

Annual Report Summary for Great Smoky Mountains National Park

Discover Life in America

NPS Fiscal Year October 1, 2005—September 30, 2006

--Jeanie Hilten, Director, DLIA

Discover Life in America (DLIA) cooperates with Great Smoky Mountains National Park to conduct the All Taxa Biodiversity Inventory (ATBI), a survey of all forms of life in the Park underway since December of 1997. Receiving support from GSM Association, Friends of the Smokies, NPS, as well as individual and corporate giving, DLIA administers grants to scientists, organizes volunteers, coordinates development and public relations, and assists Park Partners with education programs. For further information see www.discoverlifeinamerica.org or contact the office at 865-430-4752.

Summary:

The past NPS fiscal year (October, 2005—September, 2006) has seen growing linkage between ATBI scientific research and biodiversity education. As urgent as it is to discover all the denizens of Great Smoky Mountains National Park, it is just as necessary to bring knowledge of those life forms to the world. This is accomplished by communication between researchers, teachers, students, resource managers, and the general public. The mechanisms for conveying the information are varied: reports, databases, websites, images, the press and other media, plus workshops, training and presentations. DLIA has now reached a position, with the help of many dedicated and talented people, of being able not only to coordinate and support ATBI research, but to produce products that allow access to that research by anyone interested in the project.

The 2006 field season was eventful, with several Bio-Quests, Forays, special projects, and research for DLIA grants. Discover Life in America provided a variety of help to scientists and educators working in Great Smoky Mountains National Park. This assistance included housing, trained volunteers in the field, trip-planning information on the DLIA website, help with geo-referenced data and with the ATBI database, teacher workshops and activities, and overall logistics. Our organization's small staff, as well as the Education Committee, the Development and Marketing Committee, the Database/Web Interface Committee, and the Finance Committee, have been active in generating programs and products for the ATBI and supporting and strengthening the infrastructure of Discover Life in America.

Even with a difficult budget year ahead for 2007, the momentum of this essential and ground-breaking project will carry forward, into better times, the work that needs to be done. The people involved—their energy and vision—have established the Smokies' ATBI as a significant, world class effort—unlike anything undertaken since Lewis and Clark set forth on their journey of discovery. If our nation can't come to know and understand the living things residing in our most treasured natural areas, how can we possibly maintain all the inter-related parts of this grand and mysterious blue-green globe?

Highlights

- **The ATBI Annual Conference, December 6-9, 2005 at the Holiday Inn Sunspree, Gatlinburg, TN drew 180 participants, the largest meeting yet.** Keynote speaker was Dr. Dan Janzen and there were 45 other presentations, plus dozens of exhibitors.
- **An "ATBI Alliance" meeting has resulted in an action team of planners to establish the organizational structure** for many parks and other reserves conducting ATBIs. 38 people attended this meeting.
- **The "Bids for Biodiversity" silent auction, held during the Conference, raised over \$2,800.**
- **ATBI Conference sponsors helped with our expenses, contributing a total of \$1535. Thanks to: Mountain National Bank, Martin Microscope Company, The Park Grill/Peddler, Smoky Mountain Winery, National Parks Conservation Association.**
- **The "Taxa Tally" as of the end of September, 2006 is 625 species new to science plus 4,680 new records for the Park.** These records are continually changing. They are compiled by Becky Nichols, Park Entomologist.

- **We feature a different plant or animal regularly on the DLIA website.** Be sure to meet our “Species of the Month” under the highlights on the home page: <http://www.discoverlifeinamerica.org/index.shtml>
- **The George Wright Society publication “Forum” featured the Smokies ATBI and DLIA activities in Volume 23, #3.** Becky Nichols edited articles submitted by Park and DLIA staff as well as by ATBI scientists. See <http://www.georgewright.org/> or the DLIA website to download pdf files of the articles.
- **Over 7,000 volunteer hours were donated in 2005** with people working on everything from Fern Forays to blitzes to leaf litter collection to office help to photography! Plus, ATBI scientists donate a large part of their time to the effort.
- **There are now over 200,000 records in the ATBI database.** Thanks to Michael Kunze and Chuck Cooper.
- **The DLIA website gets 1.5 million hits per year.** Thanks to webmaster Charles Wilder and our partners SAIN and UT.
- **DLIA 2005 grant reports and data are now mostly complete.**
- **In-kind support from the 2005 grants totals \$145,546 and leveraged support totals \$447,200, for a total of \$592,746.**
- **DLIA provided lodging for over 980 ATBI researchers and volunteers during the 2006 season.** This program, with leased housing from the Park, allows scientists and their students to stay in the Park while they are conducting fieldwork. DLIA receives some voluntary donations to help with expenses.
- **Discover Life in America has awarded \$69,439 in grants for 2006 to 18 recipients.** To review abstracts of the proposals, go to: http://www.discoverlifeinamerica.org/dlia/grants/grant_program.shtml where they will be posted by mid April. 2007 requests for proposals were sent in January, 2007.
- **A special exhibit was on display at Sugarlands Visitor Center: “Tiny Gems from Watery Gardens” shows images of algae and diatoms.** The microscope photos were beautiful! Thanks to Rex Lowe, Jeff Johansen and their students and also to Scott Pardue, GSMNP, for arranging for the exhibit, which ran from December, 2005—March, 2006.
- **A special ATBI symposium was held at Association of Southeastern Biologists Conference (ASB) in March 2006.** There were 22 papers presented by ATBI scientists and Park Staff at this scientific meeting and the proceedings of that symposium will be published in the Southeastern Naturalist by mid 2007. DLIA Board member Dr. Patricia Cox organized the symposium.
- **A grant from the Alcoa Foundation for \$10,000 was received to study to soils of the Park.** Soil pits from 1982 have been revisited to determine changes, such as acid deposition, and lab work is underway.
- **An additional \$10,000 grant, “ATBI Connections”, will sponsor internships and teachers** working with scientists, Park and DLIA staff.
- **Funding from the NPS ATBI Base Increase has allowed \$106,000 for scientific determinations, and field equipment and supplies,** administered through DLIA.
- **The ATBI Quarterly is now mailed to over 3,200 people, plus it is available online at** <http://www.dlia.org/atbi/quarterly.shtml>
- **There are now over 9,000 images in the DLIA/ATBI images database.** Chuck Cooper manages the database, with the help of volunteer Deb Tappan. The originals are stored on an external hard drive and the database in “Cumulus” creates thumbnail references to them.
- **To view a photo gallery of DLIA activities, see:** http://www.discoverlifeinamerica.org/photo_gallery.shtml
- **The Staff and Board of DLIA extended a warm “Thank You” to Phil Francis at a going-away reception.** Phil is the new Superintendent at Blue Ridge Parkway N.P. and will no doubt carry his interest in biodiversity with him!
- **Jeanie Hilten gave the keynote address at the North Carolina Association of Environmental Education Centers annual meeting March 17 at the NC Arboretum in Asheville.** ATBI partners Susan Sachs, Heather Grossnickle, and Amber Parker, were among those who gave presentations and field sessions.

- **Be sure to get a copy of the great new book by David Wagner: Caterpillars of Eastern North America.** It is sold by Great Smoky Mountains Association— <http://www.smokiesstore.org> or <http://www.discoverlifeinamerica.org/atbi/species/animals/invertebrates/arthropods/insects/index.shtml>
- **Velvet leaf blueberry (*Vaccinium myrtilloides*) is featured as the 5,000th discovery for the ATBI.**
- **A website for the ATBI Alliance project has been established.** www.atbialliance.org is hosted by the University of Tennessee and supported by NBII/SAIN and DLIA.
- **The first “Karst Quest” was conducted in July, with the help of experienced cavers, Park staff, scientists and volunteers.** New records for the Park and species new to science were found inside caves as well as around the surface limestone areas of the west end of the Park.
- **A Myxo Blitz was held at Purchase Knob in July** and scientists collected slime molds with the help of 14 volunteers, Park staff, and teachers.
- **Purchase Knob also hosted a Fungi Foray in August**, with 21 people from the Asheville Mushroom Club, and Bird Banding demonstrations involved over 45 people.
- **The fourth Lepidoptera Bio-Quest took place in August, bringing two dozen scientists and graduate students.** A special effort concentrated on DNA sequencing.
- **September’s Fern Foray for 2006 drew over 30 people.**

Progress in Science

The 2005 DLIA/ATBI Conference in December included presentations and posters from over 30 researchers plus the keynote address by Dr. Daniel Janzen who presented his work, with wife Winnie, on biodiversity of Costa Rica—especially caterpillars. Research conducted with the support of Discover Life in America and partners included 18 grants from 2005, ongoing projects with science education, and administration of taxonomic determinations from the ATBI Pilot study, as directed by GSMNP staff. For details, see http://www.discoverlifeinamerica.org/dlia/conference/index_2005.shtml

Maps of Geology, Soils, and Vegetation will be tremendous assets for biodiversity studies in the Smokies. The geology maps are complete and can be downloaded from <http://pubs.usgs.gov/of/2004/1410/> (Big files, though!) The soils and vegetation maps are currently being reviewed by the Park. Contact Mike Jenkins, Mike_Jenkins@nps.gov

A two year project to investigate the denizens of dead wood is being run by PhD candidate Mike Ferro of Louisiana State University. DLIA Volunteer Carol Cranford is coordinating other volunteers—including high school students--to help collect insects every month.

Information from the Fern Forays has been included in a database and detailed reports can be generated. Contact Dr. Pat Cox, pbcox@tnv.gov or Chuck Cooper about the data and what it reveals about the distribution of ferns in the Park.

The “Karst Quest” in July resulted in findings of interest in and around caves at the west end of the Park. Funded by a DLIA grant, and centered out of Great Smoky Mountains Institute at Tremont, the investigation involved two dozen volunteers, cavers, and Park and DLIA staff. Dan Dourson identified **60 species of snails from one fairly small area**. Litter and debris from caves has yielded a variety of arthropods, tiny snails, and worms. A possible Tennessee blind cave salamander was found, and more creatures will be identified in the near future. Thanks to GSMNP’s Dan Nolfi, to Jonathan Mays, Ernest Bernard and his staff, and to Park Curator Adriean Mayor for conducting this survey of little known parts of the Park. Now cave conservation will have more scientific knowledge to back it up, and some experienced and well-informed people to assist with a possible cave management plan.

Some interesting notes from the 2005 DLIA/ATBI Conference reports:

- Exotic species are being found early, thanks to ATBI work. Some examples are fire ants, pear thrips, adelgids, Klamath weed beetle, Chinese jumping worm, giant Asian resin bee, European skipper, European sphinx moth, among others.
- Use of ATBI data has been significant in compliance issues, such as Ravensford, North Shore Rd., Cades Cove, Elkmont, Foothills Parkway, Topoco.

- 55 samples of water mites were collected across the Park by Ian Smith and Andrea Radwell. They found 7 of the 8 superfamilies that occur worldwide. Half of the over 100 species found may be undescribed.
- 222 collections of pyrenomycetes were made during the “Pyreno Pursuit” in September. The blitz was led by Andy Miller of the University of Illinois. 63 of these fungi are new park records and 4 are new to science, including *Hypoxylon “somethiniana”!*
- Will Reeves reported on ectoparasites in the Park, including 2 species of mite that could easily be found on everyone’s faces. A new species of flea was discovered—the first in 40 years. There are many applications of this research for public health concerns.
- Progress on the backlog of specimens from the ATBI pilot study was made by Stephanie Miller’s work. There are opportunities for students and volunteers as well as experts to help with continued sorting and identification.
- An interesting method for collecting tiny soil critters was revealed by Tommy Allen: “When I see ‘em, I spit on ‘em, and that stops ‘em cold!” His DLIA grant work on protura, diplura, microcoryphia, and thysanura covered quite a bit of the Park, both along roads and trails and, with the help of volunteers, in some more remote sections. Tentative calculations show that there are 142 million soil arthropods per acre in the Park and 74 trillion soil arthropods in the leaf litter and soil of the Park! These are probably low estimates.
- Sean O’Connell revealed more about the microbial communities of the soil: in 10 grams of soil, there are 10 million species of bacteria and archaea. In relation to the elk in the Smokies, the microbes can help us understand the health of the ruminants; there is an average of 13 species of bacteria, archaea, and eukarya per elk.
- Fireflies in the Park were big not only in June at Elkmont, but throughout the Park. *Photinus Carolina* is everywhere, with many other great displays at other locations, says Adriean Mayor. We now have 14 known species, 2 new records, and perhaps 8 more species.
- The ATBI efforts of other parks and reserves are generating knowledge about the biodiversity of ecosystems from southwest deserts to northeastern coasts. An “ATBI Alliance” is being established to coordinate and communicate, allow better funding, demonstrate management applications, and develop data and web interfaces.
- Ecological Zip Codes are a promising strategy for modeling the factors that influence distribution of organisms. Ecological addresses help scientists decide where to look for unusual species.
- 2005 was the 5th year of tardigrade research in the Smokies. These “waterbears” can go into cryptobiosis, surviving a wide range of heat and cold, including the aspect of building up sugars in their bodies to become “candied bears”! There are about 96 species in the Park. All 19 of the ATBI plots have been sampled, plus 13 streams, generating over 7,000 specimens. 13 new species were discovered. The Smokies are a hot spot for tardigrade biodiversity, having 12% of the world’s species.
- Where to go to find the most or the fewest ants in the Park? Ask University of Tennessee’s Nate Sanders. The fewest are at higher elevations and the peak ant activity is in August, September, and October. There are about 130 species of ants in the Park.
- Team Odonate report shows that there are 92 species of dragonflies and damselflies in the Park. Tremont’s Charlie Muise notes that 29 are new Park records and that there is still much work to be done in various locations.
- The global eumycetozoa survey includes projects in GSMNP: There are about 170 species of all kinds of slime molds here. Volunteers, students, and teachers have been actively involved in the work. At U. of AR, they answer the phone “Slime Mold Lab”! Low pollution sites have more species numbers and diversity.
- Anthony Khiel and Dillon Gray and others on the NRCS soil survey team are finished with the field work. Digital maps are being made and will be available for GIS interpretations. There are 65 soil series in the Park. The soil data will be of great help in understanding the distribution, ecology, and conservation of organisms and plant communities.
- The “Junkyard Bug”, a lacewing larva found by Dan Dourson, was crawling around with 6 species of snails on its back! In addition to this intriguing snail habitat, tree crotches, black walnut bases, empty snailshells, and seeps are other good places to find land snails in the Smokies. The beautiful

“ice thorn” snail is possibly new to science. Many of these were found at Appalachian Highlands Center (Purchase Knob).

- From the Lepidoptera work in the Park, Brian Scholtens reports there are 1,650 species of moths and butterflies. They expect to find from 2,000 to 2,500. Although the macro-leps are 85-90% complete, there is still a ways to go with the micro-leps. Interesting to note, there are few pests and introduced species currently in the Park. We still need to find out more about winter moths (sample by sugaring) and about host plants and distributions.
- 1,000 specimens of moths and butterflies have been DNA barcoded by Dr. Paul Hebert, University of Guelph. See <http://www.barcodeoflife.org/>

A Sampler of ATBI research results from completed 2005 DLIA grants:

- About Tardigrades, Paul Bartels reports: Our current species list (see below) now stands at 69 species, 66 new records, and 13 new to science. In my presentation at the annual ATBI meeting in December, I reported that species richness estimates based on 7000 specimens, indicated that 96 species may occur in the park. (I also evaluated the efficacy of the various species richness estimates by comparing their predictions based on half our data to the numbers present in the total database.) To put this into perspective, 96 species represents 10% of the world's known tardigrades, whereas the park is home to only 6% of the world's salamanders. We have also compared our species list to the other two large-scale tardigrade inventories, one in Italy and one in Poland, and our diversity is higher than either of these European studies.
- Andrea Radwell and Ian Smith's 2005 work on water mites (key indicators of water quality) is summarized: Water mites are well represented in virtually every freshwater habitat and are among the most abundant, taxonomically diverse, and ecologically important aquatic groups. Yet many species remain undescribed. Our goal was to initiate an extensive survey of water mites in the aquatic environments of Great Smoky Mountain National Park. From 14-27 September 2005, we collected water mites from 56 habitats representing rivers, streams, waterfalls, and springs runs in 11 watersheds across the northern and western perimeter of the Park. We identified mites from 49 genera in 25 families and 7 superfamilies, including two genera not previously found in North America and two others known only from Oregon and California. We estimate that approximately 150 species will be identified from the 2005 collections, many of which will prove to be undescribed and unnamed. Specimens from the Park are making an important contribution to improving our knowledge of the systematics and biogeography of North American water mites and to facilitate greater inclusion of the group in aquatic ecosystem research.
- Andy Miller's "Pyreno Pursuit" investigates a small but important group of fungi: Pyrenomycetes represent one of the largest groups of fungi, but are also one of the most poorly known most likely due to their small size (usually <1mm diameter) and cryptic nature. These organisms occur throughout all geographical areas on plant material and dung, where they play an essential role in nutrient cycling and decomposition of organic matter. Pyreno Pursuit, which was held September 5-10, 2005, was the first attempt to bring together experts to inventory the diversity of pyrenomycetes in the Great Smoky Mountains National Park. Collecting occurred throughout the Park in six locations including Alum Cave, Big Creek, Cades Cove, Greenbrier, Purchase Knob, and Sugarlands Visitor Center. This week-long bioblitz produced a total of 226 collections comprising 91 species and resulting in 65 (71%) new Park records and three new species to science. Products resulting from this bioblitz include: 1) a species checklist, 2) a georeferenced database with distribution and host data, 3) fresh material which will be used in creating future species web pages and identification guides, and 4) publications of new Park records and new species to science.
- The world of ants is better known in the Smokies, thanks to Nathan Sanders and fellow researchers: We spent the summer of 2005 collecting ants that are found generally just in the leaf litter. This under-studied and under-sampled group of organisms likely play key roles in ecosystem function and affect the diversity of countless other organisms, yet little is known about

their distribution or abundance. Along with a team of undergraduates (~5) and graduate students (2), we collected data from 16-m² plots at 11 forested sites. To date, we have identified ~60 ant species. Several important results have emerged from these data. The most important result is that our sampling techniques collect an almost entirely different set of species than the techniques used so far (e.g., pitfall traps). However, richness of leaf litter ants and ground foraging ants track one another in both space and time. We also devoted some time to processing samples from Chuck Parker's "how to conduct ant ATBI" project. Together, these activities have provided a wealth of information on ant diversity in the Great Smokies. To date, we have three manuscripts in press, one in review, and have applied for several other grants.

- Paul Super and interns at Purchase Knob are finding out more about the pollinators of Smokies' flowers: Pollination is one of the most important and least known ecosystem functions. The relationships of bees to specific plants are still little known and while some bee species are broad generalists, other species may be much more specialized as to the plants they visit for pollen and nectar. Two field workers—recent college graduates—with assistance from 9 high school interns, collected 593 pollinators at 95 sites on the North Carolina side of the park, either while the insects were visiting one of 46 flowering plants or using colored bowls of soapy water to attract and catch bees. Specimens are currently being identified to generate species lists for each flower. The data has been entered into a spreadsheet version of the ATBI database and will be submitted to DLIA as specimens are identified. Species web pages were written for the bumblebees and the honey bee. A taxonomic expert is currently reviewing the text.
- Gary Steck and Bruce Sutton continue their work on the pretty and interesting tephritid flies: We are documenting the biologies, distributions, host relationships, and immature stages of tephritid flies in GSMNP. These "true fruit flies" are colorful insects whose immature stages are plant feeders. GSMNP, with an estimated 60-70 species of fruit flies, is a hot spot of tephritid diversity, as it harbors over half of all the fruit fly species known from all of eastern North America. Methods include mass-trapping, targeted collecting, and dissection of infested plants to reveal details of feeding, development time, mortality factors, parasites and predators. Since 1999, we have documented the presence and distribution of ca. 55 species (2 or more undescribed) and 42 of their host plants in the Park, based on 2,000+ adults and 1,000+ larval specimens. Immature stages of at least 27 species have been collected and preserved; and 42 species of live adult tephritid flies occurring in GSMNP have been photographed. In addition, numerous photographs of hosts, larval stages, galls, mines, and habitats have been obtained. Videotapes of live adults of about 20 species have been filmed. The photographs and videotapes are being incorporated into the web pages for these species.

Progress in Education and Volunteer Action

DLIA and Park staff and members of the DLIA Education Committee continue to give talks and programs to the community about the ATBI. Anyone interested in borrowing (or developing!) slide or Powerpoint shows, please contact DLIA office or Board. To borrow the "Biodiversity All Over the Place" video, contact Jennifer Pierce: Jennifer_pierce@nps.gov

Many, many thanks to the members of the 2005 ATBI Conference Planning Committees:

Agenda: (Peter White, Jeanie Hilten and DLIA staff, Keith Langdon, Chuck Parker, Becky Nichols, Ernie Bernard, Pat Cox, Paul Bartels, Cathy Cook, Jennifer Pierce, Jean Freaney) **Exhibits:** (Carol Cranford, Rebecca Shiflett, Robb Turner, Carol Ware, Liz Domingue, Jim Burbank, Charles Wilder)

Audio/Visuals and Computer/Internet: (Susan Farmer, Chuck Cooper, Charles Wilder) **Logistics and Registration:** (Wanda DeWaard, Melinda Wilson, Jeanie Hilten, Jim & Betsy Froyd, Jim Lowe, Charlie Muise) **"Bids for Biodiversity" Silent Auction:** (Melinda Wilson, Janet Rock, Adriean Mayor, Ruthanne Mitchell, Liz Domingue) The conference could not have happened without the fine work of these folks.

Chuck Nabors donated a great deal of volunteer time to produce the **wonderful DLIA Theme music** you heard at the ATBI Conference. We can use this music for a variety of purposes—education, on the website, for movies, and other presentations. To find out more, contact Jeanie. To contract with Chuck for musical productions, call 865-681-7785

Fifteen **“Experience Your Smokies”** participants visited Twin Creeks and DLIA staff gave an ATBI presentation and involved them in collecting arthropods and viewing them on the new big screen.

DLIA Board member Jim Lowe and Jeanie Hilten led a hike for 15 participants in Wilderness Wildlife Week. We have received many inquiries about the ATBI as a result of our display and programs for WWW.

Jeanie gave an ATBI talk at Wesley Woods Camp for 25 Wilderness Medicine students. Keith Langdon and Jeanie prepared a short powerpoint presentation for NPS’s Michael Soukup.

The ATBI 2005 Conference presentations have been put on a CD and are available from the DLIA office. They will be posted on the website in the future.

Twelve **Knoxville Garden Club** members came to Twin Creeks for an ATBI field methods activity lead by Jeanie, Stephanie Miller, and Charles Wilder. We have since received a \$1,000 grant to help plant native vegetation around the new science center.

Volunteer Deb Tappan spent several days putting more images on DLIA’s external hard drive and entering them in the **DLIA Image Database.**

Volunteer photographer Dick Helsel continued his work scanning tree slides and making other contributions to the DLIA image database.

The first DLIA Volunteer Orientation Day for 2006 was held at Tremont March 25 and drew 25 participants. People came from a wide array of backgrounds and will bring excellent talents and skills to the ATBI.

Nine volunteers did a “deep cleaning” of the three ATBI houses. They are now sparkling! (The houses, not necessarily the volunteers...) DLIA provided housing amounting to 985 “person/nights” for ATBI researchers in 2006.

“Friendship Force” of East Tennessee brought a group of **8 environmental educators and conservationists from Russia** to learn about the ATBI from Jeanie and Stephanie Miller.

Volunteer Karen Frank cleaned up some of our high resolution scans in PhotoShop. We need more volunteers with such skills who can **get our scans ready for printing and other uses.** Contact Jeanie at 865-430-4752.

Susan Sachs and Jeanie Hilten prepared the **final report to EPA on the “Train the Trainers”** slime mold workshop that was held at Tremont in June, 2005. The report, plus images of the workshop, are available from Jeanie.

A proposal submitted by Jeanie Hilten and the Education Committee to the Alcoa Foundation for an “ATBI Connections” for 2006-07 has been accepted. \$10,000 will support college interns, mentorships between scientists and volunteers, work on “ATBI Fun Facts and Stories”, the images and artwork, and attendance of grantees at the ATBI conference.

The Fall Volunteer Potluck Picnic was held Sunday, November 6, 2005 at Great Smoky Mountains Institute Pavilion. Among the highlights were great salads and Betsy Froyd’s apple pie!

The DLIA Education Committee met at Sugarlands Training Room Tuesday, Nov. 8. Plans for the awards at the Conference, Biodiversity Boxes, and a grant program for teachers of biodiversity were discussed. The new **committee chair is Wanda DeWaard, 865-983-5393 and earthkin@icx.net**

Volunteer Carol Cranford has been helping in the DLIA office whenever she comes to the Smokies from her Alabama home. She did much work to get ready for the Conference.

Thank you letters were sent to community people and businesses that helped sponsor the conference and others who contributed time and effort to the event.

Great Smoky Mountains Association has produced a set of ATBI note cards with five images of plants and animals scanned on the high resolution scanner. The cards include scientific and common names and natural history information about the featured species and are available at www.smokiesstore.org

Check out the DLIA/ATBI photo galleries created by Charles Wilder with the contributions of volunteer photographers: http://www.discoverlifeinamerica.org/photo_gallery.shtml

Volunteers have assisted with a variety of projects during fall of 2005 through summer of 2006. Chuck Cooper keeps track of volunteer hours.

The DLIA Education Committee, Wanda DeWaard, chair, and members from a variety of ATBI partners, is continuing the development of **“Biodiversity Boxes”**, with funding from the National Park Service. The Education Committee will give awards again at the 2005 ATBI Conference for ATBI

teacher of the year and ATBI scientist/educator of the year. Scholarships allowed teachers to attend the conference.

Volunteers Deb and Paul Tappan donated and installed an external hard drive to the DLIA office. It is used primarily for storage of the images of the ATBI, which will continue to be entered into Cumulus. Thanks, Deb and Paul!!

Scientists have been most generous with their time for education. Mark Wetzel is one of many who have given training programs for naturalists and educators during the year. Tommy and Sue Allen, Pat Cox, Andy Miller, Andrea Radwell, Victoria Bayless, Chris Carlton, Dave Wagner, Brian Scholtens, Steve Stephenson, and Paula Furey have also participated in educational efforts.

Volunteer Training Saturday, April 8 at Sugarlands Training Room featured preparation for BioQuests and Trail Surveys.

ATBI Field Day was held at Appalachian Highlands Science Learning Center Saturday, May 20. A new record of blueberry for the Park was confirmed by Keith Langdon and Janet Rock. See: http://www.discoverlifeinamerica.org/atbi/new_science/index.shtml

Andrea Radwell, Chuck Parker, and Paul Davison led a fascinating “Water Wonders” workshop April 29 at Tremont, with 16 participants.

Ten DLIA Volunteers were a big help with Beetle Blitz 2006. Todd Long produced an excellent flyer for the Family Education Day, others set out and retrieved traps, and Marian Fitzgerald and others did beetle sorting in the lab.

Over two dozen DLIA Volunteers were a big help with this summer’s Karst Quest and Lepidoptera Blitz 2006. Be sure to check out the volunteer opportunities at <http://www.discoverlifeinamerica.org/dlia/volunteer/index.shtml>

The Education section of the DLIA website is growing. Check out the offerings at <http://www.discoverlifeinamerica.org/dlia/education/index.shtml> and feel free to contact us with suggestions.

Volunteers are crucial to the planning team for the 10th DLIA/ATBI Annual Conference: “Ten Years and 5,000 Species”, December 6-8, 2006 with featured speakers Mike Soukup, Tom Kiernan, and Paul Sloan.

Progress in IT/Communications

The DLIA website, www.discoverlifeinamerica.org or www.dlia.org continues to grow and to provide much useful information about the many aspects of the ATBI: science, education, volunteering, financial support, etc. There is better navigation through the site, new and improved education pages, photo galleries, links to other sites, information for scientists, DLIA grant program details and final reports, and field methods for volunteers, among many other pages. Charles Wilder is DLIA’s web technician and welcomes comments and suggestions about the site. Wilder@dlia.org

For “What’s New on the Web” see:

http://www.discoverlifeinamerica.org/dlia/whats_new_web.shtml

Chuck Cooper’s various data projects include the DLIA grant program submissions, fern forays, volunteers, the image database, and historic data. Data applications include project tracking, ATBI data spreadsheet, and data check/preparation for the ATBI database.

The ATBI desktop database is now available for researchers to download from the DLIA website at: http://www.discoverlifeinamerica.org/atbi/science/desktop_database/index.shtml

Or, it can be mailed on a CD. There are other ATBI data entry formats available for Mac users. Contact Chuck Cooper at the DLIA office, Chuck@dlia.org

The Smokies ATBI Database is available at: www.atbidatabase.org Thanks to hard work by DLIA staff, Great Smoky Mountains Institute, and University of Tennessee, in addition to NPS funds for the server.

High resolution scans and photos from DLIA volunteers were printed, displayed, and sold at the ATBI conference and online. There are quite a few of these gorgeous images of plants and critters still available for sale. Contact Charles Wilder, 865-430-4756.

A “Databasing and Data Quality” Workshop was given by Chuck Parker, Michael Kunze, and Chuck Cooper December 6, 2005. 25 people attended. This training is aimed at researchers who are interested in knowing the best ways to collect geo-referenced data in the Park and how to use the ATBI database.

A grant from National Biological Information Infrastructure/Southern Appalachian Information Node (NBII/SAIN) for \$26,000 has been obtained to support a “Biodiversity Data Interaction Workshop for an Alliance of ATBIs” in December of 2006.

Due to NPS and GSMNP security procedures, Discover Life in America is now off the Park internet and network. **A DSL line had been established in the Horse Barn.**

Great Smoky Mountains Association’s website now features an ATBI “critter of the week”. See: <http://www.smokiesstore.org/page.htm?PG=critter%20of%20the%20w> Thanks to Carolyn Jourdan, GSMA webmaster.

Remember that the *ATBI Quarterly* is available online and in color at http://www.discoverlifeinamerica.org/atbi/quarterly_newsletter/index.shtml Go to this page to subscribe to be notified when a new Quarterly is available.

Progress in Development/Marketing/Finances

Individual monetary donations to DLIA during 2006 are over \$10,000. Thank you, DLIA and ATBI supporters!

Revenue from the T-shirts sold by Great Smoky Mountains Association are from \$6,000--\$9,000 yearly.

Our annual appeal flyer, designed by Ruthanne Mitchell was sent to Great Smoky Mountains Association and was mailed out with the *BearPaw*. It was also included in the fall *ATBI Quarterly*. We expect more donations to come in from this appeal. (See: <http://www.discoverlifeinamerica.org/dlia/funding/index.shtml>)

Katharine Key of Springhouse Studios, with the Development/Marketing Committee, has designed a new logo and mascot for DLIA. The mascot is a cartoon of the red-cheeked salamander, “Jordie”. The logo includes a firefly graphic. These will be used on the website, with products, education, and communications. To see them, go to: www.springhousestudio.com/DLIA

A firefly toy has been obtained for sale by the Development/Marketing Committee. More outlets for the blinking plush toy are needed, but it should sell well in June-July firefly season!

Green wristbands that have “Discover Biodiversity” and www.dlia.org on them are for sale for \$5.00 including shipping. See: <http://www.dlia.org/dlia/funding/products.shtml> for this and other DLIA products. Thanks to Victoria Bayless, Gillian Bowser, and other Board members for designing and ordering the wristbands. They were a hit at the conference and netted so far over \$600 for education and internship programs.

Be sure to support the Friends of the Smokies See: <http://www.friendsofthesmokies.org/> and **Great Smoky Mountains Association** See <http://www.smokiesstore.org> They are both major contributors to ATBI activities and Discover Life in America.

The DLIA budget for 2006 included contributions of \$59,500 each from Friends of the Smokies and Great Smoky Mountains Association. There is \$106,000 for ATBI taxonomic, data, and web projects, administered by DLIA, from the National Park Service’s ATBI Base Increase. For details about the budget, contact Treasurer David Scanlon, jltlhs@yahoo.com or Jeanie Hilten.

The quarterly financial statements of DLIA are produced by Millstone Accounting. These reports are kept by David Scanlon, the DLIA Executive Committee, and Jeanie Hilten.

The 2005 DLIA audit and 990 tax forms were compiled by the firm of Willard Carr. DLIA staff and Board officers have copies.