.

Principal writer and project director, Seneca Nation of Indians American Indian/Alaska Native Language Research Grant. Awarded \$1.1 million three-year grant by the U.S. Department of Education, Office of Education Research and Improvement, Washington, DC, October 2001.

Principal writer, Seneca Nation of Indians 1000 Hours of Seneca Language, Language Preservation Grant. Awarded \$280,000 two-year grant by the Administration for Native Americans, Washington, DC, September 2001.

Principal grant writer, Native American Magnet School, Buffalo Public School District, for NYS Comprehensive School Reform Demonstration Grant (\$330K); grant awarded April 2001.



**Cornell University**  
Cooperative Extension



**4-H Youth Development**

Cornell University  
340 Roberts Hall  
Ithaca, NY 14853-5905  
t. 607 255-0896  
f. 607 255-0788  
<http://nys4h.cce.cornell.edu/>

June 8, 2006  
Leslie Allee  
Entomology Department  
Cornell University

Dear Ms. Allee,

The *Have You Spotted Me? Learning Lessons Looking for Ladybugs* Program Proposal provides a very unique opportunity for 4-H Youth to be engaged in a “citizen science” initiative. The focus of this proposal, to involve youth from rural, farming, Native American, and low-income groups, will assist New York 4-H in reaching those sometimes difficult to reach audiences in upstate New York with an exciting new curriculum and learning opportunity.

The New York State 4-H Youth Development Program is part of the Cornell Cooperative Extension system with its administrative offices at Cornell University. One of the central themes of 4-H is to connect the youth of New York to the educational resources of the Land Grant University. The programs help promote positive development, enhance science and technology literacy, develop life skills, and involve young people in their communities. By linking families with great opportunities to work with Cornell faculty members, students, and projects, 4-H helps young people get excited about learning and exploring career options.

Cornell Cooperative Extension employs more than 150 professional youth development educators, who serve local communities in each of the 57 counties and in the five boroughs of New York City. These educators will work in partnership with Cornell University faculty and staff to assist in the delivery of this proposed project. Educators are based in local Cornell Cooperative Extension associations in the heart of the communities in which they serve and are well equipped to reach out in their communities to involve youth in this program. Youth already enrolled in rural 4-H groups will be a natural audience to be incorporated into this learning experience. Training for educators and adult volunteers can be easily expedited in our highly networked system.

The need for science, engineering and technology education is essential for today’s young people. 4-H’s science engineering and technology programs prepare youth for the challenges of the 21<sup>st</sup> century by engaging them in a process of discovery and exploration. A strong collaboration with the Ladybug project is a natural fit with the goals and mission of the 4-H program in New York State and we are very excited about the prospect of involving 4-H youth in a hands-on scientific experiment of this magnitude.

Sincerely,

Barbara Schirmer  
State Program Leader, 4-H Youth Development



South Dakota  
State University

COOPERATIVE  
EXTENSION  
SERVICE

51

College of Agriculture and  
Biological Sciences

Program Leader  
Family & youth/4-H

Ag. Hall 152, Box 2207D, SDSU  
Brookings, SD 57007-0093  
Phone: 605-688-5131  
FAX: 605-688-6733

June 16, 2006

To: Dr. John Losey  
Dr. Louis Hesler  
Ms. Leslie Allee

Re: Support for the "Have You Spotted Me?: Learning Lessons Looking for LadyBugs--  
NSF Research Proposal.

To Whom It May Concern:

I am writing this letter in support of South Dakota Youth Development/4-H participation in the proposed NSF Research Proposal: "Have You Spotted Me?: Learning Lessons Looking for LadyBugs". This grant proposal contains a youth component that will allow youth to be involved in an experiential, "hands on" citizen science opportunity.

The South Dakota Youth Development/4-H program is eager to learn more about the youth citizen science model and to enhance/broaden the capacity of our youth outreach to include science based programming. We have identified four sites across the state of South Dakota that reflect rural areas, low income audiences and in the case of two sites, the opportunity to interact with Native American youth.

I am supportive of the opportunity to serve on the Advisory Committee for this grant proposal and to reflect program philosophies for youth outreach as well as to assist the grant delivery in addressing and meeting developmentally appropriate methodology for youth audiences.

I look forward to the opportunities that will be afforded to South Dakota Youth Development/4-H through this grant proposal and am excited about the ability of this programming effort to broaden and expand youth outreach efforts to underserved audiences in our state. This programming effort will allow youth to experience the scientific method and to broaden their hands on understanding of the scientific method. This is a priority for our youth outreach efforts in South Dakota.

Sincerely,

Karla Trautman  
Program Leader  
Family and Youth/4-H

Making a Difference

Date: December 4, 2006

RE: Insect Biodiversity & Conservation ^ Lady Bug Project

TO: Cornell University Principle Investigators:  
       John Losey, Department of Entomology, Cornell University  
       Leslie Allee, Department of Ebtomology, Cornell University

CC: Cayuga Nature Center Project Lead:  
       Bill Foster, Education Program Manager

Cayuga Nature Center ([www.CayugaNatureCenter.org](http://www.CayugaNatureCenter.org)) is pleased to have been asked to be a part of the „Lady Bug Project%. The Nature Center has a long history of providing environmental education to local schools, scout groups and families and we see this project as an excellent way for us to expand these offerings while at the same time providing a better understanding of the need to scientific research.

Over the last several years one of the more exciting outdoor exhibits at the Nature Center has been our Butterfly Garden. This is a seasonal structure that we erect each spring. Under the screening we have planted a diverse set of plantings that are all attractive to one or more species of local butterfly. In addition we have an inside exhibition called „Caterpillar Corner% where we raise caterpillars and butterflies for the house. At the end of the season we release all of our butterflies, since they are all native to our area. This last fall we release more than 100 Monarchs and numerous other butterflies as part of this project. We see the „Lady Bug Project% as an extension of this already popular program.

Below we have noted some of the ways we see our staff being involved in the Lady Bug Project. As the project proceeds, we fully expect to discover many more opportunities to bring the public and lady bugs together as part of an informal education process.

Naturally yours,

Douglas Weeks, Executive Director  
 Cayuga Nature Center



SENECA NATION OF INDIANS

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**EDUCATION DEPARTMENT**

---

12861 RT. 438 • IRVING, NY 14081 • PHONE 716-532-3341 • FAX 716-532-3269

Leslie L. Allee  
Department of Entomology  
Comstock Hall  
Cornell University  
Ithaca, NY 14853

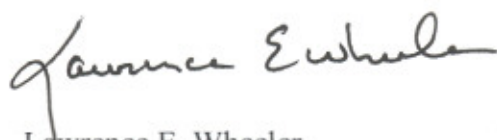
re: Lady Bug Project

Dear Leslie:

The work that you are doing with the Lady Bug Project sounds intriguing. The teachers of our summer program will be able incorporate a pilot (or a portion of the pilot project) during the Seneca Nation Kindergarten Bound Program this summer. Each week our teachers focus on different areas of every day life and incorporate them in a school-readiness curriculum. This summer, the Lady Bug Project would be a welcome addition to the curriculum.

As the coordinator of the program, I offer my support to your project in hopes that such support in these early stages will result in the opportunity to offer the project to as many Native American and Rural farming communities as possible. Our programs draw from students from the local Native American community as well as the surrounding rural farming communities. I am personally interested in assisting in the development of the materials for the project and offering translation assistance into the Seneca Language. I look forward to more contact with you and your project. Nya:wëh.

Respectfully,



Lawrence E. Wheeler  
Education Research/K-12 Program Coordinator

June 15, 2006

Dear Leslie,

Thank you for your notice regarding the Ladybug project. It was wonderful to have you come last week for the pilot run and I look forward to a similar opportunity this summer. We are very interested in participating in developing the ladybug project this summer. It was great to see how much the students enjoyed your display case, the activities on biodiversity and most of all, hunting for ladybugs using the nets. As you know, as a 21<sup>st</sup> Century Program, our primary focus is to offer an after-school and summer enrichment program that reinforces the curriculum through the use of experiential projects and activities. Consequently, the ladybug project appears to be an excellent opportunity for us to engage in true citizen science as well as to provide valuable baseline information for your project. I will also be forwarding the description of your project to other 21<sup>st</sup> Century Program supervisors in our district. Please feel free to send me any additional information or enrollment instructions to the Onondaga Nation School. Thank you for your efforts and we look forward to joining your project.

Wishing you a wonderful day,

Frieda Zuckerberg  
Onondaga Nation School  
R.R.1 Box 270  
Nedrow, NY 13120  
315-469-6991

## USGS PATUXENT WILDLIFE RESEARCH CENTER

June 15, 2006

John Losey  
 Department of Entomology  
 Comstock Hall  
 Cornell University  
 Ithaca, NY 14853

Dear John:

You have asked to write a letter of support for the NSF ISE program proposal for the "Have You Spotted Me?: Learning Lessons Looking for Ladybugs" project and am pleased to do so. I have spent 20 years of my career with the USFWS and USGS designing, developing, evaluating, and implementing monitoring programs for vertebrates and more recently invertebrates. I have headed up the North American Breeding Bird Survey, developed the North American Amphibian Monitoring Program and FrogwatchUSA, and been involved with many other national, international, regional, and local programs. Currently, I am evaluating and developing native bee monitoring programs and identification tools. Most of the larger programs I have been involved with involve the citizen collection of data and over the years I have gotten a good feel for what works and what doesn't.


For me the core of this proposal is to identify, inventory, and monitor ladybug populations. Fortunately, the project is well thought out and I have no doubts regarding either its feasibility or its ability to generate useful data. The project has the following features that will make it a success.

- Everyone can recognize a ladybug
- Individuals and society value ladybugs
- Ladybugs are colorful, approachable, gentle, and accessible to everyone
- Ladybugs can be readily identified using simple identification tools
- Catching and counting ladybugs can occur in places, times of day, and times of year when children and adults are comfortable being outside
- Data can be easily vetted and verified using digital pictures
- Statistical tools are available to make the data useful for inventory and monitoring purposes

Large scale quantitative information regarding the status of any insect is rare. What does exist is usually a simple listing of species and any attempts at quantification are inevitably fraught with debilitating statistical errors. Large scale changes in distributions of insects are known to occur in the recent past and are increasingly likely in the future. As with groups such as birds and amphibians, information on the patterns of status and changes in populations of ladybugs will, once available begin to drive their conservation. Groups of plants and animals that are not monitored only receive attention once their populations are so devastated that they appear on the endangered or extirpated list. Fundamentally, research can be accomplished at any time while once a year passes no monitoring program can ever retrieve that year's data. This program will provide such information and will compliment for invertebrates the ongoing efforts to establish butterfly monitoring programs. In addition to the attractive features mentioned above, the conservation and natural history data generated will be of use to my agency, the Department of Interior and other groups.

This project has my full support and I look forward to interacting with the developers and using the data once it appears. I am available for questions at the numbers listed below.

Sincerely,



Sam Droege  
 Head of the Native Bee Inventory and Monitoring  
 Program



June 15, 2006

Louis S. Hesler, Ph.D.  
Research Entomologist  
USDA-ARS-NCARL  
2923 Medary Ave.  
Brookings SD 57006

Re: NSF Proposal

Dr. Hesler,

Your proposal is clearly a comprehensive educational effort incorporating youth science education and the development of a useful database for Coccinellidae in the U.S. Because of my work with this insect family, I am particularly supportive of the development of the database. A comprehensive database in your area would allow for valid comparisons among states in subject areas ranging from IPM evaluations to population ecology studies. This database would be a welcome addition to the body of knowledge for Coccinellidae.

If there are any questions, please call.

Sincerely,

Kristopher Giles  
Associate Professor  
127 Noble Research Center  
405-744-6298  
Email: [kris.giles@okstate.edu](mailto:kris.giles@okstate.edu)

May 17, 2006

Dr. Louis S. Hesler  
Research Entomologist  
USDA-ARS-NCARL  
2913 Medary Ave.  
Brookings SD 57006

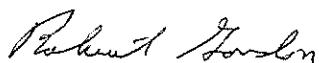
Dear Dr. Hessler:

In regard to your proposal to initiate a "citizen science" project to survey coccinellids, I would like to add my support to this project. We do not have nearly enough professional personnel to support an undertaking of this magnitude, and this seems an excellent way to tap the pool of existing but unrecognized ability inherent in many nonscientific personnel.

Speaking from nearly 40 years of experience in taxonomic research on ladybeetle systematics, most with the Systematic Entomology Laboratory, ARS, I am well aware of what is happening to some segments of our native ladybeetle fauna when faced with competition from foreign introductions such as C7 (*Coccinella septempunctata* L.). Unfortunately, what is observed in the field is rarely supported by hard data, therefore, scientists such as myself cannot build a case for or against further introductions of broad scale predators. The proposal you put forward promises to end the data drought and provide tools with which field observations can be supported by mathematical models.

I strongly encourage you to proceed with development of a grant proposal to initiate such a "citizen science" project, and am willing to support such a venture with personal expertise.

Sincerely,



Robert D. Gordon  
Research Entomologist (ret.)  
Northern Plains Entomology  
P. O. Box 65  
Willow City, ND 58384

Dr. Louis S. Hesler  
Research Entomologist  
North Central Agricultural Research Lab  
2923 Medary Ave.  
Brookings, SD 5706-4267

Dear Drs. Louis Hesler and Michael Catangui,

Thank you for your letter describing the aims of a proposed project to document the abundance (rarity) and distribution of lady beetles (Coccinellidae) in New York and South Dakota, with the potential for future expansion of the project to other areas of the United States. I think your proposal is an excellent one that could provide important data for scientists engaged in lady beetle research and other research in insect population biology.

In my opinion, much of the existing literature about the distribution and abundance of lady beetles in North America has been outmoded by the staggering pace of environmental change in the U.S. during the past thirty years. These changes include (among a multitude of effects): fragmentation, degradation, and destruction of natural habitats; intensification of "industrial agriculture", which has virtually eliminated fence rows and reduced shelterbelts in the Upper Midwest and has drastically lessened vegetational diversity, all vitally important as refugia for lady beetles. Cropping practices have changed materially, particularly management of alfalfa crops, which I think are especially important for lady beetle populations in ag ecosystems. Climatic change may also be altering the range and abundance of insect species in North America so that a modern inventory of lady beetle abundance and distribution could guide understanding of the adaptive capabilities of a key group of beneficial insects.

Exotic lady beetles were evidently introduced to North America on the assumption that their value <sup>as</sup> natural regulation of certain injurious insects would be supplemental rather than detrimental to that of endemic lady beetles, but emerging evidence suggests that at least some of the exotics are instead competitively displacing several native forms. Detailed information from data gathered by the proposed project could, I think, help to more closely define the "niches" (in the ecological sense of that term) of lady beetle species in North America and aid in understanding how "guilds" of these insects function in ecosystems.

Best wishes,

*Bob*

Robert W. Kieckhefer  
3226 Sunnyview Dr.

Brookings, SD 57006-4282

*June 5, 2006*

## UNIVERSITY OF MINNESOTA

*Twin Cities Campus**Department of Entomology  
College of Agricultural, Food and  
Environmental Sciences**219 Hodson Hall  
1980 Folwell Avenue  
St. Paul, MN 55108  
Office: 612-624-3636  
Fax: 612-625-5299*

Louis S. Hesler, Ph.D.  
USDA-ARS-NCARL  
2923 Medary Ave.  
Brookings, SD 57006

30 May 2006

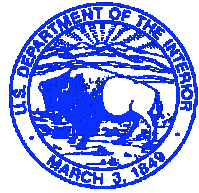
Dear Dr. Hesler,

I was recently informed of a grant proposal, regarding the development and use of a citizen science program to monitor lady beetle populations, which you and your colleagues are preparing for the NSF. Based on my experience conducting research on lady beetles, I believe that this is a much needed project, the results of which would be useful to many researchers conducting applied or basic research. For example, researchers involved with pest management could benefit from an expansive database on the distribution and abundance of these important predators of pest insects. I look forward to not only seeing the results of this work, but also being able to utilize these results in my own examinations of the invasion biology of exotic lady beetles.

Sincerely,



Robert L. Koch



# United States Department of the Interior

60

U.S. GEOLOGICAL SURVEY  
Patuxent Wildlife Research Center  
12100 Beech Forest Road  
Laurel, Maryland 20708  
(301) 497- 5660 • fax: (301) 497-5545

15 June 2006

Dr. John Losey, Associate Professor  
Department of Entomology  
Comstock Hall  
Cornell University  
Ithaca, NY 14853

Dear John:

I am writing to indicate my willingness to serve on the board of directors for the NSF project submission, "Have You Spotted Me?: Learning Lessons Looking for Ladybug". As we discussed, I believe that so-called occupancy modeling (e.g., as described in Mackenzie, D.I., J.D. Nichols, J.A. Royle, K.H. Pollock, L.A. Bailey, and J.E. Hines. 2006. Occupancy modeling and estimation. Academic Press, San Diego, CA. 324pp.) may be the method of choice for drawing inferences from the data to be collected during the course of this project. This modeling is based on repeat "presence-absence" (really detection-nondetection) surveys of sample locations and permits inference about occupancy in the face of nondetection (sometimes, animals will be present at a sample location, yet not detected during a survey). Sampling at many locations during one season permits inference about the geographic distribution of ladybugs and about the dependence of occupancy on location covariates. Sampling at some locations over multiple years permits inference about local rates of extinction and colonization and about the possible dependence of these vital rates on environmental or location covariates.

Occupancy sampling seems especially appropriate for citizen science projects, as such sampling typically requires less biological knowledge than various approaches for abundance estimation, yet still deals with the reality of imperfect detection. Software such as programs PRESENCE and MARK implement the models described in Mackenzie et al. (2006) and should facilitate analyses associated with your project. My background is in estimation of parameters for animal populations and communities, and I thus expect to be able to provide reasonable advice on design and analysis issues.

Good luck with the submission.

Sincerely,

James D. Nichols





# THE XERCES SOCIETY FOR INVERTEBRATE CONSERVATION

61

4828 Southeast Hawthorne Boulevard Portland, Oregon 97215, USA  
Telephone 503-232-6639 Fax 503-233-6794 www.xerces.org

*Dedicated to protecting  
the diversity of life through  
the conservation of invertebrates—  
the little things that run the world*

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June 5, 2006

John Losey, Professor  
Department of Entomology  
Cornell University  
Ithaca, NY 14853

## RE: Support for NSF ISE proposal *Have You Spotted Me: Learning Lessons Looking for Ladybugs*

Dear Dr. Losey:

I am the Conservation Director for the Xerces Society for Invertebrate Conservation. The Xerces Society is an international non-profit organization that protects the diversity of life through the conservation of invertebrates. The Society advocates for invertebrates and their habitats by working with scientists, land managers, educators, and citizens on conservation and education projects. One of our core programs focuses on endangered species.

For the past several years, we have been tracking the decline of the Nine-spotted lady bird beetle. This native species (and state insect of New York) has not been found in the northeastern part of its range for almost two decades, and was likely pushed out of its former habitat by lady beetles introduced for pest biocontrol measures.

In order to make strategic decisions regarding the conservation of this species, it is very important to continue to monitor its decline, as well as the status of other species of coccinellids. This monitoring is difficult to do because of the wide ranges of these beetles, and beetle densities that are extremely variable, both spatially and temporally. However, because of the relatively easy identification of lady beetles, a citizen science approach is one of the best methods for monitoring. By having citizen science monitors spread broadly across the country, we can collect data that could not be gathered in any other way. At the same time, this approach will educate young people on the importance of biodiversity and conservation. Furthermore, your innovative linkage of each data point with an image allows confidence in the data not usually associated with citizen science efforts.

The Xerces Society is very interested in seeing data collected by this project. Based on what we know about the decline of the Nine-spotted lady beetle, we are considering a campaign to protect this species. Having well-designed survey data from across the country will provide a good estimate of the abundance and distribution of this once common species to help our conservation planning. This monitoring effort also may help us find other once-common species in need of conservation attention.

Thank you for an opportunity to comment on this proposal.

Sincerely,



Mace Vaughan

Conservation Director



National Biological Information Infrastructure  
US Geological Survey  
12201 Sunrise Valley Drive, Mailstop 302  
Reston, Virginia 20192

December 14, 2006

Dr. John Pickering  
Discover Life  
711 Biological Sciences Building  
University of Georgia  
Athens GA 30602-2602

Dear Dr. Pickering:

This letter is to confirm my support of the role of Discover Life, your organization, within the proposal titled, "Have you spotted me? Learning lessons looking for ladybugs," which I understand is a grant proposal to the National Science Foundation with John Losey as its principal investigator. As invasive species information coordinator for the National Biological Information Infrastructure, I wholeheartedly agree with this proposal's scientific goals to collect high-quality data over a broad geographic scale to better understand the impact of invasive species on native beetles.

The existing cooperative agreement the NBII has with Discover Life to develop Web tools to identify, report, and map invasive species will complement this proposal very well. My program, the National Biological Information Infrastructure, which is based at the US Geological Survey in the Department of the Interior, is a broad collaborative program to provide increased access to data and information on the nation's biological resources. The NBII links diverse, high-quality biological databases, information products, and analytical tools maintained by NBII partners and other contributors in government agencies, academic institutions, non-government organizations, and private industry. NBII partners and collaborators also work on new standards, tools, and technologies that make it easier to find, integrate, and apply biological resources information. Resource managers, scientists, educators, and the general public use the NBII to answer a wide range of questions related to the management, use, or conservation of this nation's biological resources.

We are very interested in expanding NBII-Discover Life collaboration to include the proposed citizen science project related to invasive ladybird beetles. If successful, this collaboration would lead to positive results regionally (in the southern Appalachians) and nationally, by building an on-line, interactive, geo-referenced system of identification guides to approximately 500 coccinellid species. Students can use the guides to identify all but the most difficult species of their local ladybugs. I am very pleased that Discover Life will be collaborating to integrate the web database system with the species classification software that will be developed at New Mexico State University as part of the overall ladybug proposal.

The integration of abundant citizen science data with biological science tools is an important way to achieve accurate modeling of complex ecosystems. Therefore, I fully support this proposal and am excited about the outcome should it be accepted.

Best Regards,

Annie Simpson  
National Biological Information Infrastructure  
Invasive Species Information Manager

# Seavoss Associates<sup>63</sup> Inc.

101 Oxford Place  
Ithaca, NY 14850  
1.607.227.1161 (phone)  
1.607.256.0581 (fax)  
www.seavoss.com (web)

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Bruce V. Lewenstein  
President  
b.lewenstein@seavoss.com

22 June 2006

John Losey  
Department of Entomology  
Cornell University  
Ithaca, NY 14853

Dear John:

Thank you for inviting Seavoss Associates Inc. to serve as summative evaluator for the ladybug project you are proposing to NSF.

Seavoss Associates always seeks to work closely with our clients, including adapting evaluation plans to the inevitable changes that shape projects during their course. At the same time, we stand by our role of ensuring that projects meet their original goals. We would anticipate following the same pattern with this project.

Our overall goals as evaluators will be to assess the impact of project participation on the attitudes of participants. Because of the nature of the project and the audience, we think our best approach will be to conduct detailed observations of project activities and interview project participants at various times during the project. We will supplement this with formal survey data, but expect the interview data to provide much richer understanding of the outcomes. We will also meet regularly with project staff and prepare annual reports and a final report.

I have attached a preliminary budget. I look forward to working with you on this project.

Sincerely,



Bruce V. Lewenstein  
[signature inserted electronically]

## **Seavoss Associates: What we do**

Seavoss Associates specializes in projects that contribute to public understanding of science, including:

- Evaluation of informal science education and public understanding of science programs
- Design and implementation of public understanding of science programs
- Education and training in science communication

## **Seavoss Associates: How we work**

Seavoss Associates works very closely with project staff, in order to design programs that meet client needs. For evaluation projects, we provide informal feedback throughout the project operation, in addition to formal evaluation reports (both formative and summative) at major milestone points in project operation. We believe that evaluation should be an ongoing function of project management, and we provide guidance to project staff so that evaluation can be continuous.

Seavoss strives to design assessments using standard tools, both to allow for comparison among projects and to provide an opportunity for publishing results of evaluations in the scholarly literature. In this way, Seavoss seeks to help the outcomes of individual projects become useful to the broader community of informal science education.

## **Seavoss Associates: Who we work with**

Seavoss Associates Inc. has been a leader in developing evaluation models for "citizen science" projects. Some recent clients include:

- Cornell Laboratory of Ornithology on such National Science Foundation-funded projects as Classroom FeederWatch, The Birdhouse Network, and Project PigeonWatch.
- American Association for the Advancement of Science, Health Literacy community engagement project.
- Paleontological Research Institution on its "student-science partnership" projects.
- Institute for Ecosystem Studies, Research Experience for Undergraduates program.
- Agronomic Science Foundation, traveling soils exhibition to complement permanent exhibition at Smithsonian Natural History Museum

Other evaluation clients have included the World Health Organization and KCET-TV (Los Angeles).

Science communication training sessions planned and delivered by Seavoss Associates staff have been sponsored by the American Association for the Advancement of Science, the University of Sydney (Australia), the Foundation for Education, Science & Technology (South Africa), the State University of New York, the University of Zagreb (Croatia), and many others.

### **Seavoss Associates: Who we are**

Seavoss Associates is directed by Dr. Bruce V. Lewenstein, associate professor of science communication at Cornell University and an internationally-known expert in public understanding of science. Lewenstein has been a leader in developing evaluation models for "citizen science" projects, working closely with the staff of the Cornell Laboratory of Ornithology on such National Science Foundation-funded projects as Classroom FeederWatch, The Birdhouse Network, and Project PigeonWatch. He has also collaborated with the Paleontological Research Institution and the youth programs office of New York State's cooperative extension program on other citizen science programs.

Among Lewenstein's activities have been: editor of the journal *Public Understanding of Science* (1998-2003), director of the annual Hopkins Workshop on Science for Journalists (1999-2002), consultant to the NSF's biennial survey of public knowledge of and attitudes toward science and technology (2001-2003), member of the advisory board of the Sciencenter (a hands-on science museum in Ithaca, NY) (1994-present), and member of the American Association for the Advancement of Science's Committee on Public Understanding of Science and Technology (1992-1998). In 2006-2008, he is co-directing a National Academy of Sciences study on learning science in informal environments. His undergraduate education at the University of Chicago (A.B., 1980) combined courses in physical sciences and humanities. He worked as a science journalist and remains a member of the National Association of Science Writers. He received master's (1985) and Ph.D. (1987) degrees from the University of Pennsylvania in History & Sociology of Science and in Science and Technology Policy.

Seavoss Associates employs a fulltime education evaluator, Dr. Stephanie Thompson, who specializes in assessment of youth-oriented activities. Thompson received her undergraduate degree in Psychology from the University of California—Santa Barbara (1993) and her Ph.D. in Developmental Psychology from Cornell University (2005). She has worked with the New York State extension system assessing child-care and youth programs, and spent three years with the Sciencenter leading the development of an early childhood exhibit area and a discovery room for school-age children.

Seavoss Associates recruits other scholars and professionals in science communication with appropriate expertise to work on specific projects. Our overall staff goal is to provide information of use both to the immediate project and to the wider intellectual community seeking to understand science communication and informal science education. To that end, we maintain memberships in appropriate professional organizations, seek to contribute to the professional and scholarly literature, and actively seek out continuing education in current professional and scholarly practice.

### **Seavoss Associates: For more information**

For more information about Seavoss Associates, or to discuss particular projects, contact us at:

Seavoss Associates  
101 Oxford Place  
Ithaca, NY 14850  
1.607.227.1161 (phone)  
1.607.256.0581 (fax)  
seavoss@seavoss.com (e-mail)  
www.seavoss.com (web)

**Proposal Title:** "Have You Spotted Me? Learning Lessons Looking for Ladybugs"

**Agency Name:** NSF thru Cornell University

**Submitted By:** Dr. Joe Ellington

**NMSU Proposal #:** AGO6-3779

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APPROVED BY THE AUTHORIZED REPRESENTATIVE OF THE REGENTS OF NEW MEXICO STATE UNIVERSITY:

By: Cheri Lamberto

Date: 6/20/06

for Robert J. Czerniak

Assistant Vice President of Grants and Contracts





June 20, 2006

Dr. Joe Ellington is serving as PI for a subcontract to Cornell University for inclusion in the grant application "*Have You Spotted Me?: Learning Lessons Looking for Ladybugs.*" The proposed subcontract is for inclusion in Cornell University's grant application to the Nation Science Foundation solicitation number NSF 06-520 with the Informal Science Education (aka citizen science) panel in NSF. Support is requested for 36 months and is in the total amount of \$200,000.

This subcontract covers the development of an online automatic identification system for ladybugs and includes the development of image-capture, analysis, and classification technology.

The image-capture, transfer, analysis, and classification technology will be developed by Dr. Jeffrey Drake, USDA/APHIS/PPQ/CPHST as a non-funded Co-Pi on this grant in collaboration with Dr. Ellington and the Biological Control Laboratory at NMSU. Dr. Drake will be supported in this effort by USDA and collaborate on the basis of the NMSU/CPHST Collaborative Agreement.

This will involve an iterative process of:

- Determining optimal configuration/parameters for field imaging of ladybugs
  - Digital Camera Selection
  - Calibration
  - Lighting
- Developing and implementing image processing and pattern classification algorithms to identify ladybeetle samples to the species level.
  - Identify species unique features
  - Develop methods to extract unique features
  - Develop classification scheme(s) to classify to species level
- Assist in porting system to Web Server based system
- Test
- Report

Questions regarding the technical aspects of this proposal should be directed to:

Dr. Jeffrey Drake  
USDA/APHIS/PPQ/CPHST  
Entomology, Plant Pathology, and Weed Science  
New Mexico State University  
Box 30003, Dept. 3BE  
Las Cruces, NM 88003  
Phone: 505-646-2629  
FAX: 505-646-8087  
jefdrake@nmsu.edu

June 19, 2006

Dr John Losey  
Department of Entomology, Cornell University  
Comstock Hall  
Ithaca, NY 14853

Dear Dr. Losey,

The New Mexico State University is pleased to submit its subcontract for "*Have You Spotted Me?: Learning Lessons Looking for Ladybugs*" on behalf of Cornell University. The proposed subcontract is for inclusion in your grant application to the Nation Science Foundation solicitation number NSF 06-520 and has been administratively approved by the appropriate University officials. Support is requested for 36 months and is in the total amount of \$200,000. This subcontract covers the development of an online automatic identification system for ladybugs and includes the development of image-capture, analysis, and classification technology.

If the grant is successful, the University will ensure compliance with all pertinent federal regulations and policies. The subcontract agreement should be between your institution and New Mexico State University.

The administrative contact is:

Rita Parra  
Contract Administrator  
College of Ag. & Home Econ.  
New Mexico State University  
Gerald Thomas Hall, Room 238  
Las Cruces, NM 88003-8003  
[ritparra@nmsu.edu](mailto:ritparra@nmsu.edu)  
505/646-3376

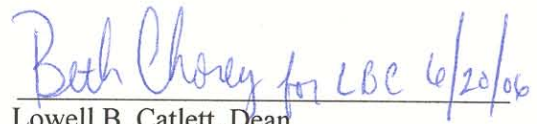
The technical contact is:

Joe Ellington  
Entomology, Plant Path. and Weed Sci.  
New Mexico State University  
Box 30003, MSC 3BE  
Las Cruces, NM 88003  
505/646-2037  
[joelling@nmsu.edu](mailto:joelling@nmsu.edu)

Sincerely,



Joe Ellington  
Professor



Lowell B. Catlett, Dean  
College of Agriculture & Home Economics