# Biodiversity Data Interaction for an Alliance of All Taxa Biodiversity Inventories: A Workshop to Design Methods, Standards, and Practices for Data-Sharing at the National Level


## Proceedings of a Workshop

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HTTP://WWW.ATBIALLIANCE.ORG/

*Information International Associates, Inc.

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# Introduction

It is recognized that in order to understand the ecosystems and the inter-related conservation needs of America's parks and reserves, the scientific work concerning them must be available and accessible to a variety of people. Without the sharing of information from an array of sources, people will not be able to obtain a full picture of the natural history of our parks and reserves. Everyday critical environmental decisions are made involving natural resources without the full knowledge of species living there. Through the expansion of the All Taxa Biodiversity Inventory (ATBI), more detailed information about all the species in a designated area is being collected. Key to making the ATBI data available to a wide audience is designing a system to gather knowledge from all inventories and present it through a well-organized database and its web interface.

Focus was placed on previous attendees for participation in the workshop. Information was posted on the ATBI Alliance website (www.atbialliance.org). In addition to information about the workshop on the website, there was also a pre-conference on line survey developed to get input about the questions that would need to be answered at the workshop. The survey results would guide the agenda and workshop itself. For those not registered a few weeks prior to the workshop, they received a follow-up phone (or email) urging their attendance or if they could not attend to please complete the pre-conference on line survey so the workshop would still benefit from their input.

The two day workshop was scheduled for 04-05 December, 2006 in conjunction with the 10th annual Discover Life in America (DLIA) – ATBI Conference since many participants would attend both. The workshop had a facilitator aiding the participants through the process of producing a new structure to incorporate, manage and distribute ATBI data, combining information technology with the natural sciences, education, resource management and conservation.

The goals of the meeting were to:

- Understand what is required for sharing (ATBI) data that comes from different local sources.
- Establish mutually agreed upon standards for ATBI information and data collection.
- Design a system to allow local databases to interact with another system to "serve up" the data to various users, including scientists, park managers, educators, students, and the general public.
- Establish continuing communications between meeting participants through an NBII Portal and a website.

## Executive Summary

Thirty-one participants from 10 states convened for a two day workshop to design methods, standards and practices for data-sharing at the national level as related to an Alliance of All Taxa Biodiversity Inventories. Specific discussions focused on data users, defining data needs, determining the functionality of an ATBI website and database, and identifying supporters of the development and maintenance of the website and database. Included in these proceedings are workshop discussion notes. Guidance on the development of the workshop agenda was based on the 40 pre-conference on line survey responders representing Arizona, Arkansas, District of Columbia, Florida, Kansas, Kentucky, Maine, Michigan, Montana, North Carolina, New York, Ohio, South Carolina, Tennessee, Texas, and Washington.

Survey responders all agreed that producing reports and engaging in public awareness should be a role of the ATBI Alliance. Responders would like to search a database by scientific name with results returned in the following formats: distribution maps (either static or interactive), fact sheets/species profiles, and species occurrence reports. In order to accomplish these results, the importance of standardizing field formats and a core group of required data fields was emphasized. Workshop participants were asked to consider the survey results during their discussions.

Participants in the workshop were first asked to discuss the reasons for sharing ATBI data. During this discussion the group identified two types of user/customer groups - (1) primary customers – users working with the actual raw data and (2) secondary customers – users working with interpreted data for education, policy, resource management, etc. The group moved onto discussing data sharing issues with two types of systems for delivering data identified. One type of system is a centralized database where data is pushed into a single database verses a decentralized database which pulls data out of all participating databases. Each type of system has pros and cons but after much discussion, the decentralized database was recommended. The resulting database and associated website should be flexible and simple for the people who collect and input the data as well as for the end users.

Working groups were categorized into the following committees: (1) Inventory Data Structure (technology, standards, push/pull of data, etc.); (2) Natural History Structure (species pages and educational component); (3) Taxonomic Working Group (TWIG) (expertise and protocols); and (4) Reserve Resources (stewardship and stories). Participants assigned themselves to committees with the task of determining a leader, identifying resources, identifying three specific funders (finding submission deadlines), defining a required mission for the core item, locating appropriate/needed members, timeline for meetings/tasks, identifying issues, and identifying overlap with other core items. Finding funding and good leaders were recognized as challenges that need to be addressed quickly in order to move forward.

A summary of the workshop was presented during the Discover Life in America (DLIA)/ATBI 10th Annual Conference (06-08 December, 2006) by Gillian Bowser, Texas A&M University.

# Workshop Discussions

## ***Monday, December 4, 2006***

The meeting began at 10:00 a.m. EST at the Holiday Inn Sunspree in Gatlinburg, Tennessee. Jeanie Hilten from the non-profit organization Discover Life in America (DLIA) welcomed everyone and reminded the group about travel assistance still available. Funding for the data workshop was provided by National Biological Information Infrastructure – Southern Appalachian Information Node (NBII – SAIN). Paul Super provided a welcome by the National Park Service (NPS) and then turned the workshop over to the facilitator, Shelaine Hetrick, of Information International Associates (IIa)/NBII-SAIN. The background leading up to this workshop was discussed briefly and then the goals of the meeting were reviewed:

- *Understand what is required for sharing All Taxa Biodiversity Inventory (ATBI) data that comes from different local sources.*
- *Establish mutually agreed upon standards for ATBI information and data collection.*
- *Design a system to allow local databases to interact with another system to "serve up" the data to various users, including scientists, park managers, educators, students, and the general public.*
- *Establish continuing communications between meeting participants through an NBII Portal and a website.*

Terri Killeffer, also of IIa, provided a quick overview of the pre-conference survey results.

Shelaine reviewed the agenda derived from the outcome of the pre-conference survey but reminded everyone that the agenda can be modified to meet our needs as the workshop progresses.

### Purposes of Data Sharing

In the first session, participants were asked to focus on the potential customers of the ATBI database and website. One important group is the ATBIs themselves. The participants saw the website as an important source of information for the ATBI's providing a place for communication, support for developing ATBIs, creating a national presence, establishing standards and structure, and better funding opportunities (e.g. economy of scale). ATBIs shouldn't be competing with one another but should represent one voice for the benefit of stewardship, protection, and management at a variety of scales.

So who are the customers other than the ATBIs themselves? Would it be everyone else? Policy makers, taxonomists, people making "sound scientific decisions," citizens, and educators were examples of other customers that came up during the discussion. For example, the current DLIA web page appears to be education driven since there are spikes in use at the end of the school year when projects are due and significant lulls during the summer and winter breaks. Another example of a potential user would be the National Ecological Observatory Network (NEON) using the ATBI information as baseline data. The discussion led to two possible groups of

users/customers: (1) primary customers – where the user is working with the actual raw data, and (2) secondary customers – those working with interpreted data for education, policy, resource management, etc.

The topic of database set-up came about with a discussion on whether to feed all the data into one central database or to query across databases. One participant posed the question whether the data at the front-end of the database was suitable to answer the backend questions? What is needed is good metadata, protocols on how information was collected, and validation of the data. The data needs to be scientifically sound or all the data becomes suspect.

The database needs to be kept simple. We also need to get something up and going with further develops later on.

## Data Sharing Issues

Chuck Cooper, DLIA, briefly discussed a meeting he recently attended - Taxonomic Databases Working Group (TDWG) 2006 Annual Meeting http://www.tdwg.org/ . TDWG gathers biological data into one large database through established standards and data schemas such as Darwin Core. One such group that contributes information is the herbariums who settled on a standard and now have an herbarium extension to TDWG. There is a potential for ATBIs to have an extension as well. ATBIs are most likely heading in the direction of rolling their data up to the global level at some point in the future once better organized as a whole. The Global Biodiversity Information Facility (GBIF) http://www.gbif.org/ has a standard – Dublin Core – and NBII is the U.S. Node of the Worldwide GBIF network http://gbif.nbii.gov.

When the group began the discussion about "Data Sharing Issues" there was an immediate split about whether the data was (1) coming in or (2) going out since there are different problems associated with each one.

For data coming into the database, it needs to be validated and checked for quality. After some discussion, the participants agreed to hold the local ATBI's responsible for the quality and validation of their own dataset prior to making it available to the public database and should include in the metadata the ability to trace the data back to the source ATBI. A key point was made that incomplete data is okay but incorrect data is not okay. The ATBI Alliance Initiative draft document addresses the responsibilities of ATBIs who participate in the Alliance and should reflect responsibilities that are proposed at this workshop.

For data going out of the database, there will need to be restricted access due to sensitive species information and proprietary issues but can do that through read/write access control. Metadata is seen as extremely important for people reviewing the data (e.g. researchers would use it to possibly screen out records based on certain criteria).

The participants also agreed there should be a technical working group created to establish the "nuts & bolts" of the database.

The ATBI database should provide baseline data (which will contribute to the development of long-term monitoring projects), GIS distribution, inventory locations (with a level of effort

defined by the TWIG), identify data gaps, negative data, tracking invasive species, and tracking rare species. Status and trend information was suggested as something to come out of ATBI data but that implies monitoring which is not necessarily a structure of the ATBI.

The ATBI database has been referred to as a "specimen level database" and the group needed clarification as to what this meant – a database containing records of a particular species at a particular place at a particular time; refers to one collection event at that place & time.

The issue again arose about a centralized database (pushing up) verses a decentralized database (pulling out). There are pros and cons to each which need to be considered such as maintenance difficulty, imposition to the local ATBIs, constraint decisions, and keeping data current. The participants agreed that all possible fields should be made publicly available without any interpretation to the data. In order to do this, standardization plays a key role but note that for some ATBIs it may be a struggle to meet new standards.

## Data Collection, Management, and Dissemination

The Push/Pull issue of the data was discussed again. Today there are many protocols that allow easier cross-walking of data between databases so the pulling of data from many databases was not seen as much of a problem. The cross-walking is much easier with common vocabularies, data dictionaries, and standardized metadata. Each TWIG should provide the metadata for their taxa. There will need to be defined a certain number of minimal common fields which could be tasked to the Technical Working Group. One pro of a central database would be from ATBIs not wishing to create a database of their own but could just drop in their data to a central location.

The point was made that the participants still have not defined the "user groups" of this database or website interface. So the next task was to define the "user groups." Researchers were listed first with their possible interest in the data for a species list, distribution maps, or effort of inventory information ("completeness" of survey). The question was asked if records are kept for when and where a sampling took place if nothing was found. Some protocols actually require this information while others do not. TWIGs could address this in their protocols. The effort of inventory implies a second type of record or a site record in addition to the specimen record. Species lists or species names will have to be address because of naming differences causing search problems. As an option, canned queries could be developed for the information people seek most often. An important point was made to include a disclaimer statement about the data and its interpretation.

Someone noted that the newly developing database should be providing data and output from the data that is already being collected. It should not require things that are not part of what the ATBIs are already doing, although the new database structure shouldn't be limited either. We should remember that many ATBIs are just starting up and are looking for guidance on standards and structure.

A second user of the database was identified as the individual ATBIs with some of the information they would seek being the same as researchers while other information may be about protocols, ATBI structure, etc. The user group was then divided into two types of users: (1) raw data and (2) interpreted data. The raw data users would cover the researchers who need access to

the specimen information without any interpretation. The interpreted data users include educators, students, park managers, policy makers, general public, and funders/stakeholders. This latter group needs the products the ATBI Alliance can produce using the raw data with scientific interpretation. All of the information needed to answer the questions for the second group may not be contained in the ATBI database so the database should be built so that it can work with or use outside existing datasets. The website could have a focus to address each of the users listed in the interpreted data user set. One option would be to develop dynamic webpages. Should this be something the Education group could focus on?

## GIS Collaboration Issues and Examples

It was noted that other information can be derived from a GPS point (e.g. elevation). Reliability of the point location should reside with the local ATBI (goes back to assuring the quality of the data). Documentation already exists about GPS information. Again, metadata and protocols are reinforced. Volunteers and scientists need to have the proper training in what is required of the data they collect and submit.

The conversation flowed to the topic of "Why are ATBIs are important?" Reasons given were to be able to take better care of the parks and beyond since if you can't protect it in a national park then it can't be protected anywhere. ATBIs could work on taxa groups that would help answer questions about water quality, air pollution, or invasive species. But the information needed to answer those questions is beyond what ATBIs are doing which is inventory and re-inventory (remember a specimen database contains the number of records but does not give a relative abundance of a species so no status and trend information). ATBIs provide baseline information to facilitate monitoring (although the information ATBIs are currently collecting may not be sufficient for some taxa to show a need for monitoring – contact people who do status and trends to find out how to help).

## Open Discussion

The Push/Pull issue of the database resurfaced reiterating the difficulties some ATBIs will have and the different constraints placed on some data. The push requires more effort on the local ATBI while the pulling would be more work on the front end but less in the long run. The point was made that we do not have to choose since it can happen both ways with some data pushed up and other data pulled out. Another point was made that NBII can provide some services (e.g. over the web) on how to share data and how to deal with firewall issues.

At the end of the first day participants were encouraged to discuss the different topics that came up and to think about the different paths/steps that need to be taken to move forward.

# ***Tuesday, December 5, 2006***

The second day began with a review of the day before.

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## *Summary of first day*

**Database Information:** Separated out the 'need from this group' vs available through other sources (such as habitat information).

**Species Occurrence Inventory (List):**

- temporal
- geospatial
- identifications (what)
- who collected
- who 'validated' determination

- Additional Species information (raw data) – each taxa has specific information that is relevant and important above just 'occurrence'
- Unique issues (changing of scientific name)

**Effort**:

- Status of collection
- Collection protocols (metadata)
- Complete vs. incomplete
- Report of status

**Metadata**:

- Documentation

**Individual ATBIs responsibilities:**

- Quality checking and validity of information
- Providing information (or providing access)
- Determining level of information to be provided (example: No T&E)

**User Groups:**

- Researchers: Data
- Other User groups (Park Managers, Educators, Students, General Public, Policy Makers, Funding Groups); applications (factsheets, reports, curriculum based information) applications

**Information and Web Content Management**

- Applications
- Factsheets (species pages, conservation information)
- Established protocols and other documentation for user community
- Educational information

***What can we add to the objective?***

**Understand what is required for sharing All Taxa Biodiversity Inventory (ATBI) data that comes from different local sources.**

## Database System and Web Interface

Based on the previous day's discussion came two user groups – those using the raw data and those using the interpreted data. The raw data comes directly from the specimen database. The derived information will come from the raw data but may also come from elsewhere to populate a fact sheet or species page. Dynamic webpages manage content and are database driven but

have some pros and cons associated with them. Pros are they can search across databases and populate the website; others can use the template once developed giving it a one-time cost for set-up, plus the template gives a cohesive appearance. An example of a NPS & NBII project is the protocol database which provides the ability to search and find protocols through a portal serving up dynamic information on a static page. There was some resistance to this idea so discussion continued.

With the development of a standard interface for individual taxa resources put in up front we would only need to maintain several interfaces which would keep costs down. It would also be easier to make any global changes since the data is dynamic instead of static. While it may ruffle some feathers in the beginning, it may be what we must do in order to accommodate the huge amount of information and website pages. We must remember that flexibility and simplicity are necessities for the people who input the data as well as for the end users. The dynamic webpages can pull information from partner databases, highlight different parks, or provide information depending on the user. Another example of a dynamic website – http://focalbirds.nbii.gov - with information on individual bird species comes from a variety of databases such as ITIS and NatureServe and is pulled into one page. ATBIs can provide information from their own databases or from other partner agencies because recreating data or duplicating effort would be pointless.

In thinking about moving forward, someone suggested looking to Biological Database and Informatics (BD&I) for potential support and to TDWG for already developed standards. Money is always an issue. It is important to be able to articulate what the organization does in order to gain funding support.

As for data going into the database, the individual TWIGs need to decide on the standards and develop protocols on a national scope. TWIGs would also have input as to what their species web pages would look like. Need to remember how to capitalize on what is already out there – economy of scale. Information can be filled in as it comes available.

While members of the Alliance must commit to providing data to the Alliance (in addition to the previously mentioned requirements), the ATBI Alliance should have responsibilities as well and the group developed this list:

- Experts database (coordination of the effort but cannot guarantee population)
- Protocols (successful ones)
- Website (linking to ATBIs, protocols, etc.)
- Species pages (structure)
- Inventory data (structure)
- Coordination (funding, workshops, etc.)
- Solve copyright issues for pictures
- Provide feedback on who is hitting the website (provides bigger picture, hot topics, and what to advertise)
- Contact information for individual ATBIs
- Promotion of ATBIs
- Seek funding opportunities

And here is a list of individual ATBI's responsibilities:

- Quality checking of information and validity
- Providing access
- Determining level of restriction on the data
- Keeping data current

Many databases were mentioned previously so at this time it was important to provide names and concepts to these databases. The idea is for the Alliance to provide structure/repository for the following four concepts:

1. Inventory database – specimen
2. Natural History database – ecological/biological information
3. Experts database – who are the taxonomic experts. This database will not be publicly available because of the private contact information. It will only be available to ATBI Alliance members.
4. Protocols

It was agreed that each one of the concepts/issues needs to have a corresponding technical working group. The discussion then turned to education and stewardship and where they fit into the four concepts. There still needs to be a product for education, stewardship, policy makers, resource managers, general public, etc. Need to think about what this database group is going to bring to the Alliance Board on how to progress forward. The technical working groups should be more or less in place with charges, assignments, and timelines.

NBII can continue to provide the infrastructure as long as federal funding allows and can also provide some training. IT support would have to come from the Alliance. NBII can also provide the ability to work live and cooperatively on a document through WebX. The participants at this workshop need to identify potential funders and look at their deadlines to submit proposals. The Alliance or the database technical working groups do not want to miss another cycle of funding. This group needs to get something organized before summer 2007 at least for the NBII funds. Other deadlines may be sooner.

Given the charge to come up with working groups and to focus on outcomes, an initial list of six core items was developed for ATBI Alliance Accountability:

1. Inventory Data Structure (technology, standards, push/pull of data, etc.)
2. Natural History Structure (species pages and educational component)
3. Expertise Structure (who they are and how to find) (available only to ATBIs)
4. Protocol Repository (collecting, student/teacher implementation of protocols, how to start up an ATBI, etc.)
5. Stewardship (examples of how to implement a particular plan)
6. Funding (eventually removed as a separate item because it is assumed under all)

The participants were now charged with deciding on which core item they would like to work in to develop ideas for funding, timelines, leader, etc. Keeping in mind the timeline for funding, participants want to have some sort of database up and running as soon as possible (less than 2 years). Immediate decisions and actions are needed. While discussing who will be in which core item, the participants decided to keep items 1 and 2 separate but recombine items 3, 4, and 5 in the following way:

1. Inventory Data Structure (technology, standards, push/pull of data, etc.)
2. Natural History Structure (species pages and educational component)
3. TWIG
    a. Expertise
    b. Protocols
4. Reserve Resources
    a. Stewardship
    b. Stories

Finally the participants divided into four groups based on the four core items and were charged with determining a leader, identifying resources, identifying three specific funders (finding submission deadlines), defining a required mission for the core item, locating appropriate/needed members, timeline for meetings/tasks, identifying issues, and identifying overlap with other core items.

The groups reconvened to report on their progress.

### *Reserve Resources*

Reserve Resources went first with Bill Zoellick assigned as the leader and Keith Langdon as a co-pilot. The other members are Gillian Bowser, Liz Domingue, and Curtis Hoagland, but the group will eventually seek additional members. They defined their mission as "telling stories" and the group plans to have their first deliverable by January 15, 2007. The prototype on the web will be in blog format and populated with ATBI stories such as new finds, invasive species, success stories, etc. Keith and Bill will provide a few examples to start this process and serve as templates for future stories. The information will be summarized in a flat document searchable like a dichotomous key. They intend to make it user-friendly and password protected. The primary audience is seen as individuals (funders, managers, etc.) that we would like to have buy-in to the ATBI process. Other users are ATBIs that need to learn from these examples. No resources were identified yet since this pilot effort can be done with current in-house resources available to Bill. Once the pilot is up, the group anticipates have a clearer picture of the resource needs.

### *TWIG*

The *TWIG* group members are Craig Milewski (leader), Stacy McNulty, Neil Cobb, and Mark Wetzel. Their goal is to have a working plan draft by April 1, 2007, by following the timeline given in the eight action items:

**Action Items**

1. Create mission (December 14) **Stacy**
2. Develop complete list of participants (December 15th) **Craig**
3. Funding: (ASAP)
    I&M program (USGS) funded **Neil**
    Research Coordination Network (NSF) pending **Craig**
    Natural Science Collections Alliance Mark
4. Develop Expertise Protocols (determining criteria for different levels and scope of taxonomic expertise) **Mark**

A. Determine taxonomic and geographic interest

5. Identify, Collate, and Develop Sampling Protocols (Ongoing) **Mark & Neil**
6. Identify and coordinate protocols among TWIGS and other programs (Ongoing)
7. Coordinate with Taxonomic Databases Working Group (TDWG) (Ongoing) **Stacy**
6. Policy for sharing and disseminating in public forums. (Ongoing) **Neil & Stacy**
8. Logistics protocols (available support systems). (Ongoing) **Neil**

### *Natural History Data Structure*

The *Natural History Data Structure* (repository) group is lead by Steve Killeffer with other member Charles Wilder, John Smith, Jason Love, Mark Zloba, Chris Bedel, Jim McKenna and Liz Domingue. Their mission is to serve or facilitate access to the ATBI database for educators, researchers, and managers. Funders have not been identified as of yet. The database will only be as good as the information going in, so since 'we' are the facilitators, we would focus on these user groups. The group's goal is to develop a different template by April 1, 2007, for each user group to gain access to the database and identifying the resource website by February 2007. There will be overlap in information contained on each template. Fields have to be universal. Resources already exist that can be drawn upon to populate these templates such as NatureServe, DLIA, and international resources. The group will need to establish links to other sites and deal with missing natural history information about many organisms. They noted that the information being used to populate the templates - pushers of information - is critical to the quality of information that is included. They will also have to address overlap for many of the templates that are created. And also, we do not want to lose information that has already been created (static pages).

This group wanted to note that an ATBI is seen as a resource for other ATBIs and will use this database in ways that are beneficial to them. There are some interesting management implications such as drawing from other web resources to understand what they are doing throughout the country. A benefit to the ATBI work would be pulling together all information such as fire, invasive land snails, etc. together under one site.

### *Inventory Data Structure*

The *Inventory Data Structure* (repository) named Dave Hill as the leader with other members Brian Scholtens, Dave Hill, Michael Kunze, Chuck Parker, Wolf Naegeli, Chuck Cooper, Ed Corey, and Jean Freeney. This group is also working with an April 1, 2007 deadline in mind. NBII will provide the infrastructure and training. The group tasked themselves to develop a template that can be used for a database for local ATBIs. It will be applicable at the national level and used as a model for information flow from those ATBI databases. They realized this process may mean a push or pull or both for the data. Part of the mission is to decide the avenue of information flow. Personnel will be needed to coordinate the efforts of the individual ATBIs such as determining how the data will flow from one to the other (the national version of what is happening at Great Smoky Mountains). The number of people was not yet identified but at least one is needed. Three potential sources of funding were identified: NSF-BDI; small funding through National NBII; collection networks (biological collection networks).

Some of the issues the group needs to address are reviewing the current standards for biological database systems (TWDG conference) and the potential of using Darwin Core as a standard. The

group needs to identify (research) the taxa authorities that are currently available and how we would want to make use or not make use of those databases (e.g. ITIS is great for some but not so complete for others like invertebrates) or other authority files that can be use. Ultimately this information would be vetted by the TWIGs that are working with the individual ATBIs.

## Wrap-up

The information each group provided were great starts. Funding is still an issue and each working group will need to think about funding individually as well as within the database group which is within the ATBI Alliance (multiple levels). In order to begin to write proposals there needs to be a list of resources, budgets, deliverables, etc. To get an idea of the types of information required to complete a grant proposal, it was suggested that groups review information on the National Science Foundation (NSF) website www.nsf.gov and www.grants.gov. Someone proposed to do get funding in two phases with the first phase of gathering enough information for a planning grant which will require identifying partners and developing a conceptual design.

An important missing component is the person leading the charge. Need to identify someone to keep the momentum going, hold the groups together and meet critical deadlines.

At this time, the group was charged to develop a summary of the workshop to be provided at the ATBI Alliance session during the DLIA meeting later in the week and also to the Alliance Board meeting on Saturday, December 9, 2006. The point was stressed again that one, two, or even three people need to step forward as leaders. The working groups all have leaders identified but most were reluctant leaders so they to need to find champions to pull into their working groups. Groups that have energetic leaders will move forward while others will not. These working group leaders will be reporting their group's progress to the board. Not clear whether eventually there will need to be someone coordinating the four working groups but this should work itself out over the next few days with the Alliance meeting.

The ATBIs need a way to communicate right now. Someone asked if there is a possibility to set something up that is very easy to use on http://my.nbii.gov. Someone will need to be a portal manager. Users will want to take the online web based training for using the portal (takes about ½ hours). There will need to be buy-in from ATBIs in order to make the use of the portal. The convenience is that the portal is already set up and it is password protected (otherwise a lot of junk may appear). There is the possibility of funding someone part-time (college student or retiree) to be the gatekeeper, to set-up the portal, etc. if everyone could chip in some funds.

The workshop ended on time.

## Summary of the ATBI Database Workshop

This two day workshop was open to any interested individuals and a pre-conference survey was developed to shape the development of the workshop agenda. The most important aspects of an ATBI Alliance database indicated by the survey and participants at the meeting were determining species location (or occurrence) information. It should be noted that this meeting focused on the information as it related to biodiversity data and information and recognized that there are many other aspects and responsibilities related to an ATBI Alliance.

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*The following summary of the workshop was provided to Gillian Bowser to present at the DLIA/ATBI Conference on 07December, 2006 during the "ATBI Alliance Session."*

**Inventory Database Information:**
Separated out the 'need from this group' vs. available through other sources (such as habitat information). This is the minimum information that is needed to share species occurrence information.

**Species Occurrence Inventory (List):**

- temporal
- geospatial
- identifications (what)
- who collected
- who 'validated' determination

- Additional Species information (raw data) – each taxon has specific information that is relevant and important above just 'occurrence'
- Unique issues (changing of scientific name)

**Effort**:

- Status of collection
- Collection protocols (metadata)
- Degree of completeness

**Metadata**:

- Documentation

**User Groups:**

- Researchers: want access to 'raw' Data
- Other User groups (Park Managers, Educators, Students, General Public, Policy Makers, Funding Groups): want access to interpretations or applications derived from the data such as fact sheets, reports, curriculum based information.

**Information and Web Content Management**

- Applications
- Factsheets (species pages, conservation information, etc.)
- Established protocols and other documentation for user community
- Educational information

**Individual ATBIs responsibilities:**

- Quality checking and validity of information
- Providing information (or providing access to information)
- Determining level of information to be provided (example: No T&E)

**ATBI Alliance responsibilities:**

- Inventory Data – repository structure
- Natural History Data – repository structure
- TWIG resources – Expertise Information (password protected) and Collection protocols
- Reserve Resources – structure to share information regarding Stewardship and success or marketing stories

**Goals:**

- Low burden for ATBIs and Alliance
- Decisions can be made on sound scientific information

Breakout groups based on the four ATBI Alliance responsibilities listed above were charged with designating a leader, developing a mission of the group, identifying funding and a timeline to have a plan in place by 01Apr2006 so that funding can be sought to meet these needs (where appropriate) during 2007.

**ATBI Alliance responsibilities:**

**1. Inventory Data Structure (repository) Working Group**

a) Leader: Dave Hill
b) Members: Brian; Dave Hill; Michael K.; Chuck Parker; Wolf N; Chuck Cooper; Ed Corey; Jean Freeney
c) Mission: A template that can be used for a database for local ATBIs and applicable at the national level and a model for information flow from those ATBI databases. This may need push/pull/both. Part of the mission is to decide that avenue of information flow.
d) Funding (ID 3 resources): NSF-BDI; small funding through National NBII; collection networks (biological collection networks)
e) Resource Needs: personnel to coordinate the efforts of the individual ATBIs; how does the data flow from one to the other; the national version of what is happening at GRSM (number of people not identified – one at minimum).
f) Timeline: 01apr07
g) Issues: Need review the current standards for biological database systems (TWDG conference). Review possibilities of using Darwin Core allow each ATBI add on to that standard. Identify (research) the taxa authorities that are currently available and how we would want to make sure or not make use of those databases (example ITIS great for some taxa and not so great for others like invertebrates). Ultimately this information is vetted by the TWIGs that are working with the individual ATBIs
h) Additional Information: NBII can provides infrastructure and training

**2. Natural History Data Structure (repository) Working Group:**

a) Leader: Steve Killeffer
b) Members: Charles Wilder; John Smith; Jason Love; Steve Killeffer; Mark Zloba; Chris Bedel;
c) Mission: Serve or facilitate educators, researchers or managers access to the ATBI database. Products from the database will only be a good as the information provided. Therefore as facilitators we intend to first focus on these user groups. Goal: develop three templates for access to the database (this will differ for managers, educators, researchers). Fields have to be universal.
d) Funding (ID 3 resources): *still need to identify*
e) Resource Needs: many available to populate the fields that we currently have available. Determine resources already available (example NatureServe). Personnel to search for information and populate the database
f) Timeline: Three templates by April; resource web site determined by Feb.
g) Issues: links to other sites; missing natural history information about many organisms. Information gained from templates (pushers of information is critical to the quality of information that is included). Overlap for many of the templates that are created. Do not want to loose information that has already been created (static pages). Dynamic pages generated from the Natural History database.
h) Additional Information: ATBI is a resource for ATBIs and information is being provided to be used as appropriate. Management implications of drawing on other resources that are doing this type of work including understanding more about fire, invasive plants, etc.

**3. TWIG Resources Work Group**

Expertise Data Structure (repository)
Protocol for ATBIs (repository)

a) Leader: Craig Milewski
b) Members: Stacy McNulty, Craig Milewski, Neil Cobb, and Mark Wetzel
c) Mission: Document informational and support network for the TWiGS through the following action items (lead person listed for each action item):
    i. Develop expertise rating protocols to determine criteria for different levels and scope of taxonomic expertise. (Mark)
    ii. Verify taxonomic and geographic interest of TWiGers (Mark)
    iii. Collate existing sampling protocols and develop new ones where needed. (Mark & Neil)
    iv. Identify and coordinate protocols among TWIGS and other programs including coordinating efforts with Taxonomic Databases Working Group (Stacy & Craig)
    v. Develop policy for sharing and disseminating TWiG data in public forums. (Neil & Stacy)
    vi. Provide logistics protocols, documenting available support systems at parks and regional institutions for TWiGers. (Neil)
d) Funding: NPS I&M program (funded, Neil); NSF Research Coordination Network (pending, Craig); Natural Science Collections Alliance (potential Mark), NSF Biological Databases and Informatics (potential, Neil).
e) Resource Needs: funding and personnel

f) Timeline: Create mission (December 14) Stacy ; Develop complete list of participants (December 15th) Craig; April 1st working plan draft
g) Issues: Soliciting full participation of TWiGs and coordinating with other efforts.

**4. Reserve Resources Working Group:**

Stewardship (repository)
Stories

a) Leader: Bill (Keith co-pilot)
b) Members: Bill, Keith, Gillian, Liz Domingue, Curtis, others as identified
c) Mission: Telling stories in a format that is categorized and searchable.
d) Funding (ID 3 resources): currently have materials at hand
e) Resource Needs: Unclear the editorial effort that will be needed. Need narratives from other parks.
f) Timeline: 15Jan prototype template
g) Issues: Unique to the other working groups. This will be a develop and learn process and similar to a blog format.
h) Additional information: By 15Jan a working prototype on the web to provide news stories and other items of interest to the ATBI community; populate with examples. (Keith and Bill will provide a few examples to start this process and serve as templates). User friendly, password protected. Primary audience: individuals (funders, managers, etc.) that we would like buy-in to the ATBI process. Other ATBIs that need to learn from these examples. Separate responsibility would assist in the development of other ATBIs. Provide tools to assist ATBIs. We have the information need to show others how to apply this information.

General discussion points from working groups:

- The working group team leads need to come to the board and say 'we need assistance in developing a proposal' ***An individual needs to be identified as the point lead for funding requests for the ATBI alliance. (Example: to develop a plan, fund a plan development/implementation)***
- Homework to review the funding opportunities available and posted proposals such as Grants.gov and NSF
- Need at least a ½ person to be the coordinator/communication person relative to exchanging information over the next year.
- Need a Champion for the ATBI Alliance
- Use of NBII portal available for the ATBI Alliance – needs a community manager; training is available (free/web-ex); a log-in is needed. All information is within the password protected area.

# Appendices

## *Final Agenda*

### Monday, December 4, 2006

| | |
|---|---|
| 9:00 – 10:00 | CONTINENTAL BREAKFAST |
| **10:00 – 10:30** | **Introductions and Purpose of Meeting** |
| **10:30 – 11:30** | **Purposes of Data Sharing**<br>• Identifying customers and their needs<br>• Benefits of working together<br>• Preventing duplication of effort<br>• Protecting biodiversity<br>• Rolling up ATBI data<br>  o To ATBI database<br>  o To other organizations/agencies |
| 11:30 – 11:45 | MORNING BREAK WITH REFRESHMENTS |
| **11:45 – 1:00** | **Data Sharing Issues**<br>• Standardization/metadata<br>• Sensitive/proprietary data<br>• Keeping data current |
| 1:00 – 2:00 | BOXED LUNCH<br>Possible discussion groups |
| **2:00 – 3:00** | **Data Collection, Management, and Dissemination**<br>• Field protocols<br>• Taxa covered<br>• Information types<br>• Current software<br>• Specimens tracked<br>• Taxonomic issues<br>  o Identification expertise needed<br>  o Verification of specimens<br>  o Taxonomic treatments |
| 3:00 – 3:15 | AFTERNOON BREAK WITH REFRESHMENTS |
| **3:15 – 4:30** | **GIS Collaboration Issues and Examples**<br>• Current users of GIS<br>• Type of location coordinates<br>• Standards/protocols/metadata |
| **4:30 – 5:00** | **Open Discussion**<br>Topics for dinner conversation |

## Tuesday, December 5, 2006

| | |
|---|---|
| 8:30 – 9:00 | CONTINENTAL BREAKFAST |
| **9:00 – 10:30** | **Database System and Web Interface**<br>• What are people searching for?<br>• How do they want to search for data?<br>• How will database/website benefit ATBIs?<br>• How will it be supported?<br>• Who will support it? |
| 10:30 – 11:00 | MORNING BREAK WITH REFRESHMENTS |
| **11:00 – 12:30** | **Database System and Web Interface continued** |
| 12:30 – 2:00 | BOXED LUNCH<br>Possible discussion groups |
| **2:00 – 3:00** | **Education Components**<br>• Citizen science<br>• Outreach<br>• Public awareness<br>• Teachers/students<br>• Website |
| 3:00 – 3:15 | AFTERNOON BREAK WITH REFRESHMENTS |
| **3:15 – 4:15** | **Stewardship**<br>• Using data for management<br>• Public awareness<br>• Stakeholders |
| **4:15 – 5:00** | **Workshop Conclusions**<br>Declaration |

# *Pre-conference Workshop Survey*
# "Biodiversity Data Interaction for an Alliance of ATBIs"

**This survey is divided into 5 sections (General, ATBI Alliance database, ATBI and ATBI Alliance support, Your database and Survey evaluation). There was no requirement to answer every question.**

**Questions are presented here as they were in the survey with the exception of personal information about each respondent. Following each question are the tallied results from all responders.**

**General**

1.) Contact Info:
First name
Last name
Email address
Confirm email address
Telephone #
Name of ATBI/Organization you represent
Web site associated with your ATBI: http://

2.) What state is your ATBI located in (if outside the United States pick 'outside US'?
(States **PICKLIST**)

3.) What state is your ATBI located in (if outside the United States pick 'outside US'?
(States **PICKLIST**)

## ATBI Alliance Database

4.) What is the most important question you would like an ATBI Alliance database to answer?
   a. Where do species occur in an area? (by community, habitat, geography, etc.)
   b. When do species occur in an area? (by season, time of day, etc.)
   c. What species are endemic or nearly endemic to a specific area?
      Do rare or listed species occur in a specific area?
   d. How many species inventoried in ATBIs are new to the area, county, or state, and how many are new to science?
   e. What invasive species occur in an area? Are these species expanding?
   f. What are the areas of greatest biodiversity?
   g. Other

5.) If other please explain (100 char text box)

6.) In your opinion, what are the top three database system search criteria from the list below.
   a. Scientific name
   b. Common name
   c. Genus
   d. Higher taxonomic unit
   e. Geographic area
   f. Keyword search
   g. Ecological biome
   h. Other

7.) IF other please explain (text box)

8.) In your opinion, what are the top three database system search results from the list below?
   a. Fact sheets/ species profiles
   b. Distribution maps (either interactive GIS layers or non-interactive graphics)
   c. Species occurrence reports
   d. Management information
   e. Current / past research
   f. Bibliographic information / references
   g. ATBI Contact information / ATBI fact sheet

9.) If other please explain (text box)

10.) Please rank the following issues below in order of importance to you, with respect to their influence on the future development of an ATBI Alliance database (1= most important , 5=least important)
   a. Agreement on taxonomy/taxonomic authority
   b. Agreement on standardization (standards)of database field formats
   c. Agreement on standardization of a core group of required data types to be included in databases
   d. Identification and procurement of funding
   e. Data ownership/copyright issues

11.) When it comes to data, how do you think an ATBI Alliance database can best serve your ATBI?
   a. Comparison data
   b. National coverage of taxa groups
   c. Stewardship
   d. Other

12.) If other please explain (500 char text box)

13.) Do you see producing reports and engaging public awareness as a role of the ATBI Alliance? **Y/N**

14.) What functionality would you want or perceive as most beneficial for an ATBI Alliance web page?
   a. Awareness of other ATBIs
   b. Point of contact with other ATBIs
   c. Methods implemented by other ATBIs
   d. Taxa groups collected by other ATBIs
   e. ATBI collection recruits (e.g. BioBlitz)
   f. Searchable ATBI Alliance database
   g. Other

15.) If other please explain (500 char text box)

## ATBI and ATBI Alliance Support

16.) How are you addressing stewardship in your ATBI? (500 char text box)

17.) Would your ATBI be willing over a period of 6 months to 1 year to assist in the development and testing of an ATBI Alliance Database? **Y/N**

18.) Would your ATBI/organization potentially be willing to contribute to: (check all that apply)
    a. Website maintenance: Providing updated textual information about your ATBI
    b. Website maintenance: Funding for webmaster
    c. ATBI Alliance database maintenance: Providing bi-annual updates of information
    d. ATBI Alliance database maintenance: Funding for staff

19.) Does your ATBI produce reports and/or engage public awareness? **Y/n**

20.) If so, how:
    a. Fact Sheets
    b. Maps
    c. Seminars (educational)
    d. Webpage
    e. Other

21.) If other please explain (100 char text box)

22.) Does your ATBI have a focused educational (student involvement) component? Y/N

## Your Database

23.) The subject or focus of your database (choose all that apply)
    a. Aquatic species
    b. Terrestrial species
    c. Flora (plants)
    d. Fauna (animals)
    e. Fungi, molds and lichens
    f. Arthropods
    g. Invertebrates
    h. Vertebrates
    i. Diseases (viral/bacterial/fungal)

24.) Does your database include the following information types (choose all that apply):
    a. Taxonomic (species based)
    b. Taxonomic (specimen based, e.g. collection records)
    c. Bibliographic
    d. Expertise
    e. Distribution
    f. Biological/Ecological
    g. Genetic
    h. Research (e.g. projects)
    i. Interactive maps (including GIS data layers)
    j. Non-interactive maps (static images)
    k. Images (including photos and drawings)
    l. Management methodology/tools
    m. Other (see next question)

25.) If other information type please explain (txt box)

26.) What database software do you currently use for storing your ATBI data?
    a. Access
    b. Filemaker
    c. Excel
    d. SQL Server
    e. Oracle
    f. other

27.) If other please explain (200 word text box)

28.) Do you provide standardized pick lists for data entry into your database? **Y/N**

29.) Other than funding, what is your ATBI's biggest challenge in terms of resources for data management?

a. Software
b. Electronic equipment
c. Staff
d. IT Staff
e. Taxonomic Expertise
f. Other

30.) If other please explain (100 char. Text box)

31.) Do you have a standardized or written protocol for field data collection? **Y/N**

32.) Is this protocol on-line? http:// (100 char text)

33.) Are organisms entered into your database confirmed by taxonomic authorities? Y/N

a. If so, what authority? (text box)

34.) Do you keep track of individual specimens that are collected as vouchers in your database? Y/N

35.) Is your data stored or used in a GIS system? Y/N

36.) What system of collection site location coordinates do you use?

a. Latitude/Longitude
b. UTMs
c. Decimal lat/long
d. other

37.) If other please explain (100 char text box)

**Survey evaluation questions**

38.) In your opinion, the survey addressed the data and database related issues/goals of the ATBI Alliance database workshop

a. Not at all
b. Inadequately
c. Adequately
d. Well
e. Very well
f. Extremely well

39.) The length of the survey you took was

a. Too short
b. Just right
c. Too long

40.) Issues that should be included in the agenda of the workshop are: (text box)

# *Results of the Pre-conference Workshop Survey*
# "Biodiversity Data Interaction for an Alliance of ATBIs"

**This survey is divided into 5 sections (General, ATBI Alliance database, ATBI and ATBI Alliance support, Your database and Survey evaluation). There was no requirement to answer every question.**

**Questions are presented here as they were in the survey with the exception of personal information about each respondent. Following each question are the tallied results from all responders.**

**General**

1.) What state is your ATBI located in (if outside the United States pick 'outside US'? (States **PICKLIST**)

- 40 responders - 18 from Tennessee/21 from other states & 1 District of Columbia
  - 1 Arizona
  - 2 Arkansas
  - 1 District of Columbia
  - 1 Florida
  - 1 Kansas
  - 2 Kentucky
  - 1 Maine
  - 1 Michigan
  - 1 Montana
  - 2 North Carolina
  - 2 New York
  - 1 Ohio
  - 1 South Carolina
  - 18 Tennessee
  - 4 Texas
  - 1 Washington

## ATBI Alliance Database

2.) What is the most important question you would like an ATBI Alliance database to answer?

a. Where do species occur in an area? (by community, habitat, geography, etc.)
b. When do species occur in an area? (by season, time of day, etc.)
c. What species are endemic or nearly endemic to a specific area? Do rare or listed species occur in a specific area?
d. How many species inventoried in ATBIs are new to the area, county, or state, and how many are new to science?
e. What invasive species occur in an area? Are these species expanding?
f. What are the areas of greatest biodiversity?
g. Other

| where sp. occur | when sp. occur | endemic | # new sp. | invasives | greatest biodiversity | other |
|---|---|---|---|---|---|---|
| 22 | 0 | 6 | 3 | 3 | 5 | 0 |

3.) If other please explain (100 char text box)

NO OTHER

4.) In your opinion, what are the top three database system search criteria from the list below.
   a. Scientific name
   b. Common name
   c. Genus
   d. Higher taxonomic unit
   e. Geographic area
   f. Keyword search
   g. Ecological biome
   h. Other

| sci name | com name | genus | higher tax. | geo. Area | keyword | eco. Biome | other |
|---|---|---|---|---|---|---|---|
| 36 | 8 | 2 | 2 | 13 | 13 | 2 | 0 |

5.) IF other please explain (text box)

NO OTHER

6.) In your opinion, what are the top three database system search results from the list below?
   a. Fact sheets/ species profiles
   b. Distribution maps (either interactive GIS layers or non-interactive graphics)
   c. Species occurrence reports
   d. Management information
   e. Current / past research
   f. Bibliographic information / references
   g. ATBI Contact information / ATBI fact sheet

| fact sheets | dist. maps | sp. occ. reports | mgmt. info | research | bibl. info/ref. | contacts | other |
|---|---|---|---|---|---|---|---|
| 26 | 39 | 22 | 14 | 9 | 7 | 3 | 0 |

7.) If other please explain (text box)

NO OTHER

8.) Please rank the following issues below in order of importance to you, with respect to their influence on the future development of an ATBI Alliance database (1= most important , 5=least important)
   a. Agreement on taxonomy/taxonomic authority
   b. Agreement on standardization (standards)of database field formats
   c. Agreement on standardization of a core group of required data types to be included in databases
   d. Identification and procurement of funding
   e. Data ownership/copyright issues

For the following results, numbers were tallied for each category with the lower the numbers representing the higher the priority. Nine respondents were removed because of ranking issues (e.g. multiple #1 or no #5).

| agreement on taxonomy & taxonomic authority | standardization of field formats | standardization of core group of required data types | ID & procurement of funding | ownership/copyright issues |
|---|---|---|---|---|
| 88 | 75 | 74 | 81 | 147 |

9.) When it comes to data, how do you think an ATBI Alliance database can best serve your ATBI?
   a. Comparison data
   b. National coverage of taxa groups
   c. Stewardship
   d. Other

| comp. data | nat. coverage of taxa | stewardship | other |
|---|---|---|---|
| 13 | 12 | 4 | 8 |

10.) If other please explain (500 char text box)

| |
|---|
| I hope all of the above. |
| other, Getting the general public more aware, involved, interested |
| Other, All the above. I think they will all equally serve our ATBI over time in ways not immediately foreseeable. |
| Ease of use by teachers and student sin a classroom |
| Other, ALL of the above, plus larger, broader database of pertinent literature, plus searchable fields for taxonomists/systematists. |
| Other, public awareness and input into decisions which impact the natural resources |
| Other, Development of standards, methods, databases (back end and front end), and linkages to global taxonomic databases. |
| other, Motivating citizens in our region by sharing the successes/stories in other regions |

11.) Do you see producing reports and engaging public awareness as a role of the ATBI Alliance? **Y/N**

| Yes | No |
|---|---|
| 40 | 0 |

12.) What functionality would you want or perceive as most beneficial for an ATBI Alliance web page?

a. Awareness of other ATBIs
b. Point of contact with other ATBIs
c. Methods implemented by other ATBIs
d. Taxa groups collected by other ATBIs
e. ATBI collection recruits (e.g. BioBlitz)
f. Searchable ATBI Alliance database
g. Other

| awareness of other ATBIs | point of contact | other methods | taxa groups coll. | coll. Recruits | searchable database | other |
|---|---|---|---|---|---|---|
| 20 | 12 | 5 | 6 | 0 | 3 | 2 |

13.) If other please explain (500 char text box)

| |
|---|
| All of the above! |
| Other, I also perceive the information obtained from BioBlitzes to be very important, but...so many groups are not conducive to BioBlitz programs.....i.e., many groups cannot be identified, even to order, in absence of microscopical examination, and often only after extensive processing and temporary or permanent mounting on slides. |

## ATBI and ATBI Alliance Support

14.) How are you addressing stewardship in your ATBI? (500 char text box)

| |
|---|
| Information gained from ATBI will be used in making management decisions. |
| NPS and BLM |
| All I can do is build a database that can be used in the future to look for major changes. None of the species in the Park in my taxonomic group are considered endangered -- despite the fact that we just found a grouse locust which had been mentioned for consideration for listing as endangered. The possible listing was a result of not knowing of other populations in addition to the type locality. Currently the only major exotic in the group is the Chinese Mantid which might be a competitor with the native species. |
| The ALGAL TWIG participates in educational programs and workshops whenever it's possible as part of the Great Smoky Mountains ATBI program. |
| It is not part of my role specifically, but is part of the overall Steering Group goal; being addressed through Big Thicket Association. |
| Not sure if we're addressing this properly at this time. This is an area which needs to be emphasized more. |
| Close communication with Park resource managers as to what they need to know and trying to direct the research towards those concerns. |
| What do you mean by stewardship here? |
| We fund the work of DLIA in the Smokies, so we do no direct work on the ATBI, so I am guessing on many of the answers below. |
| Through Citizen Science, we are engaging adults and children in the natural environment. As a result, they gain an appreciation of the wonderful diversity of life while also acknowledging that human action (and inaction) can have negative consequences |

| |
|---|
| towards maintaining highly diverse, unique communities. |
| Informally at the moment through public participation in BioBlitzes and through traditional media releases |
| Increasing support for conservation by connecting people to natural environments through citizen participation in biological surveys and related activities. This includes education at all levels. We are still a bit embryonic in implementing the ATBI. |
| time, talent, and financial |
| Providing education programs to promote ATBI awareness |
| Extensive outreach to public and involving numerous volunteers |
| I serve as TWIG leader for the Vermes group (true segmented worms and other worm-like groups). |
| We share all data with the National Park. |
| Providing park personnel with data of what occurs and where it occurs |
| As far as I know a statewide ATBI for Arkansas does not exist. I'd like to create on when I retire. |
| I volunteer to work for the annual meetings.<br>Producing publications |
| We're not there yet. Our timeline is still a few years out. |
| Very complex question for our region which is 50% private land and 50% state land. We hope a) to encourage private landowners to be good land stewards, b) to improve public land management by providing better information to agency personnel, and c) to help visitors on public lands to appreciate the natural resources there. We intend to invite these groups to participate in ATBI and to use the information gathered via ATBI for improved stewardship. |
| We work closely with a 30 member stakeholder group and use their input to direct many of our priorities. |
| Up this this time, we have not been focusing on any management or stewardship issues. Our efforts have been on getting the bio-blitzes off the ground, securing taxonomic assistance, and garnering public support. |
| Using the data to make management decisions/slow development in parks. |
| . Active management of invasive species.<br>2. Biomonitoring.<br>3. Habitat restoration.<br>4. Education on value of natural resources.<br>5. Wildlife management. |
| By involving partners and highlighting findings of rare, threatened or species of management concern. |

15.) Would your ATBI be willing over a period of 6 months to 1 year to assist in the development and testing of an ATBI Alliance Database? **Y/N**

| Yes | No | Blank |
|---|---|---|
| 24 | 3 | 13 |

16.) Would your ATBI/organization potentially be willing to contribute to: (check all that apply)
   a. Website maintenance: Providing updated textual information about your ATBI
   b. Website maintenance: Funding for webmaster
   c. ATBI Alliance database maintenance: Providing bi-annual updates of information
   d. ATBI Alliance database maintenance: Funding for staff

| updating text | funding webmaster | database updates | database funding |
|---|---|---|---|
| 19 | 3 | 15 | 3 |

17.) Does your ATBI produce reports and/or engage public awareness? **Y/n**

| Yes | No | Blank |
|---|---|---|
| 29 | 5 | 6 |

18.) If so, how:
   a. Fact Sheets
   b. Maps
   c. Seminars (educational)
   d. Webpage
   e. Other

| fact sheets | maps | seminars | webpage | other |
|---|---|---|---|---|
| 12 | 9 | 20 | 24 | 18 |

19.) If other please explain (100 char text box)

| |
|---|
| Use ATBI activities to interface science and education. |
| We will populate the website by January, 2007 |
| Newsletter |
| Just as a remark - we are just starting up, so this will come with time. |
| Hopefully, our database (such as it is) will be made available to the public within a few weeks. |
| ATBI Quarterly newsletter, volunteer training and involvement, education partnerships. |
| Press releases and newsletter |
| Newsletter |
| We are a residential environmental education center based in Great Smoky Mountains National Park. We work closely with DLIA and the NPS in the park's ATBI. |
| General summary reports and some very limited webpage coverage |
| In the next year we plan on holding TWIG workshops, developing educational materials for high schools, developing communication and outreach materials, holding citizen training workshops, involving undergraduate interns or volunteers, and hosting our first BioBlitz. |
| Extensive website, diverse public interaction, including fund-raising/educational events, and public education/outreach sessions (hour, day, week) with various public groups (grade school through college, and lay groups, all ages). |
| We are just getting started, but hope to provide all of the above |
| Quarterly newsletter |
| ATBI for the Big Thicket is just starting so some of these questions would have to be addressed by the council, but I would imagine that the group would be most cooperative in testing the use of a database and will be developing methods of communication. A website and news releases have already occurred. |

| |
|---|
| These are either current or planned activities. |
| We support science information needs (taxonomic, habitat, fundraising) for local stakeholder projects. |
| Technical reports. |

20.) Does your ATBI have a focused educational (student involvement) component? Y/N

| Yes | No | Blanks |
|---|---|---|
| 24 | 9 | 7 |

## Your Database

21.) The subject or focus of your database (choose all that apply)

a. Aquatic species
b. Terrestrial species
c. Flora (plants)
d. Fauna (animals)
e. Fungi, molds and lichens
f. Arthropods
g. Invertebrates
h. Vertebrates
i. Diseases (viral/bacterial/fungal)

| Aquatic Species | Terrestrial species | Flora (plants) | Fauna (animals) | Fungi, molds, and lichens | Arthropods | Inverts | Vertebrates | Diseases (viral, bacterial, fungal) |
|---|---|---|---|---|---|---|---|---|
| 20 | 21 | 19 | 22 | 20 | 21 | 23 | 18 | 5 |

22.) Does your database include the following information types (choose all that apply):

a. Taxonomic (species based)
b. Taxonomic (specimen based, e.g. collection records)
c. Bibliographic
d. Expertise
e. Distribution
f. Biological/Ecological
g. Genetic
h. Research (e.g. projects)
i. Interactive maps (including GIS data layers)
j. Non-interactive maps (static images)
k. Images (including photos and drawings)
l. Management methodology/tools
m. Other (see next question)

| Taxonomic (species based) | Taxonomic (specimen based) | Bibliographic | Expertise | Distribution | Biological – Ecological | Genetic | Research (e.g. projects) | Interactive maps (including GIS data layers) | Non-interactive maps (static images) | Images (including photos and drawings) | Management methodology & tools | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 26 | 22 | 9 | 11 | 18 | 11 | 3 | 7 | 3 | 10 | 11 | 3 | 12 |

23.) If other information type please explain (txt box)

| |
|---|
| We will work towards combining databases from different institutions in the next 1.5 years. Progress will depend on funding. |
| Taxonomic (species based), Taxonomic (specimen based), Bibliographic, Expertise, Distribution, Biological/Ecological, Research (e.g., projects), Non-interactive maps, Images, Again, the above are our plans, but we are just starting |
| Taxonomic (species based), Taxonomic (specimen based), Expertise, Distribution, Biological/Ecological, Genetic, Non-interactive maps, This is based on our current draft of database infrastructure - still under construction, interactive maps to be coming in following years (depending on funding) |
| Taxonomic (species based), Taxonomic (specimen based), Distribution, Trying to convince our IT folks that images should be included in the database open to the public. |
| Taxonomic (species based), Taxonomic (specimen based), Bibliographic, Distribution, Biological/Ecological, Images, Our data managers might know of others.... |
| still under development |
| Taxonomic (specimen based), Expertise, Distribution, Biological/Ecological, Its easy to say what's in an ATBI that does not exist (Arkansas, state wide). I've just begun to envision it and plan to follow up in 5-10 years when I retire. Currently, I'm thinking of web searching for existing data and building a web page to link specialist's pages. |
| Taxonomic (species based), Not sure what's there. |
| ATBI of Big Thicket is just beginning so many of these questions regarding the database are to be determined. |
| Taxonomic (species based), Taxonomic (specimen based), Research (e.g., projects), Information we collect is submitted to DLIA and the National Park. |
| We have adopted the current version of the database used by DLIA. |
| Taxonomic (species based), Taxonomic (specimen based), Expertise, Research (e.g., projects), Non-interactive maps, However, much of our information has not yet been put into a centralized data base. |

24.) What database software do you currently use for storing your ATBI data?

a. Access
b. Filemaker
c. Excel
d. SQL Server
e. Oracle
f. other

| Microsoft Access | Filemaker Pro | Microsoft Excel | Microsoft SQL Server | Oracle | Other |
|---|---|---|---|---|---|
| 17 | 4 | 6 | 2 | 2 | 10 |

25.) If other please explain (200 word text box)

| |
|---|
| Biota |
| We have a Natural Resources Inventory Database, which stores all of the species identified by our rangers, naturalists, and biologists. |
| Microsoft Excel, Note: excel is not ideal...but that's what we work with prior to forwarding our data to the GSMNP database handlers. |
| Access, System developed with Access and Visual Basic. Use of Cold Fusion for the online flat file. |
| Not sure |

| |
|---|
| Access, DLIA database. |
| Unknown. I am personally not involved in this aspect. |
| I would likely use MS Access or Excel. |
| Access, We intend to use the Smokies' DLIA database. |
| Microsoft Excel, Monitoring data ultimately are placed in the Oak Ridge Environmental Information System (OREIS), which is a relational data base that uses Oracle software. |

26.) Do you provide standardized pick lists for data entry into your database? **Y/N**

| Yes | No | Blank |
|---|---|---|
| 17 | 6 | 17 |

27.) Other than funding, what is your ATBI's biggest challenge in terms of resources for data management?

a. Software
b. Electronic equipment
c. Staff
d. IT Staff
e. Taxonomic Expertise
f. Other

| software | electronic equip. | staff | IT staff | taxonomic exp. | other |
|---|---|---|---|---|---|
| 0 | 0 | 16 | 1 | 7 | 6 |

28.) If other please explain (100 char. Text box)

| |
|---|
| Other, Time!! :) So many species (new and otherwise) and not enough time to process all the information!! |
| Staff, Communication with all the people involved concerning what reports are needed from a database. Also, convincing researchers to collect the needed data to be incorporated, ex. geo-referenced data. |
| Other, Not sure |
| Other, Time to enter and update data |
| Other, tech staff to assist in processing field samples, IT staff to assist in data entry; taxonomic expertise to assist with problematical species (to be specific, too few specialists for many groups, and thus a delay in receiving assistance, even as enthusiastic as these experts are to help...it comes down to time; most have other regular duties, so ATBI involvement is sincere, but limited by time and funding). |
| Other, My ATBI does not exist. |

29.) Do you have a standardized or written protocol for field data collection? **Y/N**

| Yes | No | Blank |
|---|---|---|
| 13 | 15 | 12 |

30.) Is this protocol on-line? http:// (100 char text)

| |
|---|
| www.discoverlifeinamerica.org/atbi/science/guidelines_submit.shtml |
| http://www.inhs.uiuc.edu/~mjwetzel/AOGSMNP.fldmeth.html |
| www.discoverlifeinamerica.org/atbi/science/guidelines_submit.shtml |
| slimemold.uark.edu/educationframe.htm |

31.) Are organisms entered into your database confirmed by taxonomic authorities? Y/N

| Yes | No | Blank |
|---|---|---|
| 20 | 7 | 23 |

g. If so, what authority? (text box)

| |
|---|
| taxonomic experts in the family since our work is all on Coleoptera |
| varies |
| Professors or experts on the given organisms |
| scientific experts |
| Genus dependent (i.e. Rex Lowe, Jeff Johansen, Susan Carty....) |
| Varies with the taxa. We have Taxonomic Working Groups (TWIGs) with leaders. |
| Various expert mycologists who are part of the project |
| But they would be if I had a database! |
| Various experts such as staff scientists, university, NatureServe. |
| individual taxonomists who do the identification |
| A professional lead taxonomist has been contracted for all of the bioblitzes we have held to date |
| Varies - state agency personnel, other experts |
| We anticipate confirmation. |
| Experts in each group confirm IDs |
| Local experts and others as necessary. |
| other recognized, certified experts - North Amer. Benthological Soc. (Taxonomic Certif. Program) |
| TWIG Leaders |
| Local experts |

32.) Do you keep track of individual specimens that are collected as vouchers in your database? Y/N

| Yes | No | Blank |
|---|---|---|
| 20 | 6 | 14 |

33.) Is your data stored or used in a GIS system? Y/N

| Yes | No | Blank |
|---|---|---|
| 11 | 14 | 15 |

34.) What system of collection site location coordinates do you use?
   a. Latitude/Longitude
   b. UTMs
   c. Decimal lat/long
   d. other

| Lat/Long | UTMs | Decimal lat/long |
|---|---|---|
| 9 | 20 | 7 |

35.) If other please explain (100 char text box)

| |
|---|
| Lat/Long, UTMs, Decimal Lat/Long, We use all three, utms are used because that is the choice of the Smokies ATBI |
| Decimal Lat/Long, Given that there are multiple partner institutions associated with CP-ATBI there is everything you could imagine |
| Lat/Long, UTMs, Decimal Lat/Long, also including distance, direction from known center of town, or other waypoint noted on USGS topographic quadrangle maps; also, township, range, section, and subunit of section, when surveys had been completed, and info included on topographic quad maps (but, not available for vast majority of ATBI in the Great Smoky Mountains, National Park). I cross-check all field GPS coordinates with my own database records (past collection information) and that available from various maps. |
| System/format is project/Investigator-specific so several formats are used, but could be converted to any format (e.g., UTMs). |
| UTMs, Most of these database answers are somewhat inapplicable because they indicate what we hope to happen - database has not been populated yet. |

**Survey evaluation questions**

36.) In your opinion, the survey addressed the data and database related issues/goals of the ATBI Alliance database workshop
   a. Not at all
   b. Inadequately
   c. Adequately
   d. Well
   e. Very well
   f. Extremely well

| Not at all | Inadequately | Adequately | Well | Very well | Extremely well |
|---|---|---|---|---|---|
| 0 | 1 | 9 | 13 | 10 | 1 |

37.) The length of the survey you took was
   a. Too short
   b. Just right
   c. Too long

| Too short | Just right | Too long |
|---|---|---|
| 0 | 29 | 3 |

38.) Issues that should be included in the agenda of the workshop are: (text box)

| |
|---|
| Authorities interested in sharing expertise. Bibliography of the most current reference guides to taxa of flora and fauna of US, updated annually. Reason: It is difficult to find the most current references for given taxa. |
| Not necessarily agenda worthy, but we've sometimes found it challenging working with the GSMNP database given the high diversity of taxonomic groups covered by the database - each having their set of collection or taxonomic specific and relevant information that should be included. -i.e. sometimes required categories are less relevant and don't make sense, and other times we'd like to include others (partly addressed by limited number of extra "columns" or categories allowed). |
| Let's really try to get folks to set up something that we can test and demonstrate as useful to a variety of ATBI parks and reserves. Of course it won't be perfect, but we can work out the glitches as we go along. |
| As our own ATBI database is not fully developed yet, our issues are not yet fully known. |
| ATBI vs. NatureServe/TNC database - Opportunities to collaborate and not duplicate, Getting a name that the general public can understand - no acronyms and no words like "taxa" (like, say, NatureServe) |
| How to include private citizens and students in ATBIs and to make ATBIs a type of citizen science. |
| How to incorporate the needs and available resources to members of the alliance who are operating at very different scales of activity. Our ATBI effort for example to date consists primarily of 4 weekend long BioBllitzes which have focused on different insect families. We are interested in expanding our scope of activity but when and how that occurs is still uncertain. Meeting the data needs for our efforts will be quite different from those of GRSM I would think. |
| Issues related to proprietary and sensitive data. |
| 1) Creating an overall database that has standardization, but flexibility. 2) Ensuring accuracy of data, particularly identifications in database. |
| Just what is the prognosis for long term commitment of funds, agency support, to underwrite and provide substantive drive for the ATBI Alliance? I know that other ATBI programs are under development (e.g., Colorado Plateau, AZ + other parts of the SE US: Acadia National Park, Maine); but just what, if any, funding is now earmarked for those programs.....both seemingly well organized and with diverse expertise already involved in planning? What about long term funding to continue, improve the ATBI Alliance database efforts? |
| Collection procedures, observation protocols, field methods, and documentation standards.<br>Mapping methods/standards |
| Clarifications:<br>Item #2. CUGA is in KY, TN, VA (multiple entries not allowed.<br>Item #3. We are charged with holistic management. No one question more important than another.<br>From Item #11 on:<br>Most of the preceding questions were based on the assumption that our unit is or is part of an on-going ATBI. All inventory/monitoring at CUGA is under the auspices of the Cumberland/Piedmont I&M Network. We have no independent funding at this park to conduct any such activities. So it is mostly "N/A" for now and the foreseeable future. The natural resource staff will soon total two individuals to deal with multiple issues in a 20,500 acre park so there is hardly a critical mass upon which to build an initiative such as ATBI. We fully support the concept and would like to be a player but do not see a realistic role for ourselves at the moment. |
| Collaboration/funding opportunities<br>How to "share" scientific/taxonomic experts |
| This survey should have made a more distinct separation between those who have an ATBI going and those who are just planning one (as we are). |
| I am a member of the Arkansas Flora Committee <www.uark.edu/~arkflora>. My goals are:<br>1) produce a web-link page to connect existing Arkansas species data and<br>2) expand that group into a state wide ATBI when I retire in 5-10 years.<br><br>Note: No true ATBI exists, so you may not want to include my survey response with your other data. |

## *List of Participants*

| First Name | Last Name | Association |
|---|---|---|
| Chris | Bedel | Cincinnati Museum Center |
| Gillian | Bowser | Texas A&M University; DLIA |
| Neil | Cobb | Merriam-Powell Center for Env. Res. |
| Chuck | Cooper | Discover Life in America |
| Jesse | Corey | NC Division of Parks and Recreation |
| Shelaine | Hetrick | Information International Associates/NBII-SAIN |
| Liz | Domingue | "Just Get Outdoors" |
| Kevin | Fitz Patrick | All Species Photography and Sound |
| Jean | Freeney | NBII-SAIN |
| Stephanie | Glenn | Big Thicket National Park |
| David | Hill | Tennessee State Parks |
| Jeanie | Hilten | Discover Life in America |
| Curtis | Hoagland | Big Thicket National Preserve |
| Steve | Killeffer | Discover Life in America |
| Terri | Killeffer | Information International Associates |
| Michael | Kunze | Great Smoky Mountains National Park |
| Keith | Langdon | Great Smoky Mountains National Park |
| Jason | Love | Great Smoky Mountains Institute |
| Jim | McKenna | Acadia National Park |
| Stacy | McNulty | Adirondack Ecological Center |
| Craig | Milewski | Paul Smith's College |
| Wolf | Naegeli | NBII-SAIN |
| Charles R. | Parker | Biological Resources Division, USGS |
| Brian G. | Scholtens | College of Charleston |
| John G. | Smith | Oak Ridge National Laboratory |
| Paul | Super | Great Smoky Mountains National Park |
| Mark J. | Wetzel | Illinois Natural History Survey |
| Peter | White | Discover Life in America; UNC |
| Charles | Wilder | Discover Life in America |
| Mark | Zloba | Cincinnati Museum Center |
| Bill | Zoellick | Acadia Partners |

## *Relevant Websites to the Document*

All Taxa Biodiversity Inventory (ATBI) Alliance
http://www.atbialliance.org/

Biological Databases and Informatics (BD&I)
http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5444&org=BIO

Discover Life in America
http://www.discoverlifeinamerica.org/

Global Biodiversity Information Facility (GBIF)
http://www.gbif.org/

Grants.gov
http://www.grants.gov/

Information International Associates, Inc.
http://www.iiaweb.com/

Integrated Taxonomic Information System (ITIS)
http://www.itis.gov/

National Biological Information Infrastructure
Southern Appalachia Information Node (NBII-SAIN)
http://sain.nbii.org

National Science Foundation
http://www.nsf.gov/

NatureServe
http://www.natureserve.org/explorer/

Taxonomic Databases Working Group (TDWG)
http://www.tdwg.org/

U.S. Fish and Wildlife Service (FWS) Focal Species
http://focalbirds.nbii.gov

U.S. Node of the Worldwide GBIF network = NBII
http://gbif.nbii.gov

## *Powerpoint Presentation*

The following presentation was given by Shelaine Hetrick, IIa/NBII-SAIN, and Terri Killeffer, IIa, at the beginning of the workshop (on 04 December, 2006) reminding participants of the goals of the workshop as well as providing an overview of the pre-conference survey results.

# Biodiversity Data Interaction for an Alliance of ATBIs

Shelaine Curd-Hetrick
Terri Killeffer
Information International Associates (IIa)

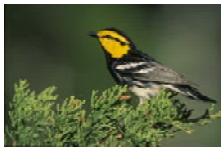
## Welcome

- Announcements
- ATBI Alliance
- Survey Summary
- Agenda
- Logo Nominations

Aquatic biologist releases a threatened goldline darter back into its natural habitat (*Percina aurolineata*).

## ATBI Alliance

- Brief History
- Data Workshop
- More details at DLIA Meeting



Golden-Cheeked Warbler (*Dendroica chrysoparia*)

## Summary of Survey Results

- Copy of results in your packet
- Highlights presented here
- Results are beneficial to the workshop
- Please look over

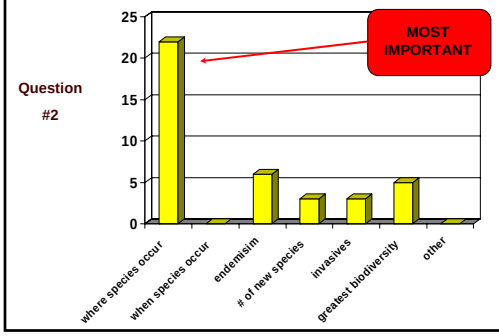
## 40 Responders

- **1 Arizona**
- **2 Arkansas**
- **1 District of Columbia**
- **1 Florida**
- **1 Kansas**
- **2 Kentucky**
- **1 Maine**
- **1 Michigan**
- **1 Montana**
- **2 North Carolina**
- **2 New York**
- **1 Ohio**
- **1 South Carolina**
- **18 Tennessee**
- **4 Texas**
- **1 Washington**

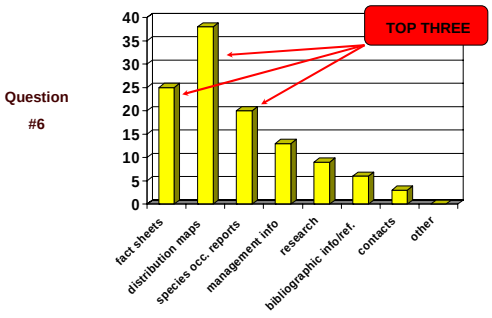
## Three Main Sections

- ATBI Alliance database
- ATBI and ATBI Alliance support
- Your database

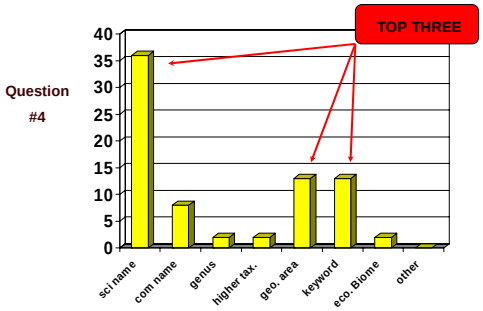
## The Most Important Question for an ATBI Alliance Database to Answer



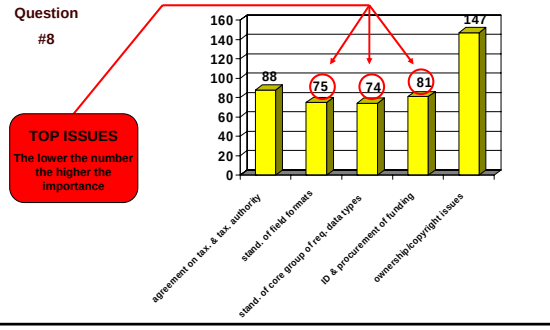

## Top Three Database System Search Results



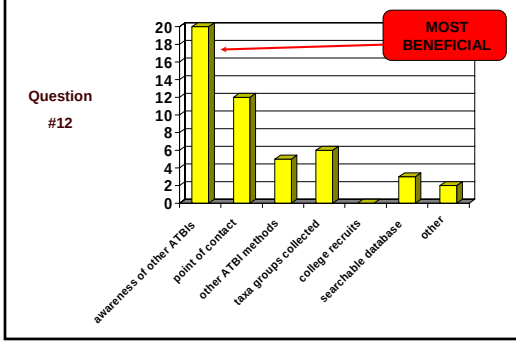

## Top Three Database Search Criteria




## Issues Ranked in Order of Importance to the Future Development of an ATBI Alliance Database




## Most Beneficial Functionality for an ATBI Alliance Web Page




## "Do You See Producing Reports and Engaging in Public Awareness as a Role of the ATBI Alliance?" (Question#11)

**All responders said "YES" to this question!**

## Three Main Sections

- ATBI Alliance database
- ATBI and ATBI Alliance support
- Your database

## Participation & Support

- 24 are willing to assist with the development and testing of the database (Question #15)
- 15 are willing to provide bi-annual information updates to database (Question #16)
- 19 are willing to provide update text to website (Question #16)
- 3 are willing to provide funding for webmaster and staff (Question #16)

## Reports, Public Awareness, and Education

- 29 producing reports and/or engaging in public awareness (Question #17)
- By (listed in order of primary to least) (Question #18)
  - Webpage
  - Seminars
  - Other (see survey results)
  - Fact Sheets
  - Maps
- 24 have a focused educational component (Question #20)

## Three Main Sections

- ATBI Alliance database
- ATBI and ATBI Alliance support
- Your database

## What is in Your Database?

- Cover a broad range of taxa (Question #21)
- Cover a broad range of information types (Question #22)

## Storing Information

- 17 are using Microsoft Access to store their data (Question #24)
- 17 have standardized pick lists for data entry (Question #26)
- 13 have written field protocols (Question #29)
- 20 confirm specimens by taxonomic authorities (Question #31)
- 20 track specimens with vouchers (Question #32)

## GIS

- 11 have their data stored or used in a GIS system (Question #33)
- 20 use UTM as their location coordinates (Question #34)
  - 9 use Lat/Long
  - 7 use Decimal Lat/Long

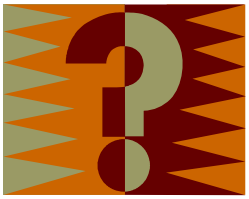
## Agenda

Collecting mussels

Session topics:

- Purposes of Data Sharing
- Data Sharing Issues
- Data Collection, Management, and Dissemination
- GIS Collaboration Issues and Examples
- Database System and Web Interface
- Education Components
- Stewardship

## Questions?



## First Session

Purposes of Data Sharing

Biologist weighing a bear

## Ground Rules



PLAY NICE
BE FAIR
LISTEN
COMPROMISE
RELAX