

The Adirondack All-Taxa Biological Inventory: Surveying Life in the Park

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Abstract

The Adirondack All-Taxa Biological Inventory will be the starting point for exploring biological diversity in the Adirondack Park, a nexus for historical and contemporary data gathering and for interaction between Adirondack citizens and contributing scientists. The ATBI will gather considerable existing data and generate new biodiversity information while involving scientists and citizens. We intend to develop an educational and interpretive tool in the form of a comprehensive, web-based, spatially-referenced database that will be used to catalog existing biological diversity from known information sources, and engage and build community support for an Adirondack biological inventory. The ATBI will initially conduct a pilot project focused on a comprehensive survey of dragonflies of the Park. We will document the interpretive and educational value of the program and use this information to refine the approach for use in the continuing effort to document Adirondack biological diversity. The ATBI will bring together groups that represent a very wide variety of stakeholders, taking advantage of local expertise and enthusiasm for the Adirondacks.

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Introduction

The Adirondack Mountains are locally, regionally, and globally significant for many reasons. The Park in our "backyard" encompasses three million acres of public Forest Preserve land protected as "forever wild" by the New York State Constitution interspersed with 3 million acres of private land. The Park is protected by one of the strongest conservation laws on the books, anywhere. Some 90 million people within a day's drive can recreate, explore, and marvel at the vast areas of northern hardwood and boreal forests, the thousands of lakes and ponds, and many miles of streams and rivers. Residents and visitors alike can be proud that this internationally-recognized Biosphere Reserve's large, protected, rural, and wild character has allowed for the persistence of almost all native species and the natural return of several others.

While the Adirondacks are the most intact ecosystem in the northeastern U.S., the Park is not immune to threats. Threats to the area's lands, waters and wildlife are many and include both local (recreation, development, roads) and regional (climate change, airborne contaminants) impacts. The deepening crisis in protecting global biodiversity has been the subject of many articles and news reports. However, this crisis isn't restricted to the tropics; the Adirondack landscape is also at great risk.

To make informed decisions about land protection, we first need to know what species reside here and where. While a great deal is known about the vertebrates and flowering plants, we know very little about the diversity of fungi, invertebrates, and the myriad

other small organisms that are a part of the Adirondack landscape. These lesser known species likely have critical roles in ecosystem function and constitute a higher proportion of total biodiversity and actual biomass than the higher plants and larger animals. And while we have identified many species, we often do not know where they are found on the landscape other than general descriptions such as "spruce-fir forest." Hence there is a need for an inventory of all life in the Adirondacks. The principle objective of the Adirondack All-Taxa Biological Inventory (ATBI) is to conduct a complete Park-wide inventory of all life, with emphasis on promoting citizen knowledge, interest and involvement.

A Clear Focus

The Adirondack ATBI has two main functions: 1) performing a complete biological inventory; and, 2) achieving this task through scientist and citizen collaboration and active participation. The Mission Statement of the Adirondack ATBI is: "Connecting people to natural communities through participation in biological inventories." The vision of the Adirondack ATBI is one of creating learning opportunities whereby citizens actively participate in scientifically-based biological inventories, become aware and knowledgeable about organisms and their ecosystems, develop a sense of honor and respect for biological diversity, and develop a commitment to retaining the benefits that conservation of our natural communities offer to humans and all life. The ATBI initiative is currently under development, using existing ATBIs as models.

An ATBI also puts information in the hands of those who need it. A tremendous amount of research has already been conducted on the biodiversity of the Adirondacks. However, coordination has been lacking among scientists, and communication has been inadequate among scientists, land managers and landowners. Efforts to improve land management and stewardship have been at best spotty, due to a lack of knowledge of ecosystem components. There are still many unknowns regarding the components of Adirondack natural communities (bogs, floodplain forests, alpine summits, beech-maple-birch forests, etc.). Also, until recent developments in computer technology, gathering all of this information into one format and in one place was difficult.

The Adirondack ATBI will document and synthesize past scientific inventory work, heighten interest in ongoing work, and employ a systematic approach to collecting biological diversity information into the future. Yet the ATBI is not just a species list. The ATBI approach requires that value is placed not just on what is found, but on discovering the distribution, relative abundance, seasonality and ecological relationships for each organism. Data collected under the ATBI is information-rich and invaluable for land managers and citizens who can protect, understand, and enjoy the living Adirondacks.

Scientists and Citizen Scientists: A Team Approach

In an ATBI citizens and scientists work together to learn about the biological diversity of the Adirondacks. The ATBI approach utilizes the knowledge and experience of scientific specialists, who collect organisms within a target taxon (group). Scientists are organized into groups called Taxonomic Working Groups (TWIGs). Specimens of beetles, birds, and other biota are captured and photographed, retained as "vouchers," or both, and sorted into groups for identifi-



White-tailed deer.

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cation to species. The sampling locations are recorded with a Geographic Positioning System. Everything goes into a central, spatially-referenced database that can be used to look up where organisms are found in the Park. A web site links the underlying Geographic Information System (GIS) database to maps and photos of each species. The GIS allows additional information such as population numbers, associations with other organisms, and condition of the population to be included for species. Sampling may be spread across the natural communities of the Park, or focused in one area in a bioblitz. Bioblitzes bring together TWIG specialists and volunteers for a short, intensive effort to collect large numbers of species in one place.

Volunteers are vital to the project's success. Recruiting talented amateur entomology enthusiasts, fans of ferns, and dragonfly devotees from New York State, the Northeast, and beyond will be crucial to getting good, Park-wide inventory data. Amateur botanists, birders, and mushroom hunters can transfer that

knowledge and love of the natural world to schoolchildren, their teachers and parents, and to the larger community. The ATBI is also an excellent opportunity to interest and instruct unskilled volunteers in natural history and kindle in them the desire to learn about and protect the Adirondacks and other natural systems. Volunteers help with field collections, sorting and identification as well as clerical work to make the program run smoothly.

Major Themes

The Project Plan is a working document which outlines the structure of the ATBI initiative. We define six working themes in the Project Plan, which articulate key elements for successful, long-term implementation of the ATBI. The first three themes relate to performing a complete biological inventory, and the latter three themes focus on achieving this task through scientist and citizen collaboration and active participation. For each theme we provide an introduction and a list of objectives.

The six themes are:

Theme 1: Biological Inventory within an Ecosystem and Conservation Framework.

A biological inventory will have its greatest value if performed systematically within an ecosystem and conservation framework. Identifying ecosystem components and understanding their roles and interactions is much more important to protection and conservation than developing simple lists of species. Within this context the inventory will have greater utility for stewardship.

Theme 2: Coordination among Taxonomic Working Groups (TWIGS) and the Biological Inventory Process.

Field sampling protocols and procedures for the database of all taxonomic groups must be carefully designed and explained so all participants will be successful in helping to populate the database with high quality data.

Theme 3: Development and Maintenance of a Temporally- and Spatially-referenced Database.

Concomitant with data collection, efforts must be made to find a physical location for specimens and technical human presence to develop the database. Several Adirondack institu-

tions, agencies and private individuals have committed to the support of the database in varying ways, and existing databases, such as that of the New York's Natural Heritage Program, will be linked or used as models.

Theme 4: Adirondack Community Involvement and Active Participation.

Volunteers and citizens' groups can become connected with scientists and assist with field sampling, processing of field samples on site or at specimen processing centers, data processing, ATBI administration and promotion. To do this the work must be interesting, relevant to every participant's life in some way, and perceived by those participants as truly useful to the success of the effort. This is where awe and wonder about the living Adirondacks spread through the human population, and our place in and our effects on the Adirondacks becomes understood. The ATBI and its results will be made available to a wide variety of media and comprehensible to citizens and visitors of the Adirondacks. The ATBI will provide learning opportunities about biodiversity for a diverse citizenry and for participants at all educational levels (e.g., pre-school, primary and secondary school, undergraduate

and graduate college students, trained and amateur naturalists).

Theme 5: Coordination with other ATBIs.

Coordination would be beneficial to our ATBI support, field protocols, database management, and promotion of the value and benefits of ATBIs. ATBIs have been conducted in several other areas of the United States. Notably, the Great Smoky Mountains National Park ATBI formed eight years ago and since then has found well over 500 species new to science. (For more information, see <http://www.dlia.org/>.) The Great Smokies ATBI is a successful model for connecting lay people with scientists to document biodiversity. Other successful citizen science efforts include Riverkeeper dedicated to protecting the Hudson River, the Christmas Bird Count, and Canada's Purple Loosestrife survey. These programs all rely heavily on volunteer help; indeed, they would not survive without it.

Theme 6: Art, Culture, Biological Diversity, and the Adirondack ATBI.

Celebrate the Adirondack ATBI with writings, art, and other cultural "products." Demonstrate the historical connection of human culture in the Adirondacks with various aspects of biological diversity.

Benefits of Biological Inventory

The benefits to cataloging the biological diversity of the Adirondack Park are many and varied. First, nature is inherently of value regardless of whether it produces medicine, logs, fur, pure water, or oxygen. The system that is the Adirondacks and all of its components has a right to exist unmolested. Inventory is a critical step – the first step – in long-term efforts to ensure protection of what makes this place unique.

Furthermore, knowledge of biodiversity and species distribution allows for improved, informed land management decisions. Rare species may turn out to be not so rare, if they are found



CHARLOTTE DENERS

Redbacked vole.

in multiple locations. We may find new species to the Adirondacks, or even to science. Better understanding of the unique Adirondack system is likely to result in increased public support for protected areas.

People's connectedness to their environment is strengthened through learning about the area in which they work and live. Humans are too often separated from their surroundings by concrete and asphalt, and the reconnection that happens during a hike or paddle, or while traveling on the scenic byways of the Adirondacks is restorative. Inspiration can be gained from appreciating the beauty of nature, whether it results in works of art or just a wonderful time in the woods.

A biological inventory will provide data for monitoring change, for example, as Eurasian milfoil and other invasive species continue to find their way into the Adirondacks. Inventory data also provide a baseline for understanding changes in time and space (temporal and landscape patterns).

Finally, there is always the potential for economically beneficial discoveries — perhaps the next medicinal breakthrough is out there in the northern woods. The natural world forms the basis for all regional economic endeavors, from maple syrup and timber production, to edible chanterelle mushroom gathering, to rustic wood crafts. Sound economic planning in the future will depend upon knowledge of our biodiversity.

Giving the ATBI Life

Acknowledging that the Adirondacks contain locally, regionally, and globally significant natural communities, a diverse community of individuals and public, private, academic, and governmental groups initiated the Adirondack All-Taxa Biological Inventory. Organizations such as the Adirondack Nature Conservancy/Adirondack Land Trust and the Association for the Protection of the Adirondacks, educational institu-



Green frog.

tions such as Paul Smith's College, SUNY Environmental Science and Forestry, and the Natural History Museum of the Adirondacks, and agencies such as the NYS Department of Environmental Conservation and Adirondack Park Agency are supportive of the ATBI.

In less than a year, the group has developed an organizational structure. A Project Plan outlining the steps needed to implement the ATBI is being drafted. A web site and database structure are being developed. As the plan nears completion, organizers will continue to seek input and garner support as activities are developed for the near future, and funding sources are identified.

Now is the time for the word to spread and for you to get involved. Volunteers are needed for a variety of tasks ranging from database development and management, to brainstorming funding sources, to development of taxon identification instruction modules, sampling protocols and more. Efforts are appropriate at every landscape scale from Park-wide single taxon efforts to small intensive bioblitzes of a single area. When you participate you'll find the

atmosphere enthusiastic, supportive, and positive. There is a role for everyone and every little bit will move us steadily to a successful completion. The ATBI would love to welcome you as a colleague! To get involved, contact Dr. Craig Milewski, email: milewsc@paulsmiths.edu.

Summary

Numerous authors have discussed the importance of biological diversity and argued for its protection. Perhaps the most eloquent of those arguments is author Aldo Leopold's — "The first rule of intelligent tinkering is to save all the parts" — as true today as it was in Leopold's time. The ATBI acknowledges the interdependence that stakeholders have with the biological community within which they live, work, and recreate. The Adirondack ATBI is designed to be supported by and to serve the larger Adirondack community, and to work with other ATBIs as a catalyst for conservation of biological diversity on a global scale. Support for a biological inventory among residents, scientists, and landowners is crucial to wise stewardship of these amazing mountains.