

All Taxa Biodiversity Inventory User Requirements Assessment

Elizabeth Nance, NPS Contractor
Draft Submitted March 18, 2009
Final Submitted August 29, 2009

1.0 Background

The National Park Service (NPS) acquires large quantities of information about plant and animal species via observations and specimen vouchers from various types of park biological inventory projects. Two types of projects in particular, the All Taxa Biodiversity Inventory (ATBI) and “bioblitzes,” provide an opportunity for the NPS to document biodiversity in park units, and to incorporate this knowledge into management planning and actions. Understanding biotic resources – what, when and where they are in parks - is an essential component of the basic conservation mission of the NPS, especially in times of climate change.

An ATBI, as the name implies, is an inventory of all the biological organisms within a specific geographic area, with the implication that basic research is devoted to the collection, identification, description and documentation of information on each and every species encountered.

The term is thought to have been coined by Dr. Daniel Janzen in the late 1980s, as part of his attempts to run the first ever ATBI in the tropical rain forest of Costa Rica’s Guanacaste Conservation Area. Janzen attributed to an ATBI the characteristics that provide the basic framework for conducting one: finite; large money (\$20-\$30 million dollar budget); a large area (50,000 to 200,000 ha); high biodiversity at the level of species, higher taxa, habitats and ecosystems; overlap among habitats and ecosystems; a short time frame (e.g. five years); conducted to meet the needs of users throughout society; part of a world-level network of various kinds of biodiversity inventory and monitoring actions; very heavy national participation at all levels; and sufficient knowledge of the products and formats coming from the effort.

In contrast, a bioblitz is generally a rapid, often 24-hour inventory of all living organisms within a given area. The 24-hour time frame is needed to account for species that are diurnal and nocturnal. Bioblitzes can be based on observations alone or they can include a specimen collection component, or both. However, they are generally not focused on the more minute taxa (e.g., parasites of bird species or soil nematode species) that would be collected through a comprehensive ATBI. Bioblitzes usually incorporate the two goals of establishing the general biodiversity of a given area in a short time frame, and

incorporating a citizen outreach or education component that helps popularize science. The term “bioblitz” is thought to have originated by NPS naturalist Susan Rudy in the mid-1990s.

The NPS is currently in the process of defining these terms for use by parks, and in a draft national strategy discussion paper, the phrase ‘biodiversity stewardship’ is being considered for both ATBI and bioblitz efforts. For the purposes of this report, both ATBI and bioblitz terms will be used, with the understanding that they are very different efforts.

Information management is an essential component to both ATBIs and bioblitzes. Data that are collected from these efforts must be standardized, error-checked, and entered into electronic data bases; associated specimens, photographs, and field notes must be curated. Information must then be made readily available on an ongoing basis to those who need it.

The NPS Natural Resource Program Center (NRPC) in Ft. Collins, Colorado, is currently in the process of restructuring its enterprise applications to streamline the management of natural resource information within the NPS. The NRPC is following a service-oriented architecture (SOA) approach, which emphasizes the development of flexible and reusable services for identified business needs.

The purpose of this project was to identify the data-related requirements of those parks conducting or planning ATBI or bioblitz efforts, to highlight the associated data management challenges and opportunities, and to identify the inherent functions that would need to be addressed in a data system that manages ATBI or bioblitz information.

2.0 Methods

At the start of the project (October, 2008) a scope of work was written to capture data components that corresponded to basic user requirements for an ATBI or bioblitz data management system. The following items were considered to be in scope for the purposes of this project:

- Basic searching and reporting requirements, e.g.:
 - Species counts
 - Species lists
- Data attribute requirements, e.g.:
 - Vouchers
 - Observations
 - Taxonomy
 - Information pertaining to data collectors; their
 - Expertise
 - Credentials
 - Affiliations
- Quality control (QC) requirements, e.g.:

- Data lifecycle states (e.g., draft, final)
 - Controlled domains and pick lists
- Geospatial requirements, e.g.:
 - Points, lines or polygon delineation
 - Accuracy
 - Resolution
 - Coordinates
- Project data requirements, e.g.:
 - Start and end dates
 - PI and Subject Matter Experts
 - Protocols
- Product data requirements, e.g.:
 - Related documents
 - Resulting publications
 - Information dissemination

Conversely, the following items, while integral to conducting an ATBI or bioblitz, were not considered to be in scope for the purposes of this project:

- Project Management
- Protocol Development
- Curation
- Planning
 - Defining cooperators
 - Publicity
 - Permitting
 - Logistics (e.g. Law Enforcement)
 - Defining taxonomic experts
 - Social science goals
 - Setting targets
 - Taxonomic targets (by Order, Family, group, etc.)
 - Geographic targets (a stream, a pond, a forest, the park, etc.)
- Project Closeout
 - Producing publications
 - Producing lessons learned
 - Identifying data gaps
 - Producing social science evaluation
- Analysis
 - Species area curves
 - Diversity indices
 - Metrics
 - Labor metrics
- Producing Deliverables

After the scope of work was vetted and revised, a review of the existing materials available on the topic of park bioblitzes and ATBIs was initiated, as well as a review of workshop results and meetings. This included documents such as:

- The draft data implementation plan for a proposed nationwide ATBI project;
- The 2006 workshop proceedings: 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;
- Creating environmental stewardship through discovery: ATBIs in national parks. Centennial Initiative program criteria – PMIS project #136557C;
- The science plan for the all taxa biodiversity inventory in Great Smoky Mountains National Park, North Carolina and Tennessee (2000);
- ATBI user needs workshop notes (May 2008); and
- Creating environmental stewardship through discovery: ATBIs in national parks. 2008 national meeting to develop a strategic ATBI/Bioblitz plan.

In addition, a review was done on a number of biodiversity databases in an attempt to understand the variety and complexity of applications currently being used by the NPS. This included the interim NPS ATBI database, the Acadia bioblitz database, the database developed by the Santa Monica Mountains National Park for their 2008 National Geographic bioblitz, and the Discover Life in America, ATBI database at Great Smoky Mountains National Park.

The focus of this project involved interviewing parks that had received FY2008 Centennial Challenge monies in order to develop bioblitz or ATBI programs. These parks were:

- Yellowstone National Park
- Yosemite National Park
- Big Thicket National Preserve
- Point Reyes National Seashore
- Santa Monica Mountains National Recreation Area
- Acadia National Park
- Death Valley National Park
- Channel Islands National Park
- Boston Harbor Islands National Recreation Area

Interviews targeted those park personnel typically responsible for emerging biodiversity efforts; for example, chiefs of resource management, stewardship managers, partnership liaisons, park science coordinators and resource specialists. Interviews were also conducted with members of park Inventory and Monitoring programs, research learning center directors and education specialists, park and university scientists, together with a few parks starting up or currently engaged in park biodiversity efforts, but not receiving Centennial Challenge funding.

Interview questions were developed after reviewing the documents and databases mentioned above (see Appendix A.). Stakeholder groups and representatives for each group were then identified and one-on-one telephone interviews were conducted to clarify user requirements and associated data issues.

Interview notes were transcribed (Appendix B) and then distilled into a functional data matrix (Appendix C) in order to easily view common problems, concerns or obstacles.

Other biodiversity-related components of the project included attendance at the Discover Life in America (DLIA) ATBI conference, December 3-5, 2008 in Gatlinburg, Tennessee, presenting information on the NPS interim ATBI database, and soliciting input for the upcoming interviews. A SharePoint collaborative workspace was also established for document sharing and collaboration. .

3.0 Findings and Discussion

3.1 Initial Challenges

This project presented many initial challenges and problems that grew in scope and size over its five-month duration. The original scope of work, presented in the project's data implementation plan, was to conduct a requirements analysis to identify the inherent ATBI functions that need to be addressed in the Integration of Resource Management Applications (IRMA) project which was to include detailed functional needs and ATBI use cases.

Use cases are defined as descriptions of a system's behavior as it responds to a request that originates from outside of that system, capturing the functional requirements of the system. Use case development is now the standard operating procedure for the business architecture for all natural resource (and other) systems being developed as part of the IRMA project at the Natural Resource Program Center in Ft. Collins.

However, as the project progressed, formal use case development was deemed premature since their development depends on a relatively focused business process being in place. The current biodiversity efforts across the NPS are varied and dispersed, with a broad range of targeted taxonomic groups, approaches, processes, and capabilities. While many basic features and functions could be identified among users, it was not yet practical to translate these functions into specific requirements for system behavior.

3.2 Range of Variability in Park Efforts

There was a wide range of variability among parks currently conducting biodiversity projects. Parks were engaged in efforts ranging from the large ATBI underway at Great Smoky Mountains National Park, now in its tenth year, to a newly-initiated (2007) smaller-scale ATBI at Big Thicket National Preserve, to single or annually repeated bioblitz efforts, to resource inventories conducted throughout the NPS system by park natural resources divisions.

Those parks conducting what is defined above as an ATBI are generally more successful in their efforts in that they are affiliated with a non-profit organization that coordinates the inventory and provides the infrastructure for the program. Two examples of this are Discover Life in America (DLIA), which spearheads the ATBI for Great Smoky Mountains National Park; and the Big Thicket Association (BTA), which runs the ATBI for Big Thicket National Preserve. As park partners, these organizations have the capability of providing the park with a suite of tools, expertise, and programs, including things such as:

- the capability to provide a sound volunteer base, typically the “citizen scientist” component of a biodiversity project;
- an education component for both students and educators, providing workshops, activities and lessons;
- a grant program to support scientists and taxonomists working on the ATBI;
- an events program to engage community members;
- a board of directors to oversee and direct the ATBI;
- staff members to run daily operations;
- office and laboratory space;
- a science advisory panel which approves the scientific plan underpinning the ATBI;
- data management expertise and a well-thought-out database.

While all of these tools and programs work in concert to move the goals and objectives of the individual ATBIs forward, the data management component is probably the single most important aspect in terms of preserving data for long term use. Both the GRSM and BITH ATBIs dedicated substantial funding towards the development of desktop and web-based databases for use by the park and cooperators. Both databases have the ability to record specimen collection information including taxonomic identifications, location data, and collection/collector information. The GRSM database also has mapping and modeling functionality.

One scientist interviewed summed up the use of non-profit partners this way, “What they’ve (DLIA) done at GRSM has been incredible and it’s sad that the NPS can’t seem to take that model and nationalize it.”

On the other end of the spectrum are the biodiversity projects generally being conducted through the resource management divisions at parks. These are typically the bioblitz-type activities, or are efforts to fill in inventory gaps left from the NPS Inventory and Monitoring programs, generally run by a principal investigator (PI) through the parks’ Research Permitting and Reporting System (RPRS). When new biodiversity efforts are started that involve a park and an outside entity, data management is usually overlooked. Protocols are not standardized that define the flow of data from initial collection through to archiving or curation and it can be unclear which responsibilities belong to whom. Valuable information therefore runs the highest risk of being misrepresented, misused or lost when projects are undertaken without regard to data management.

As a result of interviews, similar scenarios emerged related to projects with little or no data management planning:

- data were kept in Excel spreadsheets, Word files or in hard-copy reports, housed internally in the park resource management division;
- individual PIs were expected to be responsible for all data management;
- data were bottlenecked because PIs were behind on taxonomy;
- data resided with the lead scientist who conducted the bioblitz, and the park was unable to get data back;
- none of the researchers liked or used the database built for a bioblitz event;
- the park found that they were not receiving data back from their researchers;
- the data were entered into whatever database was used by the science coordinator at their university;
- preferring not to use a database, field crews were provided formatted field data sheets; not all datasheets were returned, but those that were, were compiled into an Excel spreadsheet and were kept in resource management files;
- individual researchers managed their own data; data were not merged or managed centrally;
- summary reports were submitted through the RPRS system, although spreadsheets or databases were not submitted or provided;
- for a Centennial Challenge project, the park hoped that their partner would recommend an appropriate data repository, and hoped it would be compatible with any NPS systems.

Parks have been continuing to conduct biodiversity programs even as a national effort has been trying to gain legs, momentum and direction. A well planned biodiversity program with a coherent strategy has not received a great deal of effort at the national level, in spite of attempts to bring to light the many challenges and opportunities such a program represents. Currently, the direction that the national ATBI effort seems to be headed in is one of individual park efforts based on opportunistic funding.

3.3 Taxonomic Challenges

A common theme that emerged throughout the interviews was, “to be able to protect our park resources, we need to know what those resources are.” Documented species lists are the first step towards species protection, and that implies taxonomy: what do we call those biological entities discovered on park lands?

The success of any biodiversity project will ultimately come down to the taxonomic knowledge and life-form identification skills of the persons involved in the park effort. Parks need accurate information to be able understand the similarities and differences among groups of organisms; it is *the* foundation for understanding all other biological aspects of an ecosystem in order to manage parks most effectively.

At the present time, taxonomic expertise on the various park biodiversity projects is widely varied, from high level expertise obtained through university systematics

departments, to preserved specimens sitting on desktops gathering dust, for lack of any type of available expertise.

There is a recognized national and even global shortage of taxonomic experts available to undertake specimen identifications, even on those projects such as the ATBI being run at Great Smoky Mountains NP, which has established TWIGs (Taxonomic Working Groups) to support its efforts. TWIGs are generally composed of scientists from colleges and universities, who focus on the identification of a specific order of insects (e.g., Coleoptera (beetles), Diptera (flies), etc. They can also be combined into larger groups such as those working on lichens or aquatic insects. Smaller park efforts, especially those running the more socially-oriented bioblitz activities, often have no clear strategy for specimen identifications, which results in information losses. As time elapses after a bioblitz event, there is less and less likelihood that specimens will be identified and properly curated.

Other stumbling blocks emerging from the interviews were:

- It can take from two to three years for a single collection to be identified and data returned, if they are returned at all;
- During a blitz event, some insect groups can only be identified to the family level; those specimens have been taken away from the park for further identification work, or have been relayed to third and fourth party taxonomists without the knowledge of park resource management;
- Obtaining taxonomic experts is typically done through personal contacts and knowledge;
- Taxonomic experts, who are largely brought in with no remuneration, expect to keep a portion of the collected specimens (in lieu of payment) for their personal collections;
- When working with volunteer taxonomists, there is a problem with setting distinct timelines for specimen return. The more leeway that is given to those volunteering their time, the more leeway they will take in terms of returning specimens and/or data;
- There can be many hundreds or thousands of specimens collected from passive trapping events. Depending on the staff available to sort for the target group(s), the remainder is preserved in alcohol as stored specimens often not sorted beyond the level of Order (bees, beetles, flies, etc.). Specimens preserved in bottles can take up many linear yards of storage space, often with no plan for further curatorial or taxonomic work.

In general, those parks that had successes with taxonomic experts outside of the TWIG realm were able to provide taxonomists with at least a small honorarium for their efforts.

3.4 Curatorial Challenges

The proper curation of the vast amounts of biological specimens resulting from park biodiversity programs, together with maintaining them in the proper storage environment and ensuring accessibility in perpetuity, will continue to be a major challenge for the

NPS. Many parks lack the facilities and curatorial staff needed to tackle this problem, and as a result, they are trying to collaborate with museums and universities to preserve and house park collections. However, because of the strict ownership and compliance issues associated with the current NPS policy on biological collections, parks are finding that even this route may not be viable. As a result, collections are at risk of being improperly curated or totally unmanaged due to lack of direction on this issue.

For example, one park interviewed had herbarium specimens on-site that were traditionally housed at a nearby university 20 miles from the park. Because of the ownership and tracking issues associated with their curation, the university decided to break its agreement with the park and return of all the specimens to the park. Because the park has neither the facilities nor the staff to curate this large volume of returned specimens, it is trying to find another university to house and maintain the park collection. The resource manager interviewed was frustrated that the collection would likely be located far from the park in a different state, making it extremely difficult for park staff or others to use the collection as often as needed.

The NPS has the added challenge that many of the parks' collections are culturally based, and curators are forced to deal with natural history collections that are outside their expertise. Another common theme coming from the interviews was that many parks have assigned the large responsibility of curating specimens resulting from biodiversity efforts as collateral duties for staff members. One park spoke of its concern that once its small, initial collection efforts on invertebrates were completed, there would be tens of thousands of specimens added to the (growing) collection, and the annual cycle of ANCS+ reporting would become unmanageable. There was no solid plan in place to deal with the upcoming curatorial challenges, nor a trained curator in place to do the work.

Park curators are often not kept informed of biodiversity programs that intend to collect specimens. One park mentioned that even though there was a full-time curator at a park that had planned a bioblitz, the curator wasn't involved in any of the planning prior to the event, and only brought in afterwards, when accessioning and cataloging were already mired in difficulties.

3.5 Citizen Science vs. "Real" Science

Some parks expressed concern over the difficulty in trying to blend a scientifically sound data collecting event with an outreach event geared towards the use of citizen scientists. One park summed it up in this way: "The I&M program hasn't been interested in volunteer efforts, largely because of their science-based approach. Volunteer help in the parks is huge; it provides the education component to many programs and is often the only way in which parks can obtain the manpower needed to complete inventory projects."

Another park commented that while their resource management division is growing, they lack the manpower and funding to hire staff to do all the projects they would like to do. Therefore, there has been a push to engage the public and to have persons volunteer to

help out with various projects. Developing a citizen science program would allow the park to have free assistance to address some park goals for management, and at the same time allow the park to engage and educate the public.

In general, parks that are in the process of conducting an ATBI found that bioblitzes are not a major data component of the ATBI; they are done more for outreach and education purposes. Other parks were resistant to the idea of bioblitzes in general, or the use of citizen scientists:

“I don’t see much value in a 24-hour collecting type event – we would rather downplay that and focus on science.”

“A 24-hour ‘free for all’ bioblitz is not the appropriate manner in which to proceed - there is too much going on, and too much data to be lost.”

“We do not see much value in a 24-hour effort geared towards “collecting things” so we are not really interested in adopting this type of activity. We really don’t want to conduct bioblitzes and prefer to leave collecting and scientific rigor up to the scientists.”

One park expressed the opinion that it didn’t view bioblitzing as a data collecting exercise; that data would be a secondary or even opportunistic goal. Their goals were more in the outreach realm; to engage the public and to get their own park staff interested and excited about biodiversity.

Hiring a science coordinator for a bioblitz was mentioned by several parks as a means of solving some of these problems such as making sure the science is robust, making sure there are specific protocols followed, and most importantly, to be able to follow up with specimen identifications. Also, this puts the responsibility in the hands of someone outside of the park, who is in the research/science community, and who can take the lead on recruiting and confirming the scientific participants. This way, tasks for the two components – public outreach/logistics and science coordination - are split in half. Parks that had more (data) successes with their bioblitz efforts typically engaged the services of an outside partner to run the event, paying them a modest amount of money. Another successful strategy mentioned was to embrace local schools and faculty at small, local colleges and to pay them a small honorarium

3.6 NPSpecies and the I&M Program: Do Park Biodiversity Efforts Fit Here?

The topic of appropriate use of the NPSpecies database in relation to park biodiversity projects brought about lengthy discussion in most interviews conducted. NPSpecies was originally touted as being the NPS’s biodiversity database, and would be a logical receptacle for data coming from park biodiversity projects. And while it was built to accommodate invertebrate and non-vascular plant data, the distinction between NPSpecies and the interim NPS ATBI database (or other ATBI databases currently in use by parks), is that NPSpecies, in its current form, was not designed to be a collections-

based database; rather, it is essentially a database that documents park species presence/absence via associated evidence records (references, vouchers, observations).

When the NPSpecies portion of the Inventory and Monitoring program was initiated, the thought was to collect data across all taxonomic categories, but with the realization that it was unrealistic to inventory every taxonomic group at the outset. Because data from the vascular plant and vertebrate animal groups were of specific interest to parks, these groups were chosen for focused inventories. Information on the remaining taxonomic categories has been gathered largely through individual park efforts, without the benefit of a structured data management process. These data are at the highest risk of being unmanaged or lost.

Most of the park comments associated with the NPSpecies database pinpointed the frustrations parks are having in trying to understand where or if their biodiversity programs could fit into NPSpecies:

“NPSpecies is just a fun fact numbers type of thing. I need to be able to put things in some form that species lists and studies and references and data can all be interrelated. And I don’t think it’s universal (across the NPS) that people are using these (I&M) databases to hold any of that information.”

“My expectation is that data will go into NPSpecies to keep that current. However, I don’t really see that the NPSpecies program is serving much of a need for our all-taxa database needs.”

“It would be great if we could send our database in its existing format to Ft. Collins and have them populate NPSpecies – we don’t have the staff to do this.”

“As I understand things, NPSpecies, as it is currently constructed, is not going to serve our full wish list of needs, so it may not be the appropriate database to capture everything we would be looking for. More broadly, it would be really useful for me as a park manager to be able to go to one portal and find out about biodiversity in the park. Right now, there’s a database that’s been developed and used for our ATBI project, but if you were to contact our I&M program, they wouldn’t have any idea about how to get to those data.”

“You can say we have this many species in the database, but it’s limited information about limited groups of organisms, and we don’t have the important data we need, like, where species are geographically located, their frequency, what time of day do we see them, etc. – not information that scientists and researchers need who are working on these organisms – these lists are just that – they’re lists!”

“I haven’t thought a lot about it – I maybe assumed we would put data there, but then, it’s only focused on vascular plants and invertebrates.”

“I don’t really know whether NPSpecies is the appropriate place or not for invertebrate and non-vascular plant data. I would say there is a vast backlog of known information about these groups at our park, so it would be a pretty big undertaking to say we would want to put everything in there.”

“We would definitely like the data to go into NPSpecies, NatureBib, etc. I think this is important given the fact that I will be moving on from this park, and the NPSpecies database will be the tool that [those who replace me] can go to, to get lists, etc.”

“For the data from our bioblitz – to be honest, it’s probably not enough for me to get the information into NPSpecies. I need, for example, taxonomic serial numbers (TSNs), so I would have to match up names – I think this is a really big mess.”

“I’m not sure if we will put our ATBI data in NPSpecies. I would like our ATBI database as being the tally when questions are asked of it, so we’re going to focus our efforts on that database and make it as whole as we can. Putting aside my own frustrations with what NPSpecies has been able to do so far, I’m just going to make the assumption that it is not going away, and that if we are collecting data that is part of the inventory of the park, we should find a way to get it into the NPSpecies database. But I’m not terribly interested in using NPSpecies as it currently exists, as a tool for querying our data.”

“NPSpecies has been, is a lot more problematic in terms of taxonomy, especially for the groups we have worked with in our blitz efforts. We did not/were not thinking ahead on whether we wanted to enter our data into that database – all I can say is that we haven’t considered that to this point. So yes, while it would be desirable, we haven’t done anything about it.”

“Given the current status of I&M databases, NPSpecies is one place where we can merge the various inventories through our I&M program, and our ATBI. To me, that’s a simple step we should take; whether we want to do more, is a separate question, but yes, absolutely, we should bring the data into NPSpecies.”

“Yes, we are interested in putting our data into NPSpecies; I think that the NPS has picked NPSpecies, and I think the more we can get on board with that, the better.”

“We are absolutely interested in putting our ATBI data into NPSpecies; but I’m kind of depending on Ft. Collins to be able to issue some type of temporary TSN numbers, even though they may never turn into permanent TSNs as far as ITIS is concerned, but at least, it will be in the database and associated with the park.”

The Natural Resource Program Center, and the Inventory and Monitoring Program are very interested in seeing that the integrity of these data are maintained and that collections are properly curated. Parks seem to be questioning why their I&M programs have moved away from further efforts to inventory the full suite of biological organisms in the parks, especially after the success they’ve had with vertebrates and vascular plants.

Where parks have developed their own databases for use in park ATBI programs, there is no cross-pollination between those databases and those developed for the I&M program. Furthermore, parks have no well-thought-out plans for developing future inventories in tandem with their I&M networks; rather, their ATBI/bioblitz efforts are island projects each developed in its own way.

One interviewee summed up it up thusly: “We are hopeful that work will continue with our I&M program, but right now, there is no vision on how to accomplish this.” Another stated that for a biodiversity program to be a component of the IRMA project is “a waste of time and effort,” since the park views NPSpecies as the *one* place to go to get species lists, vouchers and observations. He thought people (users) will get confused as to where to go to get information. “I think the last thing we need is another place to go look for the same data; that parks are frustrated enough,” and wondered why NPS had to keep coming out with new applications that are bigger and better, when parks haven’t even been using the old (I&M) ones.

3.7 ANCS+ and the RPRS Databases

The ANCS+ (Automated National Collection System) and RPRS (Research Permit and Reporting System) databases play an integral part in biodiversity studies. All collections made from NPS lands are mandated to be catalogued in the national ANCS+ database. As with curatorial responsibilities, ANCS+ is often handled by cultural resources personnel as collateral duties. The RPRS database tracks the activities and results from research conducted on park lands. Some parks require RPRS records to be created for all projects (including those conducted by park staff); others use RPRS to track non-NPS research work.

Of the nine Centennial Challenge parks interviewed, only one park had entered data from their biodiversity program into the ANCS+ database. When asked how parks envision this happening, one park indicated that they are “blindly assuming” that the data entered into their ATBI database will be “exportable in some format that can be brought into ANCS+”.

“Our curator has complained that when researchers with permits come and hand in their IAR (Investigator Annual Report) reports, they often hand it in, or email it in, but it never comes with any data – where the specimens they collected are located, copies of their field notes, etc. – there is no enforcement for data.”

An outside scientist, frustrated with doing projects in cooperation with the NPS, stated that they were concerned that when scientists go through the standard research permitting system, and then their data gets put into ANCS+, that it “in essence gets lost in the system and nobody has access to it.”

Another common theme from interviews was that data from projects done via the RPRS system are not managed centrally at the park; rather, they are managed by the researchers who collect the information. At best, the park can hope to receive an IAR, but rarely do

they receive spreadsheets or databases containing the actual data from an RPRS project. “In the past, if one of those reports had to do with vertebrates or vascular plants, the I&M program would have potentially gathered up that information to populate NPSpecies and/or NatureBib, but in projects involving invertebrates or non-vascular plants, there is simply a body of reports and publications, with no data follow through or accountability.”

There are many small and dispersed biodiversity-related projects being conducted through the RPRS system, and parks are getting data, or at least reports, but they don’t know what to do with them; they don’t know how to make the efforts more cohesive, and don’t know how to ‘get information into one place.’

One park stated that the RPRS system is the only thing parks have which lists the many research projects that are going on at a park, but other than having that system, “no one really has a clue what is going on in the parks.”

3.8 The NPS Interim ATBI Database

With the exception of one park that had not begun its efforts, none of the Centennial Challenge parks interviewed used the NPS Interim ATBI database; a database that was developed as an option for their park biodiversity efforts.

A few parks, and particularly those who attended the May 2008 User Needs Workshop in Fort Collins prior to the development of the interim database, mentioned that the goal of the database was to ‘pull together something for people who were starting up a biodiversity program, and who didn’t have alternate sources for storing their data.’ All parks interviewed did have alternative sources for storing their data, though it was not clear to them whether or not they were ultimately supposed to populate the interim database in addition to their own data storage methods.

One common thread in discussions was that databases in general tend to be too complicated for a 24-hour period of use; that the onus during a bioblitz is not necessarily on the data collected, but on doing the actual collecting or observations, and that data ‘seems to happen after the fact.’ One resource manager responsible for a bioblitz stated that “people don’t want to be bothered with entering data during an event; they want to spend as much time as possible in the field, collecting the data. There is a practicality side (data entry needs) and a deliverable side (what the NPS needs) that needs to find a happy medium.”

Across the NPS and independent of Centennial Challenge parks, only one park had beta-tested the interim database. For that effort, the parks’ I&M data manager spent approximately six hours previewing and testing the database prior to the parks’ bioblitz. Comments received back on this effort were:

“We attempted to use the ATBI interim database during our bioblitz, but it wasn’t easy to do that on the spot; it was a difficult database to use and has a steep

learning curve. There were mandatory fields that had to be filled in prior to adding data, and this did not allow flexibility during our event.”

3.9 Park Uses for Biodiversity Data

Parks were mixed when it came to the topic of the potential uses for data coming out of biodiversity programs. When resource managers thought that the data could be useful, it was for topics such as understanding climate change, helping to direct restoration efforts, or to simply maintain park species lists. Conversely, some resource managers had no clear cut understanding of the usefulness of biodiversity data:

“We haven’t used the data to make management decisions. Data are suspect, since it’s just a snapshot in time, it’s limited data with no statistics involved.”

“There’s a lot of inventory information we don’t know what to do with – it’s interesting, but what do we *do* with it? It doesn’t affect how we manage our park, or, we don’t know how it *should* affect our management.”

“Bioblitzes have been a great way for us to engage our public, but how valuable this information is to the long term management of the park, I am not sure I can speak to that.”

One park resource manager stated, “Can you really tell me how knowing that this insect that was found over there on this date, at this site, is really going to influence a resource management decision?” When queried as to what benefit he saw in the program, he felt that the value of this type of work was getting community members and staff involved in the concept of biodiversity, as well as having a programmatic component with scientific value.

4. Recommendations

The product of a park biological inventory, regardless of scope or size, is data. In the process of interviewing park staff and participants in ATBI and bioblitz efforts, it is apparent that data resulting from these efforts are frequently lost, poorly managed, poorly documented, stored in formats that prevent sharing, or otherwise not fully usable. If these inventory efforts are to continue, it is imperative that guidelines be established and tools created that provide parks and their partners the ability to properly steward biodiversity data.

A park considering a biodiversity inventory project is immediately confronted with multiple questions and decisions. Examples of project range include:

- Project scope can range from a limited to a broad geographic area, and can encompass a narrow taxonomic group or all biota encountered
- Project time frames can range from 24 hours, to multiple years or decades

- Project participants can range from renowned taxonomic experts, to experienced biologists, to citizen scientists to school children
- Project intent can range from a simple public-relations event, to serious scientific inquiry

Because of this range of variables, a one-sized data management solution will not work. Instead, a range of data management options can be determined, ranging from basic project documentation, to a complex and sustained ATBI. An inventory project manager could select the option that best corresponds to the data needs and park capacity. What follows are three proposed options, each of which has specific tie-ins with the Natural Resource Program Center's IRMA project and its associated NPS Natural Resource Information Portal (NRInfo – <http://nrinfo.nps.gov>)

4.1 Data Management Options

Three general information levels can be identified for biodiversity inventory projects:

Level 1: corresponds to a one-time or infrequent bioblitz event, typically involving citizen scientists and with an emphasis on community involvement first and scientific rigor second. Most collections would be considered to be “destroyed in analysis” and would not receive long-term curation, although some records may be exceptions. Some type of data management structure is developed; for example, a spreadsheet, a simple data base, field data sheets, or other types of tools easily used or maintained by an average user.

Data management recommendations for a Level One project would include:

Required

- documentation of the project in the NRInfo Portal
- uploading of any associated products (e.g., project report, summary data results, spreadsheets, species counts) to the portal
- entry of species status, observation or voucher records into NPSpecies if identification is confirmed and if the record represents a new species record or changes the status of a “probably present,” “unconfirmed,” or “historic” species status in NPSpecies.

Optional

- entry of other species taxonomic, observation or voucher records into NPSpecies (including records pending definitive identification)

Examples: National Geographic-sponsored bioblitzes; cooperative project with local school district.

Level 2: corresponds to more structured inventories that may be repeated, with an emphasis on scientific rigor first and community involvement second. Project can include trained or skilled volunteers. Taxonomic expertise is available for identification

of some or all collections. Many collections would be made with the intention of long-term management or curation. A structured, digital data management procedure is in place, such as the ATBI Database developed by the Natural Resource Program Center, or a customized application developed by the park or cooperators.

Data management recommendations for a Level Two project would include:

Required

- documentation of the project in the NRInfo Portal
- uploading of any associated products (e.g., project report, data tables, species summaries) to the portal
- entry of species status, observation or voucher records into NPSpecies if identification is confirmed and if the record represents a new species record or changes the status of a “probably present,” “unconfirmed,” or “historic” species status in NPSpecies.
- provision of voucher information to ANCS+

Optional

- entry of other species taxonomic, observation, or voucher records into NPSpecies (including records pending definitive identification)
- use of NRInfo Portal as primary data management system

Examples: inventories conducted by park resource management divisions, by Inventory & Monitoring Program networks, or via cooperative research projects; focused and repeated bioblitz events.

Level 3: corresponds to long-term or well-established ATBI projects that have multiple years of data, a high level of scientific oversight, direct involvement of taxonomic specialists, and existing data management procedures and tools in place. If citizen volunteers are used, they are well-qualified or work under the direct guidance of experts. Collections are made with the intention of long-term curation.

Data management recommendations for a Level Three project would include:

Required

- documentation of the project in the NRInfo Portal
- uploading of associated products (e.g., project report, species summaries) to the portal
- entry of species status, observation or voucher records into NPSpecies if identification is confirmed and if the record represents a new species record or changes the status of a “probably present,” “unconfirmed,” or “historic” species status in NPSpecies.
- provision of voucher information to ANCS+

Optional

- entry of other species taxonomic, observation, or voucher records into NPSpecies (including records pending definitive identification)
- use of NRInfo as primary data management system
- establishing direct linkages for data transfer from the primary biodiversity database to the NRInfo Portal.

Examples: Great Smokies ATBI; Big Thicket ATBI; Boston Harbor Islands ATBI

4.2 Explanation of Requirements

Establishing basic, easy-to-achieve baseline requirements is a first step towards greater collaboration and consistency in data management. In addition, these requirements are geared toward averting information loss and raise the level of awareness of ATBI and bioblitz efforts. Implementing these requirements, however, requires up-front planning, a commitment to data management throughout the project, and recognition that a project cannot be considered successful or complete unless the resulting data have been properly handled.

Documentation of the project in the NRInfo Portal: By 2010, users of the portal will have the ability to enter information about natural resource-related projects. Information will include the project name, project scope, key contact persons, and the ability to upload and link to related products such as reports, data sets, maps, or other media. Entering project information will provide at least base documentation on all inventory efforts and ensure they are not lost in the ensuing years.

Uploading of any associated products (e.g., project report, summary data results, species counts) to the portal: every inventory project, whether it's a bioblitz or long-term ATBI, produces some type of result. This may be as simple as an executive summary or briefing to a superintendent, to a more complex or rigorous analyses of data. As with documenting the project, uploading associated products ensures data remain discoverable and retrievable in the future.

Entry of species status, observation or voucher records into NPSpecies: if identification is confirmed, and if the record represents a new species record or confirmation of a "probably present," "unconfirmed," or "historic" species status in NPSpecies. While there is much confusion and uncertainty about the role of NPSpecies and ATBI efforts, it seems reasonable to expect that new park species records that are documented and confirmed should be entered into NPSpecies. The NRInfo Portal and the revised version of NPSpecies should make this process far easier. As with project documentation, this capability should be available to users in 2010.

4.3 NPS Natural Resource Information Portal

As the Natural Resource Information Portal (NRInfo – <http://nrinfo.nps.gov>) evolves, it will allow a comprehensive management of species observation and voucher records that,

in conjunction with other portal capabilities, will meet most of ATBI-related data management needs. Figure 1 illustrates the major components of the portal that specifically relate to ATBI-type projects. Once a project is documented, affiliated records can be entered or uploaded (such as documents, data sets, photos, observations, or vouchers). A standard list of NPS units ensures consistency, direct links to NPSpecies are maintained, and links to other data systems such as RPRS will be forthcoming. In addition, the portal provides a secure repository for long-term data storage, security, and access.

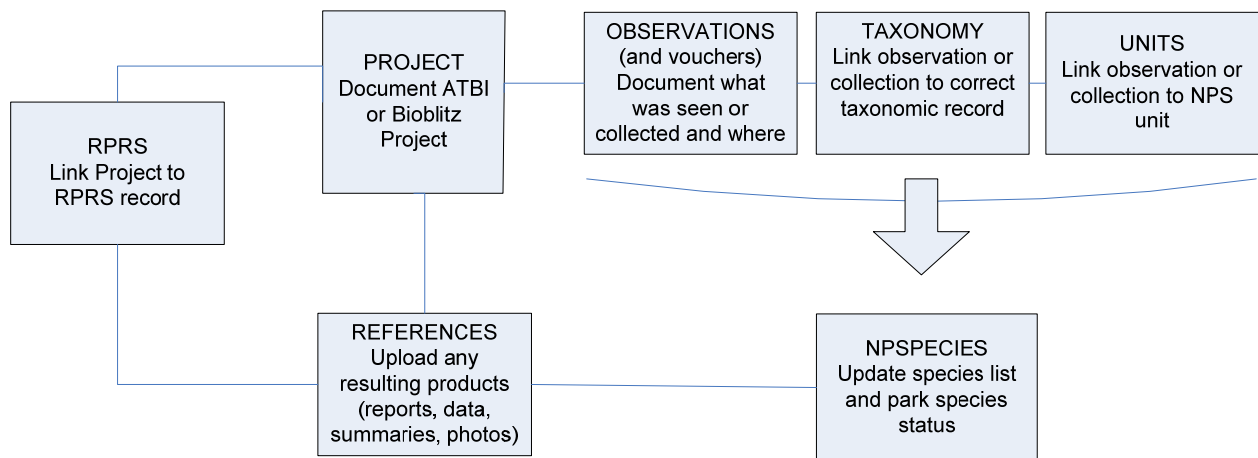


Figure 1. Components of the Natural Resource Information Portal that could accommodate ATBI or Bioblitz data.

Several areas identified by users as important are not, however, currently addressed in the near-term portal specifications. These are:

- Information pertaining to data collectors and subject-matter experts; in particular, expertise, credentials, and affiliations. This information can be incorporated into the observation and voucher components of the NRInfo Portal, although some information elements will not be maintained due to government restrictions related to the collection of personally-identifiable information (PII). As the observation and voucher services are developed, ATBI users will have a significant role in specifying their requirements.
- Geospatial requirements. Identifying and developing the geospatial components of the NRInfo Portal has not yet begun; however, the basic requirements identified by ATBI users are aligned with the requirements of all other users, i.e., the need to create spatial features (points, lines, or polygons), affiliate them with associated tabular records, and clearly capture and convey the accuracy and resolution of the spatial features. Again, ATBI users will have a significant role in specifying their geospatial requirements as these services are developed in the portal.

4.4 Data Sharing

The underlying framework of the portal, service-oriented architecture, is inherently designed for sharing data among multiple external systems. Incorporating ATBI data into the portal framework sets the stage for linking to other bureaus and agencies (e.g., USDA, BLM, USFWS, USGS), and organizations such as NatureServe or the Global Biodiversity Information Facility (GBIF).

GBIF, in particular, is a world-wide data portal that makes primary, scientific, biodiversity data (documented species occurrence data) from multiple sources openly available via the Internet. It does this by building an information infrastructure that interconnects hundreds of databases, and by promoting the digitization and sharing of data. It then uses online information retrieval services to search these databases, extracting data in a way similar to what Google does for web resources.

Biological specimens and observations collected from national parks represent a permanent record of the natural resources at a specific point in time, and provide important information about the natural history, biodiversity, and biogeography of the national park system. In order to gain a solid understanding of these resources, data need to be properly managed, cared for over the long term, and provided to scientists, resource managers and to the next generation of park managers, in such a way that they can be discovered and accessed, in order to help the NPS maintain its mission of preserving natural systems unimpaired for future generations.

Appendix A: Interview Questions

Bioblitz/ATBI Database User Needs

Vision

If it worked perfectly, what would this Bioblitz/ATBI system look like?

In describing this perfect system, you are allowed - and encouraged! - to brainstorm any and all criteria this perfect system could have in terms of its functionality: what data needs to be captured, how you want the data displayed, what reports are needed as outputs, how easy it is to use, etc. Every suggestion is fair game, from the big ticket possibilities such as whether or not a web-based interface would be helpful, down to the smaller ticket items like the ability for reports to be generated as an Excel spreadsheet or a .pdf file.

Interview Process

Focus on the WHAT, not the HOW.

- Try not to constrain yourself with wondering how the needs you are suggesting come into existence.
- Focus instead on what you need to conduct your daily business when working on the data and data management issues associated with a bioblitz.

Focus on YOUR needs, not other peoples' needs.

- This is a neutral forum to discuss ideas.
- Names of staff members giving input are not used in this analysis.

Interview Questions

General, Big Picture Questions

1. What are the goals of your blitz activity?
2. What do you call the effort at your park?
3. Is your I&M network involved in your park effort? Your RLC?
4. Is there a vision for future efforts at your park?
5. Who uses, or is planning to use, the data from your blitz efforts?
6. How do you think this information will be used long-term?

Data/Data Management Related Questions

7. How do you currently keep track of the data that resulted from your FY08 (or other) blitz efforts? Where is this information?
8. What types of information did you collect during your blitz?
9. Was there information that you wanted to collect, or thought about collecting, but were limited because of time, funding or other, as a means of satisfying the goals of your blitz effort?
10. How are data entered for your blitz project?
11. Please describe how the data work flow proceeded during your blitz activity. (i.e. from initial data acquisition through to project end or archiving).
12. How do you think data entry should proceed?
13. Is/was your effort collections- or observations-based, or a combination?
14. If collections-based, what are you doing with specimens? What problems are you having?
15. If collections-based, do you have an approach for how data will be entered into ANCS+?
16. Do you think blitz data should go into NPSpecies?
17. What is the quality of your blitz data like? Do you do any QA/QC to your data?
18. How do you use this information in the course of your work?
19. How do others in your office or workgroup use the data?

Appendix B: Interview Notes

Acadia National Park

ATBI/Bioblitz User Requirements Interview Questions

11 December 2008

Q: What are the goals of your blitz activity?

A: One goal is to learn about the animals (resources) that we don't know much about – things that haven't been well inventoried; more cryptic things. I fully realize that one 24 hour effort once a year on one taxonomic group is not as scientific as it could or should be. The basic goal is that we want to learn something about the resources we've got, we want to develop good partnerships with these organizations we have worked with, and provide some opportunities for public education, and manage that, and be able to handle it in a way that doesn't exceed our capability or capacities in the park. There are no dedicated staff to this, or any real money – it's all been done collaboratively – we don't want to expand it to the point where we'd be overwhelmed. Only one person is running and organizing these events and it's a collateral duty for him.

Q: What do you call the effort at your park?

A: A hybrid - somewhere between an ATBI and bioblitz.

Q: Is your I&M network involved in your park effort?

A: No.

Q: Your RLC?

A: It's run through the RLC. The one staff person (RLC coordinator) we have had in the past, left over a year ago. We consider this an activity sponsored by the RLC. Our RLC is for all of Acadia; it's a campus, a former military installation – that's where the events are held. The participants stay overnight on the RLC campus – they don't pay for housing, it is provided in exchange for their time. They are charged a small registration fee that is used for administration stuff and supplies. They also pay for their food – the food service is provided, there is a place where people can pay for meals. So people come and stay for the whole weekend.

Q: Is there a vision for future efforts at your park?

A: Adding another effort for next year, so there will be two efforts this next fiscal year. The vision would be, if there is money, we would like to expand it. More than one effort per year. Would also like to broaden the effort geographically – to the rest of the park. Would also like to look at seasonality in collections – so far, all the work is done in the summer. We can house and feed up to 150 people, so can't grow more than that. The effort is facility-driven in many respects. We are 5-6 hours from Boston, and 10 hours from NYC – the park gets 2-2.5 million visitors per year.

Q: Who uses, or is planning to use, the data from your blitz efforts?

A: The State of Maine Forest Service uses it – we have an Access database that we developed for these efforts – we populate, before the blitz, whatever data the state of Maine has, in regards to entomology. The Maine Forest Service keeps their own lists, and we pre-populate our database with their data. They in turn, get an updated, more refined version of our list, for their lists – new state records, etc. We haven't used the data to make management decisions. If we had to do an EA, we would probably look at these data, but I'm suspect about using it, since it's just a snapshot, it's limited data at best, with no statistics involved.

Q: How do you currently keep track of the data that resulted from your FY08 (or other) blitz efforts? Where is this information?

A: It's housed in our Access database within Resource Management – we don't currently have a data manager. Lists are exported to the Maine Forest Service.

Q: What types of information did you collect during your blitz?

A: All of our data are based around the concept of a lot number – a lot number is a unique number that is assigned to a group of specimens that are collected at a certain place, a certain time, in a certain way. As stuff is being collected around the park, people are putting a data card with the specimens into a Ziploc bag – when they come back into the lab, they are assigned a lot number to that unique group of animals. On that lot number, there is a site name that is arbitrarily given to it, with a UTM location. In addition to this, as stuff gets checked in with their lot number, then a date/time/site description is written, with the collection method, collector and comments – this is open ended for the user to fill out, like what host were the taxa found on. So the key information is the lot number, and how the specimens were collected. Everything is put in a general area, where then people who are sorting, grab that information, start sorting by the taxa they are looking for, and discarding everything else; the lot number stays with that remaining group. The

people that are doing the identifications, start their work – once the id is made, we have another form that is filled out with family, species, genera, who did the id, the lot number.

Q: So these guys are identifying things right there – they bring their keys, etc.?

A: Yes – we have keys, microscopes – and a lot of things are identified right there – can be up to 70-80% identified. In other cases, like spiders, we couldn't leave the working area with lists; that took another 8-9 months to get data back.

Q: Was there information that you wanted to collect, or thought about collecting, but were limited because of time, funding or other, as a means of satisfying the goals of your blitz effort?

A: It would be nice to go back to all these sample sites, and get more details on the habitat information. 40-50 sites are visited each year, repeatedly over the years. It would be nice to have a form with site characteristics being able to be checked off – no time to do this so far. Would also like to have photographs of the sites.

Q: If collections-based, do you have an approach for how data will be entered into ANCS+?

A: They are getting cataloged – we don't want to have everything in their collection, just a representative sample – for example: male/female/juvenile/adult. We have a curator – as stuff comes in, he gets the information he needs, and has many volunteers that help him with cataloging.

Q: How does he get the info?

A: Not from the database – he get's labeled specimens back.

Q: Do you think blitz data should go into NPSpecies?

A: We have started putting information there, but since it's not available to the public, we aren't making lots of progress. Has a contract with a person every year to update bibliographic information, and if anything is mentioned in those reports, it is also captured in NPSpecies.

Q: But not from the ATBI database?

A: That is one goal – to populate NPSpecies using the bioblitz data.

Q: How will you do this?

A: It would be great if we could send our database in its existing format to Ft. Collins and have them populate NPSpecies – we don't have staff to do this. Don't know if the data manager if his network (NETN), could also help – the park realizes that bioblitzes are not part of the Vital Signs effort.

Q: How do you use this information in the course of your work?

A: Data are not being used internally – more for others outside the park – there's a lot of potential, but not a lot of use yet. The Maine Entomological Society is using ACAD data for their lists. But as far as data being used to support management issues – there are no major management issues where these data are being collected, and the park would be uncomfortable making too many conclusions with what we are learning, given that it's a 24 hour effort. The educational and outreach value is the important thing.

Discussion: The park has been having one 24 hour collecting event per year; the sorting and identifying and preparation goes from Friday – Monday. The public is not excluded but also not intentionally invited. They have a partnership with the Maine Entomological Society; the University of Maine; a small college, the College of the Atlantic, the Maine Forest Service, and the NPS. This past summer was their 6th annual event. We focus on one taxa in depth, and bring in a number of taxonomists in that discipline, who have expertise to lead the identification. The other participants are amateur entomologists, members of the Maine Entomological Society; lay people with strong interests. The taxonomist is in charge of, or responsible for, getting all the material identified, pinned and returning vouchers. Has evolved into now, on Friday night, they have a mini-conference where a number of speakers talk about the research in entomology that they are doing, and then folks are given an orientation about why we do these things, and what is going to happen on the weekend. On Saturday morning, there are some detailed workshops on identifications – teaching everyone how you identify these things – the major morphological characteristics, things about the ecology, natural history of the group, where you find them, how to sample them. Then, we go through the lab where everyone will be bringing their specimens to process them. Around noon, we begin the collecting effort. We have places that are assigned where people go to, or they can go to places on their own – it's limited geographically, is not the entire park. Has been one basic collecting district, called the Schoodic Peninsula – it's the only mainland portion of Acadia. Efforts are concentrated there, though people can pick new sites. As people bring in their specimens, we have a data management system in place – stops for now,

more about data management later. Throughout this 24 hour time, people are starting to sort and identify. On Sunday morning – not really directly tied to the bioblitz effort – there is a separate public program where they do advertise and recruit for the public to come. Local residents or visitors come – not a huge number. This past summer, had a retired entomology professor from the University of Maine leading this – this is an introduction to entomology, and then we go out and actually collect near where we had the class, and then take those people with what they collected, and run it through the sorting process, and what they collected becomes a record of the bioblitz, even though it was collected around the classroom. But they get to see what happens, and so that's the public section – they leave and then the event ends 24 hours later, and they continue sorting, etc.

As with many parks, one of the issues we have when you have species that are hard to identify – we're at the whim of the taxonomists who are doing the identifications. During our fly blitz 2-3 years ago – we are still waiting for those data. There's nothing I can do about this. The goal is to get as much data entered before the blitz is over – a single person does most of the data entry.

Q: Regarding the lot numbers – who/how assigns the number?

A: There are two people at a computer – this is the first person they see when they return to the lab – generally is the park person running the blitz. One person will be at a computer where they have a GIS map of the park, so if people didn't have a GPS unit, we find out where they were. We have another map that has existing sites where people have collected in the past – these are already identified with a number and name – if they were at the same place, they are given this information/code. If not, they tell us where they were, and we try and get a UTM for that. Once they have that, it goes to the person next to them, who gives them a lot number.

Q: How are lot numbers kept track of, after specimens are rough sorted to family?

A: You have a Ziploc bag with hundreds of specimens in it – with all kinds of groups of insects, and a lot number card. The entomologist will then sort by the taxa we are looking for – anything that is not, for example, a dipteran (a fly), is discarded. Then, they will start sorting by family, and then start pinning. As they pin and label, they are also putting the lot number right on the label. They are then put in a unit tray (by family) and go to the expert for identification, with the lot number on it, so there is no loss of information. However, we often don't have a good inventory of who has taken what – it hasn't been a huge problem, but it is an area we can improve on. As stuff is identified to family – I don't have a list of who took what. Stuff is often sent off to a third or fourth party without my knowledge. This is fine – the lead taxonomist is ultimately responsible

for this – their responsibility is to send the specimens out, get them identified, get vouchers back, develop species lists, and even write up a small report. Sometimes, they get an honorarium for this, based on the fees we get from the registration.

Q: How could we help with tracking?

A: It should be easy – give me a list of the lot numbers you’ve taken, and the number of specimens for each. The park isn’t too worried about specimens being taken – a park person is present at all times. The one thing is that during the last few hours, it gets a bit busy with people trying to pack up. Is trusting that they will get things back, and this is usually the case. Also have a policy that anything that is discarded, people can take – these are the “destroyed in analysis” specimens.

Discussion: ACAD used their Centennial Challenge money to create a user-friendly, biodiversity atlas, on the web, so people can map the results of the various bioblitzes. Photographs of sampling sites could be part of a mapping tool, so that when you click on a sampling location, you could get habitat characteristics, and site photos, and the list of species found there, over all the blitzes. Another missing item is to translate the results we are learning to a more lay audience, or even to the participants who come back. Have a high repeat rate for participants – 60-80% of participants come back every year. Would like to engage them in the off season – i.e., a web presence where people could interact, where people could leave messages, photos, share things – and have the ability to look at the data. The site is not currently up and running; the mapping tool is in production at University of Maine. The park is committed to creating a front end part to their existing web site, focused on the bioblitz; they would then link to this mapping tool. Something we do uniquely here at ACAD - a number of our Resource Management databases are not only available internally to the NPS, but they are also hosted outside the NPS; for more accessibility and easier to maintain. For example: NatureBib; we don’t really use it at all, but have a similar database on the University of Maine’s website, that anyone can go to, to search for all of our bibliographic information; for both natural and cultural resources information. Every year, we have a contract for the University to update this database, based on what has come in during the previous year. This is external to the NPS; same for this mapping tool. All gray literature, reports, field notes, etc. are on this site. Can’t download .pdfs yet, but hope to have it in the future; abstracts, key words, only. We gave up on NatureBib – too complicated, and wasn’t meeting our needs. So many researchers ask us for information; now we just give them the URL, and they have access to all the information the park has. The park is also wanting to develop a “research opportunities” webpage.

Has a large backlog of data mining needs that I&M program didn’t address.

Not having problems with ANCS+, as far as they know. Their museum is growing ACAD is the repository for I&M inventory collections.

The park wants to focus on the translation of what they have been learning; especially for the public – unless its rare species data – doesn't want to sequester data internally.

Big Thicket National Preserve
ATBI/Bioblitz User Requirements Interview Questions
Interview_1
12 January 2009

Q: A Thicket of Discovery staff member mentioned that you two were going to have a meeting last Friday on some database issues and that you were going to decide how to interface with NPSpecies. So I'd like to talk about that as well as getting your perspective on how the BITH ATBI database evolved – I know you worked on an initial database for them....

A: When this first thing all started, I looked at NPSpecies as possibly being *the* database for the park to use, and not to have to create something else (new). But when I started getting into to it – me and the database person at HARC (the Houston Advanced Research Center); we started to find that NPSpecies simply wouldn't take care of all the data fields that we found necessary to keep track of as part of a project management database, as well as keeping track of species captured at certain locations. We needed to see how we were going to keep track of PIs, TWiG leaders, projects for the PIs – because PIs can have more than one project – set up at different sites – and all of these types of things. And NPSpecies is simply a one location-type table with a collector – in terms of a voucher or observation. You collect one location for that particular species.

Q: I don't mean to interrupt – but I need to ask a question – you said it 'didn't have the data capabilities you needed, in terms of PIs, etc, but what about the actual data you were collecting?"

A: I'm going to get to that....

What we ended up doing is looking at *some* aspects of the NRDT (I&M Natural Resources Database Template), with the Locations table and the Events table and Sites table, etc., and then added in some of the components of the ATBI database from GRSM. I have a relationships structure that shows this – we pulled in those tables that kept track of the project management aspects of the database from them (GRSM), and then we pulled in the ITIS information from NPSpecies. And the Observation and Voucher table

from NPSpecies, which we ended up combining, calling it the tblObsVouch – the only difference is – it ended up collecting a lot of the same information, so we just put in a field for a voucher or an observation. One of the reasons we did that, was to make it easy for me to be able to import this information into NPSpecies. But we haven't yet - but basically, I'm pulling from one table – I have the ATBI data set here and I'm just going to write a query and pull in all the fields that I need to import into NPSpecies. When we first started this things, I didn't expect the ATBI database to be the end all/be all database for BITH. Ultimately, that's what NPSpecies is for. Once a year, or once every 6 months – or whatever we deem to be necessary – the database will provide me an export, and I'll import that information into NPSpecies, just based on vouchers or observations for particular species. It could be that I'm adding new records to the database as well.

Q: So you just made a real important point there, and I'd like to go back to it – you said that you're looking at NPSpecies as being the end all/be all receptacle....

A: Well, when you're collecting data for an ATBI, like I said, you have to keep track of data collected for that ATBI, so for us, we have funding from the Centennial Challenge, we have grants from other people, and you have to report back on that every year....

Q: When you say 'us', do you mean your network?

A: No, I'm talking about BITH.

Q: I wasn't certain what context you were speaking in. So then you're helping the Thicket of Discovery folks develop a strategy for trading data – between their data and yours?

A: Yes, before their data manager came on (for the ATBI), there was just me. I helped to get that person hired. What happened was, this first effort started – with the (then) chief of resources, Curtis Hoagland – he emailed to say that Gillian Bowser was pushing hard for an ATBI effort, so we're going to try and start an ATBI. I went to the first meeting to see what it was going to be like, because I knew that no one was going to be thinking about data management. So at the meeting, we started talking about the types of data we wanted to collect – it was me and one other person, Stephanie Glen from HARC. We were put on a data management committee; so we started forming committees, and because I was with the NPS, they nominated me to be the chair. So once that happened, and we started to look at data structures, and other databases – that's when we built our initial desktop Access database, and put it on a cd. We took that, and the idea was that there was going to be a master database here, at the I&M network, and as PIs put data into their desktop database, and when they were finished with their project, they would

send it off to me along with their field sheets to be scanned and archived, and the master dataset would sit over here. Following a similar implementation path as our monitoring data.

Q: How does this sit with your network? Is this simply one of the services you provide your parks?

A: That was going to be something that would eventually – hopefully! be handed over – that is, this is the process, this is how it is going to happen, but from the very beginning I kept talking about – now look, data management – you know we spend 30% of our funds on data management, it's very important, it's very time consuming – and at that time too, our network was in ramp up phase, with Phase 2 and 3 – we weren't doing any monitoring yet, so I still had time to deal with things. And I told them, look, my time on this is going to be less and less through the years, so we need to, as we secure funding, you need to look at funding a data management position, to interact with the PIs, and they didn't understand all of what needed to be done, until it came here – until it got to that point.

Q: Where does ANCS+ fit in?

A: That's still a little bit down the road. I'm talking about just the basics of trying to get data from PIs and trying to get PIs familiar with the database and let them know what needs to happen, when it needs to happen....

Q: So they weren't responding to your database on disk?

A: No – because they had no one there (at the park) to explain it to them! Curtis wasn't doing it, Lisa Jameson wasn't doing it – it was all written down – I had a how-to – but no one used it. So my suggestion was that they needed someone there (at the Thicket of Discovery), to follow up with PIs, as PIs come aboard; when a project is funded, or when a PI wants to join a Twig, or something like that, then you have someone to sit down with them and say, “here's what you're going to do, you're going to go to the Chief of Resources and get a permit; as part of that permit process, you're going to be required to do all these things, *including* all the data management requirements, so that means inputting the data into the database, and providing the I&M data manager, with information, etc.”

Q: Yes, so that's a bit of a glitch with these types of efforts right now across parks – there's not a lot of follow through....

A: But there's no glitch any longer for us, because now we have a data manager, managing the ATBI database. So that's why I pushed for one – it started getting to the point where people were going out and collecting things, and money was being handed out, and they knew people were out there doing things, but nothing – no one was seeing any data. That just put the ball right in my court, as far as hiring a data manager. So once we got that person on, and we went to the on-line application – we started seeing people actually using the database, because they had someone to contact; someone to talk to. That person (the ATBI data manager) went out to the field with them, and made sure they were collecting the required fields, etc. Just having someone there to run the project, is so helpful...

Q: And the ATBI data manager said the database was fairly easy to use? that it didn't require an extensive training?, that maybe it was fairly intuitive?

A: I think that depends on what generation you come from - a lot of these old guys, well – for the newer guys, the graduate students – yes, it's relatively intuitive, but when you look at these old PIs who are retired, and used to writing stuff down on paper – it's tough, but we're just taking the data in any form we can, and the ATBI data manger is importing it into the database.

Q: Have you had problems with lost data? At the GRSM meeting, there was some mention of this, but was it those data which weren't being entered via your desktop application? What became of those data?

A: The data was never entered into anything.

Q: So then, it was left up to individual PIs to record data in whatever formed they wanted, and then ATBI data manager is tasked with rounding it all up?

A: I think that's what she's doing, but I'm not sure....

Q: So that's in part what I'm trying to help figure out – how can we keep these types of scenarios from happening...

A: Have people on staff! And that hasn't happened until we got this data manager to keep track of who's going out, when they're going out, and also – it helps to have a park Resource Manager who cares about the project. Now we have someone (at the park) who is willing to take the lead on it; willing to sit down with individual PIs to tell them, ok, well you're going to have to enter things into ANCS+; you're going to have to get a permit; you're going to have to put your data into the ATBI database – we didn't have

that up front cooperation from the park to begin with. So that was a big stepping stone too – getting someone in there who could take the lead and give a damn about doing an ATBI. The person in that position before, didn't. He was just doing it, probably because of Gillian – she was the one that got all this started.

Q: Yes, there's a bit of history with this project....and there's really no one heading up the charge for this effort right now – it's kind of in a holding pattern...

A: Right, so each park is doing their own efforts; if they have a Friends' network, or if they have some extra funds or if they have people that just want to go out and collect data...

Q: Yes, so from a network perspective (I&M), can you tell me of what you see with all these little independent efforts, and then all of the data storehouse that these data need to go into, like ANCS+, NPSpecies, etc.

A: This is how it works: ideally, we are supposed to get field sheets; we created field sheets with all of the necessary fields – the PIs were supposed to use them. But we're not getting anybody who is using them; we're not getting any field sheets to scan, so what happens now is, more than likely, the ATBI data manager is putting the data into the database. Or, we do have some PIs who enter data. The data gets into the ATBI database. The ATBI database collects all those fields that are necessary to populate NPSpecies – vouchers and observations, together with who collected it...basically, who, what, where, why, and why. So that data gets pulled out of the ATBI database, it will be sent to Ft. Collins for upload into NPSpecies. Now, before they upload it to the master data file? What I'm going to request of them – and they've done this for me before - is just put it into a backend Access database – and I get that back. At that point, we get with the park, and ask them, okay, who is your ANCS+ person or volunteer?, etc. – now it's their responsibility – the parks' responsibility, to sit down and say ok, here are all my vouchers, and now it's my job, as the park person, to get with the PIs and say ok, these are all my vouchers, what numbers have you assigned them? And then, because NPSpecies has the option to enter in the additional ANCS+ fields? – to create the ANCS+ export? That will be the mechanism or the tool we will use to get the ANCS+ data into it. So either they give their portion to the PI and let them enter in the ANCS+, or more than likely, what's going to happen, is that a park resource manager is going to have to put the information in, and keep on top of the PIs – get the voucher information in there, get that database back to me, I do the export – you have to do some cleanup with the export in order for it to be sucked into ANCS+. I get that data to them – I give them the export – he imports it into his database, and then at the point, I look over it again; make sure everything is complete; and possibly go through some type of certification process

for those data to say ok, yes all of these are present in the park. Shouldn't have any issues with synonym names because it's all going to be new data – and then, send that up to Ft. Collins for them to upload into the master version of NPSpecies.

Q: Excellent. Do you have a protocol for this?

A: No, it's all in my head – it hasn't even been implemented yet.

Q: Another question I have is – these are new data that are being collected, in terms of insects, fungi, etc. – and it's doubtful you're going to get species level identifications immediately back from you PIs – what do you think about TSNs, with all these new names that will be coming in?

A: A lot of these insect names, slime molds, etc. – you can only sometimes only identify to genus – sometimes only to family!

Q: Would you still envision uploading those sorts of data into NPSpecies?

A: Absolutely! The only problem is that you can't – I mean, we've already got some invertebrate data into NPSpecies, and it has – I think it has a temporary ITIS number, so that gives us the option of at least, putting it into the database and if it's found at the Family level, and that's normally what that thing is, when you look at it – to me, that's more important than not recording it at all, so yes, we still envision doing that, and uploading all those that may not have a TSN for it. But I'm kind of depending on Ft. Collins to be able to issue me some type of temporary TSN number – even though it may never turn into a permanent TSN – as far as ITIS is concerned - but at least, it will be in the database, and associated with the park.

Q: Given what we've talked about, would you be interested in using the interim ATBI database?

A: When I went up to visit last May (to the Ft. Collins meeting), and we started to pull together that database – we put in a lot of the same fields, points, etc. – the same stuff that was hashed out in our (parks') original meeting with HARC. I went there several times to pull together just a simple back end for us to start developing, and a lot of those things are in that particular application as well (the NPS interim database). So the goal was – at that Ft. Collins meeting in May, was to pull together something that people who were starting up an ATBI, can use, and not necessarily make everyone *convert* to this particular application – the interim ATBI database. So I don't envision us in the future, using it – especially because the on-line database is working well for them (BITH) –

making them go on to use something else. They'll continue to use the on-line database. But the backend is in a way that I can import in to all of the national datasets, or THE national dataset – NPSpecies – it's still available to do that.

Q: I guess where I'm going with this – the context - is in light of the IRMA development going on with the Resource Management applications – and so I understand what you're saying about the lack of need to use the interim ATBI database when you've got an on-line application that seems to work well, but what about a bigger picture – even in terms of a wish list?

A: Being on-line. But as for this being a component of IRMA? I would say no. I would say that that would be sort of a waste of time and effort, honestly. Because, if you want NPSpecies – and this is the way I had to sell it – because we had this whole issue with historical data, and had to sell the ATBI committee on what we would do with that historical data. And basically I said, NPSpecies, as far as the park is concerned, ends up being the final park species list. So when it goes public, or when the park needs something, it has ONE final place to go – it goes there, it generates a list – here are all the species I found there, here are all my vouchers, here are my observations – it doesn't matter what taxa it is – it's there, in the NPSpecies database. If you start hanging up, and putting the ATBI online database, now, you have data that's associated with the ATBI, and data associated with NPSpecies, which one are people going to use? They will be confused! Do I go to NPSpecies to generate a species list? Do I go to the ATBI database to generate a species list? people will get confused! I think that we should use ATBI data to support the *function* of NPSpecies, but not necessarily put all those functions available on line, for someone else to punch in.

Q: Thanks – in exploring this a bit further, and maybe playing devils' advocate a little – like with an insect data, some people have told me in interviews that, look, I can make really great use of the I&M programs' vegetations maps, out of their soil layers, out of their climate data, we can build these layers together, but I can't but a species list on top of that – I need abundance data, I need distribution data, I need to be able to track species through time – so NPSpecies might not fit for that use.....

A: Actually, it could. You start looking at all your GPS points – say a guy is looking for a certain type of insect. All the ATBI data has been collected with GPS points, saying that I've found all of these – either by site, or location of the individual voucher or observation. You have a GPS point, I have abundance data – you know – abundance data is relative – you're never really going to pull that out of any database, really – if you have all of the ATBI data uploaded into NPSpecies, then I have – let's say, every time I find this insect, I find it at this point – it's the same information that's going to be in the ATBI

database, except that it may be that along with all of *his* information , there are other PI's information too, about other insects, or maybe it's the same insect that he wants, and it's all uploaded onto NPSpecies – so he downloads that – he gets the voucher table, or the observation table, or whatever, and takes the x and y coordinates and puts them on a map, and there they are – that's where they've all been found. So a very important thing is to make sure that PIs collect location information – GPS points.

Q: Ok....

A: I think the last thing we need, is another place to go look for the same data. Parks are frustrated with that – if we keep coming out with new applications that are bigger and better – well, they haven't even been using the old ones, you know? The old versions!

Q: What is the status of inventories at your I&M network?

A: We're pretty much done. All of our data has been certified, and we're just waiting on some final reports from a couple of inventories.

Q: Any thoughts on IRMA, the portal?

A: When IRMA was first showcased, they showed it to where NPSpecies would basically have the same tools and filters online, as the desktop version. To tell you the truth – I never go on-line, with the current query system, I can't get an accurate look at what data is there and how do I want to filter it? I always download it, or I go to my Access (desktop) version – that's what I use. That's why we were crying when they (Ft. Collins) said they were going to discontinue development on the Access version, on the desktop. So, if they can take all those filters, and tools and searching abilities and the certification process, and put it on-line then, that would be great. Because you can't certify data on-line. Let's say I have a new inventory, say for this ATBI, eventually, I'm going to go to that PI before I upload it, and say, ok, I would like some assistance with this – let's say I have a taxonomic issue, or let's say they could provide me with some sort of abundance data based on their experience, and what the definitions are for the Abundance fields. If they can fill that out – I'm going to go to them and do all that in the NPSpecies desktop version. And then, once all that is done, and I consider it to be certified, that's when I would send it up to Ft. Collins. Ok, this is a complete dataset – load it up to the master file, and make it available to everybody. And if I don't have that tool, then I have no way to do that. But still have IRMA be able to filter out – filter by voucher dates, filter by PI – don't just spit out a species list. Not only that, but don't just spit out a species list that only shows me – on the Local List – I might have old vouchers that are underneath the

old name...I kind of got off on a tangent there, but when you talk about IRMA and what it's supposed to do – hopefully, it will do those things.

Q: It's been interesting talking to you, thanks – I talk to a lot of different stakeholders, and everyone has something a little bit different to add – but I usually end these interviews asking if you have wish list items for data....in terms of this ATBI effort?

A: It's difficult to provide a park with – here's a usual manual on how to start an ATBI, that will fit every park situation. But I think with some parks, what they're looking for is simply – ok, here's a database that you can use, to have someone sit down and say how's the big picture going? – and the things that took us the longest times to get off the ground were - how to hold committee meetings, what those meetings were supposed to produce, making sure that you have all of the things in place to dole out money - to how to manage the money, to how to manage PIs, and how to get the data from them – all those types of things – how to actually run a bioblitz. What things have worked and what things haven't worked? I think that would be beneficial for other parks, rather than having some big on-line database and expect people to go and put all their data into it.

Big Thicket National Preserve
ATBI/Bioblitz User Requirements Interview Questions
Interview_2
6 January 2009

Q: First, I'm wondering if it would be possible to get a username/password for your ATBI database?

A: For what purpose?

Q: To review it!

A: It doesn't work like that.

Q: How does it work?

A: I don't understand why you want to see it?

Q: Again, to see what the data look like, to see what types of data you are collecting – simply to review the database.

A: Do you want to see raw data or pretty data?

Q: The raw data would be fine.

A: It doesn't work like that – I can send you raw data, if you want.

Q: I'm just curious, why is it so difficult to see your data if it's on-line?

A: Because it was set up weird – before I got here – and the logins are not security conscious as they should be.

Q: Can I promise just to look at the data?

A: There is a Science Committee meeting tomorrow, and I have to pass all requests through them – for people to get logins.....

Q: Okay....

So I was thinking that I could possibly answer some of my questions by seeing your database on-line, but if that is not possible right now....Can you tell me a little about your database – all I have is that HARC (Houston Advanced Research Center) built the database for BITH.

A: It was built in Access, and it's now in Sequel.

Q: Who did this?

A: HARC, but I couldn't do any kind of data manipulations from the backend because it was (physically) at HARC, and I couldn't get into it. This was causing a lot of problems because I couldn't pull data when I needed it. So the committees okayed me to lease a Sequel Server, offsite, to migrate this to. So I migrated it from SQL2000 to SQL2005, and I'm now building an external reporting, so we can retrieve data much easier.

Q: How many records are in the database?

A: A few thousand, at least.

Q: What types of data do you collect?

A: From the ATBI!

Q: Ok, let me backup –

A: They're supposed to put data in, but getting them to give me things is always an adventure.

Q: Excuse me – who put's things in?

A: Well the researchers are supposed to put things in, but I find that a lot of researchers can't – because they have dial-up, for example – and they can't enter data in because it's

too much (time), or, they just have so much data that I argue with them, and they send me data, and I upload it from the backend, which is why we need to go to this Sequel system.

Q: How does your work flow proceed? It seems there are bioblitzes in the park that contribute to the ATBI effort, and then there are these mini-grants, given out by the BTA (Big Thicket Association) Science Committee, to researchers for targeted collections. So those are the two ways you get data into the database?

A: Right.

Q: So, can you tell me a little about both of those efforts, in terms of work flow?

A: The way the work flow goes, is the researchers have to get permits to collect (from the park), then they let us know that this is done, and then there's the part where they get the permits for voucher numbers, and blah, blah, blah, and the way – the grants, and the grants go through the committees, and then they let me know that somebody needs a username/password because they are going to be doing research, and they need to enter data in. And those are the people who get money, so we expect data out of them. I have quite a few researchers who do enter data on-line themselves, and they've entered quite a bit – slime mold people, butterfly person, the amphibian people and the fish people – all are entering data on their own. Other people, I've had to negotiate with them – and they send me things, and I enter it from whatever format they give me.

Q: For example, like an Excel spreadsheet?

A: Right, and I've got one old-school guy who sends me data in an old Word document, and I'm having to write a program to break that down and put it into an Excel query. So that's about how it goes.

Q: What about NPSpecies? Can you talk about that?

A: I know a little, in fact, the I&M data manager is coming over on Friday, and we're starting to look at what should go into NPSpecies and what should not.

Q: Do you have a plan for tackling this?

A: That's what we'll be discussing on Friday.

Q: So your I&M network is involved in your effort?

A: Oh yes, deeply involved, I'd say – at least their data manager. At the outset, he developed a database, and nobody used it. It was in an Access format, and was burnt onto a cd and sent home with the researchers, and the researchers never used it. So when I came on, and HARC said we could just do this on-line, I said let's go ahead, since no one is using the (desktop) cd. And we can solve problems as we go along. And it has worked. I'm finding I have a much higher success rate with the researchers entering data

this way – I’m always going to have those that can’t, or won’t – but I will work with them to get their information in, even if I have to work through the backend myself. For a year and a half, while they had the cd, they didn’t get *any* data in.

Q: I guess that was what Linda Brindle (from BTA) was alluding to at the DLIA meeting last month – that data were lost – is that true?

A: No, I don’t think we lost any data.

Q: When did the actual ATBI start?

A: In 2006, before I was here.

Q: And you started when?

A: Last year, in March.

Q: So all the collections that were made prior to the HARC web-based database – that got sent out with the researchers to put on the desktop cd – what happened to those data?

A: Nobody sent data in. Oh, there was one person who did – that’s been entered in, manually.

Q: So basically, it *is* lost then?

A: No, it was entered in.

Q: I’m talking about the researchers that had the Access application on disk.

A: They didn’t even use it – with those people, what I did was – I started pestering the researchers as part of my job – I had complete lists of who had done what, and I started phoning and emailing them; pestering them for their data. I had a good success rate, either getting them to enter their data on-line, or having them send it to me.

Q: I see – do you have a how-to for the database?

A: No, I give them a username and a password with the URL, and a short explanation, and they can do it.

Q: So it’s fairly self-explanatory?

A: It is – it’s very self-explanatory. It’s straightforward for them – they don’t seem to have problems. One researcher lets me know additional fields to bring in later, but –

Q: Do you have an idea of how the park wants to use these data?

A: I have no clue!

Q: That was more a question for the park Resource Manager, but I thought I'd ask you too.

A: For certain data, I pull it and give them numbers, or whatever they need.

Q: So there is a reporting function? Or you just do that with queries?

A: There is a reporting function; now I'm working on a reporting service so I won't have to use queries so much.

Q: Are you having any particular issues with the data?

A: No.

Q: Let me ask you this – do you have a wish list; maybe even something the NPS could help out with?

A: No, not really. The only thing, maybe are for photos, and things like that. If we want photos attached to the data, or if that's necessary, or that sort of thing? Photos, or video or sound bites, etc.

Q: How do you deal with the spatial component for your data?

A: We don't have one.

Q: No GPS coordinates, etc.?

A: They're supposed to send that in to us as part of their data.

Q: How many projects do you run at one time; where people are entering data?

A: The scientists entering data, or me?

Q: All.

A: Right now, there's probably about a dozen or more.

Q: So if you're entering data, you're entering it for somebody, right?

A: Right.

Q: How does the bioblitz data fit into this?

A: (laughs) They give it an Event name, like bioblitz x, with a date, and then the data goes in under that.

Q: Would you say that there are any quality issues with those data?

A: Sometimes, but then I go back and hound the researchers for clarification.

Q: How many bioblitzes are run in a year?

A: We did a big bioblitz in June, and then have a bunch of mini-bioblitzes going on.

Q: What did the big bioblitz entail?

A: It encompassed anything and everything – macro fungi, Lepidoptera – all kinds of things – maybe you could talk to Linda Brindle about that. Anybody that wanted to give me data, could – to be honest, I only got data from I think two people, from that huge bioblitz – I get much more data from small blitzes.

Q: And how does that data come to you?

A: Well, they either enter it in, or the send it to me. Just recently, I had the macro fungi guy send me a spreadsheet – he has dial-up, and can't do it from home.

Q: Do they keep field sheets during the blitz?

A: Oh yeah, they keep field sheets, and once the voucher number has been attached, they send me the data.

Q: So they are also doing collections during the blitzes?

A: Yes.

Q: So who does the permitting for this?

A: By the NPS.

Q: Right, so there's a lead PI for the bioblitz, or maybe the park resource manager does it?

A: We have PIs that are assigned TWiG leaders, so those people are responsible for getting the permits from the NPS, and so it goes from there.

Q: Anything else?

A: I think, considering that we just came on-line with it this year, and before, we didn't get *any* data, and now we've got a couple of thousand records in there from May, until about now – I think that's pretty good.

Q: Yes, it's a great effort – so you see this as an effort that's going to stick around?

A: Oh yes, I'm half-time, and I stay very busy.

Q: Any other questions for me?

A: Last May, I was up there (in Ft. Collins) for that user needs workshop? I came back from there jazzed, because I felt like I had contributed and we had done a good thing, and I was wondering if that database was still....is it going to be used, or is it scrubbed?

Discussion: explains the NPS interim ATBI database, and the Centennial Challenge program.

A: One of my PIs – the first to use our on-line database – she was very complimentary towards our on-line database; said it was really easy to use, and just pleased with it. She has entered all her data fairly quickly.

The plan is to have all our on-line data go into NPSpecies – when the I&M data manager originally wrote the database, he did it so that it would talk directly to NPSpecies. And converting it to SQL changed some of the naming conventions, but I don't think it's going to be too big a problem to crosswalk the data. But the I&M data manager feels that putting the ATBI data into a separate database will keep it separate from all the other – like we have a ton of historical stuff, and he doesn't want a bunch of historical stuff on-line, because it just mucks things up.

Q: This is interesting, because I believe Resource Management is saying that – I believe that the on-line ATBI database is going to be the receptacle for everything; in other words, they want to take the NPSpecies data and put it into the ATBI database.

A: Yes, well, I think that's why the I&M data manager is coming over on Friday; he needs to make sure that things are clear about how the on-line ATBI database needs to function with NPSpecies.

Big Thicket National Preserve
ATBI/Bioblitz User Requirements Interview Questions
Interview_3
11 December 2009

Q: What are the goals of your blitz activity?

A: Blitz activities are different from the whole ATBI. The ATBI is the important part of it – it's trying to inventory, document and discover everything that hasn't been looked at yet. In the case of BITH, the vertebrate taxa are not very well inventoried, so we are doing a herpetological ATBI project.

Q: Is your I&M network involved in your park effort?

A: Largely through their data manager - on the data side. Others are aware of it.

Q: And the I&M data manager developed an initial database?

A: Yes, that happened before I got here, but they went with the HARC (Houston Advanced Research Center) database – it was adopted and is still being modified. Last week, we took it back from them and now have it on a hosted Sequel server – we need to do more work with the backend of the data, and trying to do that via HARC has been too difficult. We haven't been able to give them enough money for their continued efforts.

Q: By backend, do you mean more legacy-type information?

A: Some of it is legacy, but also researchers haven't been willing to enter record by record even in the on-line and instead, have their own Excel spreadsheets and other data formats of the data from their project.

Q: Who is responsible for getting that data into the on-line application?

A: When the researchers are receiving money, a condition is, if you want to receive the remainder of the award, you have to hit all of our targets for reporting and data.

Q: Who enforces that?

A: Ultimately it's enforced when they ask for money – Linda Brindle (of the BTA) will not cut them a check, so she's making those decisions in concert with their data manager on if the data has been submitted, or even if they've applied for a password and user name to use the data base. Resource Management will also be an enforcer to find out if they've been doing their field work and submitting their reports.

Q: These people are also applying for RPRS permits?

A: Yes – and that’s one other “hook”. Our ATBI is different that say, YOSE, because our park areas are spread out, and we include in the Thicket of Diversity, some non-park areas – TNC lands, private forest lands, etc.

Park Resource Management is responsible for more of the project management for the ATBI – and is the chair of the science committee. They review proposals from taxonomists who want to add their group to the project. The ATBI data manager is the chair for the data management component – but they have to be strongly related. Need to be on the same page to be sure the projects are progressing.

The non-profit is called the BTA – Big Thicket Association. The Thicket of Diversity (ToD) has a charter, but it’s under the umbrella of the BTA; the ToD is meant to encompass not just the BTA, but the other partners that are working on the ATBI project – the NPS, etc.

BTA issues mini-grants similar to those issued by DLIA (Discover Life in America) for GRSM. Started the effort in 2006 with Gillian and (then) resource manager, Curtis Hoagland. In FY2008, they received a big influx of Centennial Challenge money, and hope to have more in FY09, so that was the seed money. BTA also writes grants.

Q: With 08 funds, have you applied them towards blitzes?

A: Yes, we did a big public blitz in June of last year – and awarded 4-5 new TWIG grants since getting the money.

Q: At the DLIA meeting in December, Linda Brindle (of the BTA) mentioned that data were lost – is this true?

A: Not to my knowledge – at first, we were handing researchers a cd with a desktop database, asking them to enter the data into that program. That didn’t work very well. The on-line version is working a little bit better. Linda and the ATBI data manager might not have the same perspective that I have – when I talk about ANCS+ and NPSpecies – they don’t have that obligation or requirement. I need a solution in terms of the researcher can provide their data once, and satisfy all of the data houses that we’d like to have populated.

Q: Do you have an idea as to how this can happen?

A: No. (Laughs.) I’m afraid that we are going to drive the researcher’s nuts. Even though in the research permit with us, they sign that they will deliver data that is ANCS+

compatible – when they receive a grant from the ToD, they’re saying they will provide data in *their* database (ToD – the ATBI database), so it’s not really clear yet to everyone, what the researchers are really going to have to do. We’re still at the start of this effort.

Q: To understand the data progression – they apply for a grant, are awarded a grant, and then they need to apply for an RPRS permit, if they are collecting, so the data they generate – then he/she has to fulfill the terms of the RPRS endeavor, like writing an IAR, and then you’re just waiting to receive specimens back from them?

A: Yes, since we don’t have a park curator, it hasn’t been on the top of our list – to call researchers and make sure they’re aware of this and are doing it.

Q: Where are the specimens repositied?

A: We do have 6-7 agreements that have been signed between institutions and the park, so there is some awareness in getting these institutions to agree to NPS curatorial standards for all ATBI projects under which specimens are being collected.

Q: So when a scientist deposits his/her collection at one of these institutions, that’s when you’d need to get the data back in order to put it into ANCS+?

A: Yes – we’re just starting our first effort now – one of our scientists told us his specimens were rough-sorted, etc., so we assigned him an accession number and a block of catalog numbers, and labels.

Q: If you don’t have a curator – who does this?

A: It’s a collateral duty for another staff member right now – it’s his first year of doing it. We’re trying to be easy on ourselves so far, because we haven’t been collecting very much in the preserve, but once we start adding thousands and tens of thousands of specimens to the collection – the annual cycle of ANCS+ will become onerous for us. Right now the park collections are in an annex in Beaumont, TX, and it’s had two hurricanes hit it recently, so it’s not a place for us to feel comfortable about specimen curation. We are currently doing some work on the building we’re in right now, and hopefully at the end of next year, we’ll have some space that is a bit better. LBJ is also building a curatorial palace that could house our collections – but the plan for ATBI is to work with these other facilities.

Q: If I understand you correctly, you do not have a plan for how the data will be entered into ANCS+?

A: Yes; we're hoping that that will become apparent – I'm blindly assuming that what is eventually entered into our ATBI database, is going to be exportable in some format, where we can bring it into ANCS+. This is probably a very naïve assumption on my part.

Q: Has the ATBI data manager been in touch with your collateral-duty curator to understand what the field requirements are?

A: I don't have an understanding of what her understanding of this effort is. I know she's been working with the I&M data manager and was involved in the data management meeting last May (in Ft. Collins), so she has some understanding of what is involved.

Q: Switching to NPSpecies topics – you mentioned that some of your vertebrate groups weren't very well done, I'm curious as to why this is, given the fact that the I&M program was given funds to complete this work. Was it a drought year or something that prevented them from getting good data? I'm assuming inventories were done for all your vertebrates and vascular plants?

A: No – I can't speak for the resource managers who were here for those years, but apparently, they made it known that we had older inventories that were adequate and for whatever reason, made the decision that inventory dollars would go to other network-wide priorities, and not re-survey things that had been surveyed in the 1970's in the preserve here, so we don't have birds, herpetofauna – or we have old lists for these in NPSpecies. Data are not contemporary and not complete.

Q: What about the new ATBI information – do you see this being entered into NPSpecies?

A: I'm not sure. One thing we haven't done yet, is going the other way - taking our NPSpecies records and importing them into our ATBI database. I would like our ATBI database as being the tally when questions are asked of it – we do want to know what has been newly discovered since we began this effort, but we also want to know what we have, so that would include historic/legacy data. So we're going to focus our efforts on the ATBI database and make that as whole as we can – and putting aside my own frustrations with what NPSpecies has been able to do so far – I'm just going to make the assumption that it is not going away, and that if we are collecting data that is part of the inventory of the park – we should find a way to get it into the NPSpecies database.

If NPSpecies is being used in a service-wide way, then I want us to get credit for biodiversity in those tallies. I'm not terribly interested in using NPSpecies as it currently

exists as a tool for querying our data, but recognizing the amount of time and money that went into it, and that it is used at a level beyond our park – if we’re going to be collecting data that is compatible with NPSpecies, then yes, I would like to get it in there.

Q: How do you intend to use this information in the course of your work?

A: This is a tough question – so far there have been a lot of meetings – people say these flowery things about the value of ATBI data, but I sit there scratching my head saying “can you really tell me how knowing that this insect that was found over there on this date, is going to influence a resource management decision?” I don’t think that’s going to happen, unless it’s a T&E species, or otherwise given some level of management importance. In terms of the value that I see – I see it apart from the scientific value – getting people involved, in taxonomy, in discovery – I try to give more than just lip service to that – it’s important. On the science angle, I don’t know if the ATBI is going to reach the point where it’s a management tool to decide whether or not to allow a right-of-way project in some area of the preserve, or a power line or a bridge – that’s going to be very hard to do. I don’t know of any example of where people are using information at that scale, for managing an area. But this preserve was founded on the principle of biodiversity, and has a lot of statements and scientific papers published on getting at “why is that, and is it really true – is this some kind of biological crossroads?” I’m a proponent of the project, but trying to generate something other than lists – distribution data – here’s what we have, here’s where it’s found, and it would be great to get to the point where we could generate some research proposals aimed at why is this still here?, given the fact that this is a second-growth, disturbed habitat. The things that are left – how have they managed to hang on?

Q: So in using this information in the course of your work, that’s your interest, not that you are going to use it to inform management decisions?

A: Yes, I’m really challenged in thinking of how we are going to use this information at a project-level scale. To know that a beetle or a butterfly is found in a certain place, so in this BITH project area; do we issue the permit for this work? I am challenged by this. Other research topics that I’m hoping will be stimulated by the ATBI – climate change is a big one, hurricane disturbance is the issue of the day - I’m hoping that the ATBI is going to help formulate some hypotheses and some research, and answer some important questions – though if we were to discover something related to global climate change in the preserve, how are we going to influence our day to day management in terms of what we do about it?

Q: Anything else to add re: data or data management?

A: I have a hopeful attitude that we're going to be able to cover all of the data programs that are out there. If something could be changed that made it integrate with something else that has utility – I'm conservative on this. I'd like for us to make that change if possible, for example, to make sure that data could be imported into NPSpecies or some other application, or even applications that are outside of the NPS, like some of the things that were talked about at the DLIA meeting; like biodiversity data portals. Our ATBI database is just one of many, many little data palaces being constructed and built out there – I would hate for anyone to be spinning their gears, whether it's a researcher or us.

Q: But you are interested in seeing your data mesh with a larger, more global effort?

A: Absolutely, because then it's available to more people! If any of my hopes about our ATBI efforts spur on other kind of research ideas – if this has any chance of happening, we've got to be able to share our data.

Boston Harbor Islands National Recreation Area
ATBI/Bioblitz User Requirements Interview Questions
3 Interviewees
17 December 2008

Q: What are the goals of your blitz activity?

A1: There are co-equal objectives; one is the science based objective of providing vouchered information about the biodiversity of our park, in an area where we probably have a lot more biodiversity than we're going to have in other groups, given we are an urban park with extensive disturbance of most of our park lands. The project got started based on E.O. Wilson's micro-wilderness vision – don't overlook the micro-wilderness in your backyard sort of idea – that spurred the program. And indeed, we have found we have a lot going on in the micro-wilderness. The insect focus is largely because it's fairly obvious that we're not going to find a lot of mammal species or amphibian species in our park, no matter how hard we look. We've had the I&M program done for the core inventories for vertebrates and indeed, there's not a lot of diversity. So the science goal is to understand the remaining biodiversity in the park, and how that could affect our management planning, as well as our interpretation of park resources. The other side is the education and interpretation side, as an urban park, we have an opportunity to engage the public in seeing the biodiversity that they would otherwise overlook – this is an area where we've really focused. Turning information collected in the ATBI and turning it into classroom, curriculum based activities; visitor displays at the Visitor Center, etc. So

the goals broadly are understanding the biodiversity in our most rich category of taxa, and engaging the public in biodiversity in an urban area.

A2: You hit it with those two goals, for the science part of it, understanding biodiversity, that includes species lists and cataloging species, but also getting some idea of distribution across islands and possibly, relative abundance data across islands so we can look at patterns within the park of species distributions. Maybe this comes next, but as far as databases, and thinking about who is going to use the data that we collected in this science piece – it seems like there are various audiences for this data, one is researchers, including students who are doing projects who want access to the data, and me, as I start trying to synthesize these data, and the public because we have our database accessible online, and hopefully, managers, so that they can get data out of the database that is relevant to managing these resources.

Q: Can you fill me in on the status of your knowledge of the larger categories – vertebrates as well as vascular plants?

A1: Both have been inventoried – a few years ago, a regional botanist finished the plant inventory for the park, but am not sure of what the status is in the I&M databases, for those data, but the fieldwork is done, and I have the report from the botanist, but am not sure if it is in NPSpecies.

A3: There are listings in NPSpecies, but it's been frustrating for me as far as databases and this project – we're calling it an ATBI, with a heavy focus on insects, but we do have knowledge of everything in the park, so my vision for a database – if I could have my wish list – the piece we don't have is putting all that together in one place. Being able to generate lists, making it useful for students – I would love to see lists of species in an understandable way – with pictures, sounds, etc. When we're holding the bioblitzes there are separate needs for databases. The ACAD model worked great, where people could enter the data right there. The thing to add to that, that I would like to see considered under development, is making an interface so you could see the results as they are coming in - for all species. Some bioblitzes are done very broadly, so ideally, with a map in the background – but if it's just a list, it's just a list. We tried to do this in a manual way, and it is very effective.

Q: Before we jump into database issues, I'm still trying to understand the scope of the effort here – how many islands comprise BOHA, and how many do you do work on?

A2: There are 34 islands, and as far as the insect part of this, we've sampled fairly intensively on about 10 of them, and have some data from others.

A3: I think this is typical, we just take islands that are similar – from the outer, from the inner – in any one study, and we never do all 34.

A2: The plant data comes from a lot more islands.

A1: All 34.

A3: The intertidal project was about ten. Islands are segregated into different sorts of habitats, so different projects lend themselves to different research studies, and they'll take a representative out of a group of islands – outer are further away from the mainland, inner are closer to the mainland, so typically, you will sample in both areas.

Q: Your I&M network is somewhat involved with this effort, but not in the sense that you need help with NPSpecies?

A1: I would say they are largely uninvolved with our ATBI effort and it would be great for us to figure out a way to think about all of our inventories *together*, rather than this ATBI project being one island developing its own way, and the I&M inventories proscribing to a system that is being developed within the I&M networks. Our I&M network is doing an awesome job with the Vital Signs monitoring protocols they are developing in tandem with us – they are great – but there is definitely a disconnect for this particular project.

Q: And that disconnect is that all your species lists are maintained in NPSpecies, and that you want these lists as well? So are you interested in finding a one-stop-shop for all your lists?

A1: Someone else might have opinions on this as well, but for me, as I understand things, NPSpecies as it is currently constructed, is not going to serve our full wish list of needs. So NPSpecies may not be the appropriate database to capture everything we would be looking for. More broadly than that, it would be really useful for me as a manager and for the parks' youth services, and interpretation staff, to be able to go to one portal and find out about biodiversity in the park. Right now, there's a database that's been developed and being used for the ATBI project, and if you were to contact the NETN, they wouldn't have any idea about how to get to it. (Much chime in and agreement!)

A2: When I first came here and started the ATBI project, I did talk with Fred Dieffenbach (NETN data manger at the time) on several occasions and showed him the database and talked to him about how we could get this data into NPSpecies. It seemed a

fairly simple thing to do – at the end we would just export the data in an Excel spreadsheet.

A3: They had intention on capturing the data – but with the change over - but NPSpecies just doesn't do the public interface – it's a private database; it doesn't have the capabilities; it's not easy to get information out of.

A2: There's also no reason why you couldn't use the database we are using here – it's not specific to Harvard University.

Q: You're talking about the Mantis database?

A2: Yes. All of the parks' biodiversity data could go into a database like this.

A3: And it does have the capability of pictures and possibly sound data? (no answer).

Q: I'm trying to understand your needs – you need one place for these data to reside, so you can pull out lists, whether it's for vegetation or invertebrates?

A3: I don't know if we're ever going to have one database that is going to serve all the needs – each research study is very specific and need different fields, but what we need is for them to be able to talk to each other and a way to maintain and keep them up to date. It would be ideal to have one place where there is every species list, and to be able to share data. I don't know that it could do everything you need it to do between the science and the public things we envision, but it's so scattered right now – some of ours are on paper, some are inaccessible, so we need a place to put *all* biodiversity information.

Q: I think that's a common problem that is expressed throughout the NPS.

A3: I've visited GRSM and they have at least three, between all their partners – it's impossible to keep them completely up to date.

Q: It seems like you've got quite a focus on providing this information to the public, and researchers – is there information that you have that is sensitive, and that you would want to restrict access to?

A1: Yes – we don't have the concentration of rare species that other parks do, but there are some, and as we are learning more about our insect fauna, that could come up again. So yes, we would have some need to protect some of the information.

Q: How do you think this information will be used long-term; how could this information benefit the NPS?

A1: Monitoring indicators for our active management work, another is monitoring so that we can have an early detection framework for new invasive species, particularly pests of concern, and awareness of our park – habitat variables of different scales – we tend to think about our habitats as forest or scrublands or beach habitats on a broad scale, but the awareness of the biodiversity at the invertebrate level is opening our eyes to the fact that we might need to think more carefully on a smaller scale about management. One that I'm really interested in – back to the first one – specifically developing indicator taxa for assessing our management actions. I come from a habitat restoration and vegetation management background, and it seems like everyone that is doing habitat restoration, only use vegetation indicators. It would be really neat to utilize the knowledge base we are gaining on the insect distribution and abundance in our park, to use some insect information as part of indicating our success for management actions.

A3: We need to know what is out there! We had a mammal inventory a few years ago – we're still finding mammals that didn't make it on that study. To manage properly, you have to have an understanding of what is there, and having it cataloged is a good way to start.

Q: That's a common theme that people offer up.

Q: Are your efforts mostly terrestrial, or are you doing anything in benthic or marine habitats?

A3: It's mostly terrestrial – a little bit of intertidal work. They did an intertidal bioblitz this past summer, but the water is not included in the boundaries of the park, even though we rely very much on it.

Q: So it ends at the shoreline?

A3: Right.

Q: So you don't have, for example, a fish list?

A3: No.

A1: One of our Vital Signs for which a monitoring protocol is being developed, is the intertidal biota. The actual legal boundary of the park – given we don't own and manage

the park – we consider the intertidal area as something that is of great concern for protection and management. Right now, we're not doing management actions in the intertidal zone, but it is one of the two primary Vital Signs monitoring focuses for our park right now. This year we should begin the first year of intertidal monitoring – it's a rocky, intertidal Vital Signs monitoring protocol.

Q: Can someone explain what the vision is for future efforts at your park? Do you see this continuing on year after year, and maybe adding more groups? Or are you going to be focusing on arthropods?

A1: That question is our question of the year. We need to determine that because the original funding source for the partnership with Harvard Museum of Comparative Zoology is soon to run out, so we need to figure that question out. That is one of my primary objectives for this year, to answer that question. I don't see us moving beyond an invertebrate focus anytime soon, given the condition of the parks' environment, but it's not clear what our 5-20 year plan is, regarding the ATBI.

A3: At the last meeting with Bert Frost and Mary Foley, they had a wonderful moment where they realized that everything that inventory and monitoring does – as far as biologically – is part of an all taxa inventory. It's just another word for it. In my mind, these things are all apart of it, so even if it has to start becoming more opportunistically of the things we study when we can...

A2: I can also tell you that the insect component won't be finished after 5 years!

A1: (To colleague): You bring up the I&M side of this, but there is no additional inventory money coming into the park, and no projects planned right now, from the I&M program, to do additional inventories, so unless....

A3: Right, but we still need to group those together, and put them under this umbrella, where the database would come in handy, because we have been lucky enough to have several inventories.

Q: How do you currently keep track of the data that resulted from your FY08 (or other) blitz efforts? I know you use the Mantis database – I'm curious about the export utility you mentioned at the DLIA meeting – if you're indeed interested in getting the results from your Mantis database into NPSpecies – what's the stopgap on this?

A2: Do you mean what's holding us up from doing this?

Q: Right – is it just staff and funding?

A2: The idea was to do that at the end of the project, or the five years, when as complete as data set is ready. We could do it anytime, but then we'd have to be constantly updating it. We could do trial run.

Q: But this is one of the objectives of the project – to take the data from Mantis and upload them into NPSpecies?

A2: I believe so. That's what I talked to Fred D. originally about – and that was his main concern – whatever database we used, that this would be a relatively simple maneuver to export it to NPSpecies.

A1: Given the current status of I&M databases, NPSpecies is one place where we can merge the various inventories through the I&M program and our ATBI. To me, that's a simple step we should definitely take – whether we want to do more, is a separate question – but yes, absolutely, we should bring the data into NPSpecies.

Q: It sounds like it needs to be a much more easy, transparent and evident process to do that – right now it seems like the steps to make that happen aren't very clear.

A3: I don't think it's that hard to get the data into NPSpecies; it just takes the data managers.

A2: Yeah, for Mantis, you can export things straight to an Excel spreadsheet, and then I think that can get sucked right into NPSpecies.

A3: Right – that's not the big deal, it's just that neither one of those databases does everything we need. We can't pull out information – we have access to NPSpecies, sort of – a certain set of reports, but it's not user friendly; it's not everything we need.

A1 to A3: So why do you think Mantis wouldn't work for what you want?

A3: Because everything like the bird, mammal and plant data aren't in there.

A2: But someone could put them in there!

A3: I don't have access to manipulate that – the problem is that we don't have a data manager that can be running the reports we need.

A2: I think it's more of a labor thing. You could download Mantis on your computer, and have access to this database remotely.

A3: Good to know.

Q: Then you've got the question of then – if you want to get something that's region-wide, or service-wide, you'd be looking at a couple of different systems.

A1: Yes.

Q: So it kind of sounds like future versions of NPSpecies need to take into account, some of the ATBI needs, and look at making this information easier to get to, and easier for the public to get to, things like that.

A1: Yes, and to have expanded fields to include things like photographs and sound files.

Q: Ok.

A3: One of the big limitations with that - I'm not sure what the criteria that needs to be – but it seems like, when I just casually looked in NPSpecies, there are some things that are certified, some things that are not, so then those don't show up, and some things aren't allowed in there, so it's restrictive – there should be a way to easily mark that – for their different statuses – and keep them separate. i.e. – these are the ones that are vouchered, or followed up with whatever the criteria are – these are the ones that have been witnessed, these are the ones that are awaiting certification or something – there should be a way – because otherwise, you can never really get everything into the same place.

Q: Right, and so that would be similar for ATBI where you might have collections that are awaiting verifications, or identification, or maybe you've got an identification, but the specimen hasn't been processed – there could be a lot of stages.

A3: Oh yeah.

A2: And typically, for my part of the ATBI, I only put things in, once they have a name on them. If there is some uncertainty, I certainly note that, but we only put specimens that have been identified into the database.

Q: And you have about 1000 records?

A2: A little over a 1000 species and about 25k specimens, and that's 6700 lots. 6700 different specimens or groups of specimens that adds up to about 25k total.

Q: Those aren't individually into Mantis are they? You just enter a type or a voucher you've collected to represent the group?

A2: No, we enter everything. The lot would be, if we have 20 females of a particular species from a particular trap – those all get entered as one lot. Otherwise, everything gets entered individually.

Q: I'm confused, when I've searched your database, it only seems to return a small subset of data – I don't get 10k records – I don't get that lot information.

A2: I will need to check on that – but that information should be in there.

A3: And that database too has limitations as to what you can pull out of it as it is on the website right now.

A2: Yes, and that's where Whit's thing will be helpful, with the Mathematica interface.

Q: And what is that?

A2: There's a student here who is working with this thing called Mathematica, which is kind of a way to play around with data, but he's using it to develop some user-friendly interfaces for us to be able to extract data from the Mantis database and to map species distributions, or sampling locations, etc. You can actually click on the sampling location and get species lists, images, a photo of the sampling location, create graphs and pie charts, etc. So that's going to be really helpful for me when I start synthesizing data, and he also hopes to create a module for education purposes.

Q: And this is all in the Mantis database?

A2: This is *using* the Mantis database, but using this other software called Mathematica.

Q: How will you host that?

A2: It's something you can download for free, so if a teacher wanted to use it, you could download it for free – I'm not sure exactly how it works – we'd have to talk to Whit on that, but it definitely is going to make the data more accessible, or easier to extract exactly the kind of data you want.

A3: I think Mantis is currently set up on the website, where you can just basically look up by order, species, etc.

A2: Yes, the website is fairly limited that way.

Q: And that's what I was talking about when I told you I wasn't getting lot information. Maybe that's not evident on the web?

A2: I will check on this.

Q: What types of information did you collect during your blitz? We're interested in talking about the various stages that all blitz type efforts in the various parks go through – so what kind of information you assemble prior to a blitz event and what type of information you collect, and what types of information you post process – can you take me through these three phases? i.e – how does it come about? How do you target your organisms? How do you line up experts, if others are needed? Sampling times – structured vs. traditional? Can we start about the start of a blitz?

A3: We've held two so far – we started out modeling after the blitzes we went to at ACAD and a bit of experience we went through at GRSM. When we did our beetle blitz, we picked that organism because we were already doing insects (through the ATBI); something that is easy to find, relatively easy to identify, and something we had experience with – since I had gone to a beetle blitz. Also, the PI on the ATBI project (Brian Farrell) is a beetle expert. That's how we chose beetles. Lining up experts is typically through whom you know, and taxonomists who know each other – it's really personal outreach work, that works best. We tried everything with press releases – but we were weak in that area, that time, because there were some conflicting events. We had people interested, but we picked a bad weekend for that. In ACAD they have *teams* of people and *teams* of organizations, and it can take up to a year to pick a date and decide what you're going to do, and sometimes you decide what you're going to do based on the resources you have available. For the intertidal blitz that we were kicked off, we wanted to explore other parts of the rocky zone, so it was kind of opportunistic.

Q: So you've had a beetle blitz and an intertidal blitz?

A3: Yes.

Q: Did the beetle blitz begin the whole ATBI data collection effort, or, are you guys doing independent sampling on these islands, other than through blitz activities?

A2: Yes, the blitz has been a pretty minor component, so the beetle blitz we did was a fairly small scale effort on two islands; the second summer I was here. It was a minor component. That's really the only blitz that has directly contributed data to my database (Mantis). Otherwise, we've been sampling ourselves, doing structured sampling each year, on between two and four islands, so we set up pitfall traps, malaise traps, etc., and so I work mostly with students and interns to collect from the islands during spring through fall. So the blitz hasn't really been a major component of the ATBI – it's kind of more of an outreach.

A3: We've been trying to find that balance with – from the parks I've visited – it's very difficult to blend a scientific event with an outreach event, and so ours have been more outreach oriented. Although with the intertidal blitz, we did do a good job attracting scientists and students and they helped a lot on that day to identify the majority of the species. There's still a lot of follow up work afterwards. The science coordinators do it for us.

A1: Let me provide a bit more context on that – as was just mentioned, for the intertidal blitz - this was Mary's suggestion - we actually dedicated 5k to hire a science coordinator for the bioblitz itself, to make sure that the science was robust, and that we were going to have specific protocols, and the ability to follow up with identifications. And to put it in someone outside of the parks' hands, who is in the research/science community to take the lead on recruiting and confirming the science participants. So we basically split the tasks in half; the public outreach and logistical planning largely fell in one court, and the science side of the coordination of the event and the follow up was someone who worked at North Eastern University Marine Science Center, and since this was an intertidal bioblitz – that same group is developing our intertidal Vital Sign monitoring protocol, so we targeted it from them.

Q: So where does the data from that blitz reside?

A3: We're hoping eventually, in Mantis, and into NPSpecies.

Q: But right now, where are those data?

A1: We got the report yesterday; literally, the draft report – and that will be finalized in a month or two. Right now, the data exists in whatever database was used at North Eastern Universities' Marine Science Center.

A3: And much of that we didn't need to actually collect; many of them could identify right out in the field so it lowered what was actually collected at the event.

A2: I would say that if you do want this to go into Mantis, this will be a good test – to see how easy it is to *import* data into Mantis.

Q: How do you steward or collect data when you're out in the islands doing your structured sampling? Do you use field sheets that you then take and put into Mantis, or do you have this lot principle, like ACAD? how do you physically deal with data when you're doing your sampling?

A2: We do take out field sheets, and for every passive trap we set up – i.e. pitfall traps or malaise traps – we take GPS coordinates, come back after every day in the field, and we enter all those sampling events into Mantis. And that includes the physical location and the date and who collected and what kind of trap it was and generally what habitat type it was. Then we generate labels from that for our specimens

Q: Through the Mantis database?

A2: Yes, and the way we track the specimens – what sample they are associated with – is a little like eight or nine digit code, that says what island?, what trap?, which trap?, what kind of trap?, which of those traps?, and what date?. And we abbreviate that to a small code, and so those are hand written labels that stay with every specimen that gets pinned up, or every vial of specimens, or every sample of specimens, and when an insect gets identified, it will then get a printed name label with the determiner, and then every specimen or every lot of specimens gets a unique specimen identification number, and that goes in the database. That's how we track. And so that specimen gets linked with the species – the species has already been entered into Mantis in a species page, with all the higher taxonomic information and that also gets linked to the event in which it was sampled. And you can also put in information about how it's curated and who determined the species, and life stage, etc.

A3: And those are similar things that you collect in a bioblitz too, so it's the same sort of process.

A2: When we did the beetle bioblitz, we adopted the protocol that ACAD uses because it was a simple way to get things into a database in the field –

Q: Into Mantis?

A2: I transferred all that information into Mantis.

A3: I think that was a critical piece of having something at a bioblitz, and it's something to really offer someone when you're going to host another one, so having this base sort of system of data entry – you don't have to recreate it every bioblitz you do. You just need a different species list – the protocol may change a little bit based on the organism but at least having a consistent way to enter it in, is important.

Q: You mentioned species lists, do you actually have species lists out in the field with you when you conduct these blitzes?

A3: It's done in the lab typically.

A1: Actually, in the intertidal bioblitz case, we *did* actually have species lists out for the structured sampling part, for the beetle blitz, it was different. We also planned an Odonata blitz, but it was rained out. But yes, for the intertidal blitz, we did have a species list that was developed by the marine science coordinator. That way, folks could expedite their structured sampling in the field.

A3: And they did have a process when they took it back to the lab to enter data right away, so she was building the spreadsheet in this case. For the beetle blitz, we used an Access database, and that's what ACAD used too – they just tweaked it a little bit.

Q: A difference I see between you and ACAD is that ACAD does these targeted blitzes, so, these passive traps are going to be capturing everything – do you discard specimens and just focus on particular groups, or are they inclusive?

A2: We don't discard anything, but we do groups as we find people to work with them, so some things, it's obvious that we have help from the outset – ants, bees, carabid beetles, etc. – those certain groups get picked out right away, but there are some orders, like flies for example, where right now, we've got a lot of vials with flies not even sorted to Family yet. But for instance, last year I contacted someone who was interested in looking at the fungus gnats, so we went through and pulled all the fungus gnats. It's a slow way to do it, but otherwise, God knows how many vials we'd have.

Q: And how many vials do you have?

A2: Oh man, we have a few shelves full.

Q: And so you went through all of those vials to pull out the fungus gnats?

A2: Yes. We had separated out the Nematoceran flies, so it wasn't as bad as it could have been, but it's not a very efficient way to do it. So there are a lot of things that have not been sorted beyond Order level.

A3: I think a lot of the parks face this, because there's just so very few taxonomists that are available to do this.

A2: That is a problem with putting out any kind of trap, because you get a lot of specimens! If you say you just want to do an ATBI focused on beetles – the whole ATBI just on beetles – but if you put out any sort of passive trap, you'll get lots more than beetles.

Q: I guess where I'm going with this, is that because the NPS doesn't own these islands, you don't really have a concern with ANCS+ at all, so this is a unique situation in your park, and so you're basically free to do what you wish with these specimens; you could discard them if you wanted to just focus on the beetles – you could discard the by-catch, but what you're telling me is that your saving everything and storing them, and hope to get a taxonomist to help you with these other groups?

A2: That's right, that's the eventual goal. But with one person doing this one at a time, and struggling to get an intern, it's a very slow process. And there's quite a few groups that we have good coverage for the islands and so we have everything worked up, but there's many more than we don't have worked up. And yes, we won't throw them out, but for some groups it may be awhile, even if they ever get worked up, quite frankly.

Q: So again, you trap, or structure sample throughout the spring-fall, but not the winter?

A2: Not the winter – access is difficult in the winter, so I haven't sampled in winter.

Q: Do you go back to these same sites again and again – those that you have GPS points for, so you relocate them?

A2: We do each one, one year. There's one island where we've gone back.

Q: So each island, you tackle in a year?

A2: Yes.

Q: A specific island and a specific number of traps?

A2: Yes.

Q: So maybe there's not that many? You have a couple of pitfalls, a couple of malaise traps, etc. – so when you go out to the island to take down the trap, then – that's what I'm interested in – how do you track this – do you have a field form you use, do you put a label in that catch?

A2: We usually have between five and eight pitfall sites, so I'll talk about pitfalls now. Each of those sites has three pitfalls, and we'll leave them open for a week, and pick up the contents, and the thing that gets dropped into the specimen container, is that little code I talked about, that identifies the island, that it's a pitfall trap, which one of the sets of pitfall traps it is, and the date.

Q: This is done prior to you going out to the island?

A2: No, that's something I write out when I'm on the island – I drop a scrap of paper into the sample.

Q: So that's how you track the data, so that when you get it back to the lab and start sorting....

A2: That little code follows every specimen that comes out of that container, and that sampling event – that gets entered directly into Mantis right after we come back from the field.

Q: So during the event, say you emptied ten traps, so you'd know you'd have to track ten lots?

Q: That will be on the data sheet, so every time we go out, we fill out a data sheet, and it says, if a pitfall trap was dug up by a raccoon, so a sample wasn't collected, etc. – it will provide any information that goes with that sample, and that just stays in a binder, and some of the notes will go into the database as well. So we're keeping track of things in the field, and when we come back, we enter things in the database, but that little code tracks the specimens.

Q: So you're not really dealing with taxonomy during the event?

A2: No. The other thing we do, is active sampling, so when we're out on the islands, we have our nets and we do some hand collecting. Sometimes we collect observational data

for things we can identify out in the field? Like a monarch butterfly, and that gets written down on the datasheet and that gets entered into the database as a field observation. Then if it's something we just caught in the net that we bring back with us, that just gets noted as a sample we caught by hand. We don't keep track of location for those – just what island it came from.

Q: So this is a busy project – you've got a lot going on; a lot of samples, a lot of follow up.

A2: Yes. And then we get things from the school groups – I won't accept samples that don't have labels in them, so I'm very adamant with the rangers that anything that gets collected has to have collection data that comes in with it – and that gets incorporated into the database too.

Q: So we're talking about another effort then?

A2: We have some classroom activities where kids go out and do some collecting, so that's usually with nets, or hand collecting.

Q: And this is independent of the ATBI effort?

A2: It's part of the ATBI effort because it's part of the outreach part of the ATBI, but the specimens are actually coming into the database.

Q: Do you find that a productive way of getting information?

A2: I wouldn't say it's hugely productive, but they do go out to some islands that haven't been part of our effort, and sometimes they collect some pretty interesting things.

Q: The rangers and interpretive staff arrange this?

A2: Yes, rangers and teachers.

A3: We were involved with developing the curriculum for this, so it's an entire program, there's in-class and field activities that go along with this. The teachers really like that part of it, that the kids are real scientists in a way.

Q: How many types of those efforts go on in a summer? Is this a summer activity, or during the school year?

A2: It's during the school year, and they are mostly coming out as a class. One of the islands is owned by Outward Bound, and they run a month long program for the entire 5th grade from an entire school district in Wellesley, MA. We've had the ATBI be a component of that, so that's where most of my samples come from. And then there's probably five other programs – it's a matter of 10-15 vials.

A3: We've sent youth groups out looking for specific things as well.

A2: So yes, the data (specimens) come from many varied sources. There are also Harvard students that are carrying out research projects of their own, and in the course of that they are collecting more specimens as well.

Q: Which again, filter back into your ATBI database?

A2: Yes, that now includes recordings.

Q: Who maintains your website?

A2: A woman here who is a faculty assistant for Brian Farrell, the PI of this project. I work with her a lot to figure out what needs to be posted, but she goes in and does it. That is free labor for this project – it's being donated. The database itself is maintained and information uploaded to the web by another individual here who is a curatorial assistant in the department, so that is all donated labor, which is crucial.

Q: Are there any concerns with over collecting? Do you have collecting permits? Since you don't have to report your data to ANCS+?

A2: We do have a collecting permit.

A1: We do coordinate research and collection permits, and use the same database as all other parks – we do it on behalf of all our partners in the park.

Q1: So then the PI goes through the RPRS system, and gets a permit that way, and then is responsible for the IAR.

A2: Yes, I do that.

Q: I'll leave with this – I've been trying to ask folks that are involved with Centennial Challenge funding – how you see me helping you move forward? – I'd like to be clear on what your need is. What I understand is, that you are a bit frustrated in that you have a

number of databases that your inventory data resides in, and you're hoping it will be in one place – and ideally that would be NPSpecies, but because of certain limitations it has right now, that might not be something that your interested in at the moment, but maybe in the future? Can you comment on what you want to get out of this effort?

A1: For me, it's not so important that it's in one place, but that it's clear – if it's going to be in two places, it's clear what's in each of the two places, and which is NPS only – which is a closed database – and which is open to the public, and what the features and report capacity is for one or more databases that we use. It's very unclear to me as a manager – and I think it's unclear to the public – what is available, and how. To me, it's not so important that it's in *one* database, but we should understand ourselves, and be able to explain to the public, where to get the information, very broadly. Where to get biodiversity information about the park.

A2: It's been awhile since I've looked at NPSpecies, but it's essentially just gives list of species, no distribution data, etc?

Q: Yes, lists – it tallies presence data; there's a subjective abundance value, a nativity component, and a residency component.

A2: If you're looking at information for one species, do you see where in the park and when it was collected or just that it exists in the park?

Q: For every record in NPSpecies, the guidance is that there should be some sort of evidence for that species – a voucher, an observation, or a reference.

A3: I've only been able to pull out a single species, with one coordinate, but it doesn't tell me what island. It seems so limited – I don't know if this is the best place – to warehouse a species list – that's great, but I don't envision one overall database that could cover all the needs, but I would like to see the ability to get it in one place, and pull it out with this quantitative information.

A2: I don't see how the needs are so different across taxa – there are essential things you need to know.

A3: It could be – I think they tried to do that with the last round – get the common fields – it became fairly complex.

Q: Another difficulty I foresee in your situation is that the acronym BOHA, is what you would go to, to get that information, and as of now, it's not separated out by islands. When you get a vascular plant list for BOHA, it's not island specific.

A3: And the managers don't care as much about that.

A1: That's an excellent point – that's a very important need for us, both for management and for the public.

A2: If you had a person dedicated to the task, I don't see how all the data on birds, mammals, plants - why all that couldn't go into a collections type database?

Q: Into Mantis?

A2: Yes, but maybe not that one either, but that kind of database is set up for that. For managers that want distribution information, and when that thing was active, I would think that they would want more than NPSpecies has to offer.

A3: Whatever it is, it has to talk to NPSpecies – Mantis supposedly does do that.

Ft. Collins (on the interview): As you might know – NPSpecies – linked with this effort that Libby is doing – is going through a major overhaul and we are looking at a lot of these kinds of needs and considerations. Just to give you a little bit of hope, part of the new design does accommodate what we are calling subunits in a park; for example, in a western park, they might want to look at east of the continental divide vs. the west, or parks like yours which are considered islands. And there are other subdivisions that parks need to be able to establish and associate with information, so that's definitely going to be in an upcoming version of this new system. The other is that I've heard some great ideas and great comments on NPSpecies, and I'd like to include you in some of the request for feedback, as we move forward with this new system design, and so you can help verify that we're on the right track, or you can make suggestions that will be helpful to us in our design process.

Q: Anything else?

A1: I would just note – this is sort of self-evident – but we're talking about what would work for us for the long term, and one thing that isn't good for us, is we have this project going on in partnership with Harvard, and a lot of the best information right now, is residing on that website right now that is hosted by Harvard, and all of the information – the actual data – is in a database hosted by Harvard, and that is obviously not a good

long-term structure for data management for the park. So this is a big challenge for us, at the park level, but it would be great if this broader effort could assist us with – provide us with options.

Channel Islands National Park
ATBI/Bioblitz User Requirements Interview Questions
6 January 2009

Q: What are the goals of your blitz activity?

A: We're partnering with the TNC, and we want to develop a strategy for working towards an eventual ATBI. What we want to do is pull together information about what we know – currently – what inventory information we currently have about the park for vascular/non-vascular, vertebrates and invertebrates, with the primary focus being on the terrestrial side. Less on the marine side, because that is a huge, huge black hole at this point. We would like to use the 40k (Centennial Challenge monies) to fill some key gaps in knowledge, and also to bring in a cross-section of taxonomists that we are hoping we can excite about the potential for additional inventory work on the CHIS, and try to put together some strategies and proposals for additional funding. For instance, we've talked about trying to put together a comprehensive proposal for NSF funding. So we want to use the 40k in some ways, as seed money, to work towards a larger program for ATBI. We obligated the money to TNC, so the money is obligated but not spent yet.

Q: What kind of staff will be involved? I mean, have you done anything to date, or is this a new program?

A: It's a new program. There is a lot of inventory work going on right now at the park – I shouldn't say a lot – but there's some –

Q: Independent of the I&M program?

A: Yes, so there are scientists, taxonomists, etc. who regularly apply to the park to do surveys and taxonomy work.

Q: Through the RPRS process?

A: Yes. And over the years it varies as to what and where most of the work is being done. Like right now we have a lichenologist who is very interested, and is doing, a fair

amount of work, and there's been some marine invertebrate biologists who have been doing some taxonomy work - - so we always have someone working on various projects.

Q: What happens to the data from those efforts?

A: It's not managed centrally. It's managed by the researchers who collect the information.

Q: And so at the end of their project – then, what? They submit a report, and that supposedly contains the data?

A: Yes.

Q: So you get a bunch of reports, but not necessarily spreadsheets or databases, or anything like that?

A: Right, and so of course the park in the past – the I&M program – took some of those reports to populate NPSpecies, if they were for vascular plants or vertebrates. In other cases, like for the invertebrate or non-vascular plant work, there's just a body of reports and publications.

Q: And so there's no real database with records that come with these?

A: Correct.

Q: So back to the staff involved – you've obligated the funds for TNC, and then they are going to what? Formulate a plan for you, and then, how will you staff that?

A: No, we'll do it jointly. And we will not hire any additional staff to work on this – it will all be done with park staff. So what we've talked about with the TNC is having a workshop, with the identified scientists that we know are interested in this program, and talk about what would be our strategy, what are the information gaps that need to be filled, and how do we best spend this 40k that we have at this point. We have yet to do that, but plans to do it this winter or spring.

Q: And so then you would highlight which taxonomic categories you would want to target?

A: Yes, so for example, maybe we'll spend a little money on this workshop, and maybe there will be some key participants that will need travel funds; we might identify some field work, or some legacy samples that haven't been identified or published, or

something like that, that we would want to support completely in that work. Or, some work that needs to be done to make the strategy more cohesive, like what is it that makes the CHIS important for biodiversity? What do we think is yet to be discovered out there? Why is this something that, for example, NSF would want to fund as a larger project? And perhaps it would be one of these independent scientists that would actually write the proposal. But we've had a few of these independent scientists who say they would be very interested in working with a team of taxonomists from different disciplines to identify the CHIS as a project for more inventories.

Q: Do you have an idea of how to tap into the available taxonomic expertise?

A: We'll leave this up to TNC – we don't really have the time to take the leadership on this. I don't know as well as I should – I have names of some people that are interested.

Q: Is there a University nearby?

A: Yes, but overall, that's not where I'm seeing the primary interest. There is a museum in Santa Barbara and a botanical garden, and those are places that have taxonomists who are very interested in this program. But the lichenologist is at UC Riverside, and there is a coastal/marine invertebrate taxonomist, interested primarily in beach invertebrates – he's at Texas, so they're not necessarily local.

Q: Do you have any idea of what kind of data you want to collect? Or how you'd like to store it?

A: The reason that we haven't gotten this down until now, is because that's been directed from the park – what's happening now in terms of inventory work, is scientists coming to us and asking us if they can go out and do collections, and we say yeah.

Q: So what happens to those collections? They go through the RPRS system, they get a collection permit, and then they have to address ANCS+ right?

A: Yes.

Q: How does that work?

A: When someone is going to do collections, and they are not going to use up the specimens in analysis, they need to tell us that when they request the permit, and we tell them what our museum catalog requirements are, and then we work with the collections specialist here – in our cultural resources division – they are notified that there will be a

collection as a result of this research permit, and then that researcher needs to then tell the park how many specimens they collected, and how they're going to be curated, and then we prove that, and give them the numbers – catalog and accession.

Q: Do you have a curator on staff?

A: No we don't. The ANCS+ side of things is handled by the cultural resources personnel – there's a curator in our network – at Cabrillo NM – and that person has come up here periodically to help with things here, but there's backlog. This is not a full time job for anyone.

Q: Is there a facility for your specimens?

A: There is – a bally building (?) – something used by the NPS 15-20 years ago – a small, portable building that meets standards for maintaining collections – and we do have some specimens in that type of structure, but the majority of our specimens are not here at the park. Both the Santa Barbara Museum of NH and the Santa Barbara Botanic garden – we have a collections agreement with them, and they are the primary repository for specimens from the park. But because of other researchers doing work, there are collections in a lot of different places.

Q: Do you find that the collections are ever lost? Do they always get returned to the park?

A: They don't have to be returned to us, unless that was part of the permit – generally, we don't want to curate them here – we don't have the ability to do it. We prefer to have them curated at another facility that has the staff and facilities to do that.

Q: Let's talk about NPSpecies a bit – would you have a goal of putting your ATBI data into NPSpecies? Is this a planned thing, or have you thought about it?

A: I haven't thought about it a lot, I guess I've assumed that we would, but I think NPSpecies is primarily focused on the vascular plants and invertebrates, correct?

Q: Yes, but it does have the ability to house more than that – I'm just trying to get a feel for what you intend to do with the data from your ATBI effort.

A: Yeah, whether NPSpecies is the appropriate place or not for the invertebrates and nonvascular plants, I don't really know. I would say that there is a vast backlog of already known information about nonvascular plants and invertebrates, that isn't in

NPSpecies, so it would be a pretty big undertaking to say we would want to put everything in there.

Q: So what do you envision doing with the data?

A: It hasn't been decided.

Q: So you're going to be collecting data, but you're not quite sure why? I'm kind of confused here – in other words, if –

A: We haven't put together a plan yet, for either collecting the data, or anything – right now we have 40k, so it's not going to be that much. What we need to do is develop a project proposal for something bigger, including that whole enchilada, and we're just not there yet.

Q: Got it – and if I'm hearing you correctly, NPSpecies is something you might be considering, but not necessarily?

A: Right – I don't think I'm the expert on this – one of the reasons I'm bringing in this team of taxonomists, and we've got TNC and the NPS as equal partners in this too – so it's possible that TNC will say that, well, here's another database we think would be the better repository – and maybe they're compatible? That would be ideal.

Q: Are you aware that Ft. Collins has developed an interim ATBI database for use by parks?

A: Yes.

Q: As a resource manager, can you tell me what potential uses for data that would be coming out of an ATBI – how that information could help you with your job?

A: Yes – I think this can be important as we look at issues like climate change, or other types of management actions we would take, and how that is going to affect species we have that are rare or endemic, that we might not be aware of right now. CHIS has more federally listed species that only occur in the park, than any other NPS unit. We have a pretty high number of endemic species, and I think when we get into the nonvascular plants and the invertebrates – we just don't have a good handle on what we do have – that's where our big knowledge gaps are. But what we do know from the rare vascular plants and vertebrates, is that island species are very vulnerable to perturbations as the result of some of the past land uses – the islands have all been ranched, we've had major

conversions of vegetation on the islands – we’re trying to reverse that now, but a lot of species that only occur on the islands, are unnaturally rare. In some of the recent lichen inventories that have occurred – we’ve seen that same pattern. With the lichens, we don’t have endemics, but some rare ones – they tend to be widespread. But we’re seeing the pattern of some lichen species, that the lichenologist believes probably were very wide spread on the islands in the past when we had say, the substrate – which in some cases was, say woodlands – were more extensive, so some of these lichens were more extensive. So the woodlands were largely eliminated, so the lichens are almost eliminated too. They kind of hung out in these little refugia that weren’t as heavily impacted by the grazing by sheep and cattle, so that’s the same pattern we’ve seen with other – like vascular plants, for example – they end up hanging out in some kind of refugia. So we don’t have that type of information very broadly for nonvascular plants and invertebrates. But I think once we have that kind of understanding, it will highlight the importance of restoration, and help us direct what’s important for us to restore and protect. Habitats we might be undervaluing at this point.

Q: Do you foresee your I&M network to be involved with this ATBI?

A: Maybe on the data management side of things, but on the network side, there’s not much going on with inventories.

Q: So you could see asking maybe their data manager to come join you in these upcoming discussions?

A: Yes, SAMO is where the data manager is, and she’s been working with the bioblitz for SAMO. I think that she would be involved – certainly in an advisory capacity. We’ve even talked about, if we get a proposal funded to do something bigger at the CHIS, one possible approach would be for us to hire an assistant to the data manager, so we could fully integrate her into the program, but the network data manager doesn’t have the time to just take on the task. Maybe she would supervise whoever does undertake this. It could be that whatever we decide to do initially, is not to do field collections, but do a better job of pulling together the information that has been done in the past. But I think those are some of the things we need to talk about – with these independent experts that really know the history of collecting in the CHIS, and what the source of knowledge is, and the state of the knowledge, and what the gaps are, to decide what is our highest priority. But I guess I have enough experience with these types of workshops, to know that, generally, it always used to be that the first order of business is to figure out what has already been done, if there’s been a lot done, and that there’s usually not as much interest in going out and doing additional field work because there is a lot that has been collected, but the information just hasn’t been brought together in a cohesive manner.

Q: Are you happy with the lists you have in NPSpecies?

A: Yes.

Q: Do you have an RLC?

A: Yes.

Q: Would they be involved at all?

A: Possibly – they are limited right now, it's just one person.

Q: Who is that?

A: Susan Teal.

Q: What RLC is that?

A: Right now we're called the Mediterranean Coast RLC, but they're talking about changing it – that's also at SAMO, where Susan is.

Q: So basically, you're using your Centennial Challenge money to leverage more opportunity for the park and you're in the start up phase of a biodiversity program?

A: Yes.

Q: Do you have any questions for me?

A: What are you doing with all the interviews?

Discussion: Explains the data matrix; and trying to pull common threads, etc.

Discussions about the I&M program - - how the NPS is dealing mainly with the Monitoring side of things and not necessarily the Inventory side of things. i.e. – there are many little efforts being conducted through the RPRS system, and parks are getting data, reports, but don't know what to do with them – don't know how to make it cohesive, don't know how to get it into one place.

A: Yes, I would say this is true. We're interested in both the Inventory and the Monitoring parts. But we're not entirely sure what to do with the Inventory side of

things. Some of the inventory information, particularly the lichens, and how it relates to land use – that is useful to management because we can say that the rarity of these species will help us to direct our management. But there's a lot of inventory information we don't know what to do with – it's interesting, but what do we do with it? It doesn't affect our management, or we don't know how it *should* affect our management. Another thing that has come up here – I should have brought this forward when we were talking about databases, is there has been some interest here in these databases like the Encyclopedia of Life, and Tree of Life, and those kind of things, that maybe have a more popular interface? I don't know that much about them, but I know I've been asked why we aren't using those kind of data repositories, as opposed to NPSpecies, which is just an internal thing, and not connected to larger efforts where you can put it into context?

Discussion about data portals.

A: These are the kinds of conversations we haven't had – and I guess the NPS with NPSpecies, is working with that database to make it better, but I have a feeling that most of the parties aren't going to come with a pre-determined bias towards – let's use the NPS database – I think it will be discussed along with these other possibilities. That's why I don't know what we're going to end up with yet. But where I want to go, is not business as usual – everyone doing their own thing – we just haven't made those decisions yet.

Q: One last question, do you foresee any type of public or outreach component to your effort, or will this be left up to TNC and park staff?

A: We are going to have a public component, but not in the field side of things. In part because the islands are so hard to get to. The way we're foreseeing it, is that there is going to be some mining of past information and field work, but by the end of say a year, we're going to have this cadre of scientists who have pulled together information looking at the body of work that has been done – but they'll be very knowledgeable about the resources on the islands, and we'd like to have a one or two day public series of presentations and maybe displays, highlighting the biodiversity of the CHIS, likely to be done here at park HQ on the mainland. So that would be our way of bringing the science to the public. Maybe in combination with a field trip to the islands but we're not going to have a bioblitz, with the general public collecting in the field. I went to a bioblitz at the Santa Monica Botanic Garden – they did a 24 hour collecting blitz, but at the same time, during the day, they had displays, and scientists with their microscopes, and speakers, giving slide shows on their area of expertise. For me, I found the talks interesting and seeing the scientists doing their work interesting, but didn't think there was much value in the 24 hour collecting thing. So we're downplaying that. We will have a public side to it, but the focus is ATBI, with no blitzes at all – just standard science.

Congaree National Park
ATBI/Bioblitz User Requirements Interview Questions
3 Interviewees
16 December 2008

Q: What are the goals of your blitz activity?

A1: The major goal is to do species level inventories of groups that aren't covered by the I&M network. Secondary goal is to engage park visitors and citizen scientists.

Q: What do you call the effort at your park?

A1: Blitzes to understand a small group of organisms – not an ATBI. We have done spiders, an annual butterfly count - which is not a blitz – bird counts; also not a blitz, and a mussel inventory.

Q: Is your I&M effort involved in your park effort? Your RLC?

A1: Our I&M network is not involved; our RLC is the lead organizer of the blitzes. It's the Old Growth Bottomland Hardwood Research and Education Center.

Q: So your RLC is responsible for organizing and advertising, etc., the events?

A1: Yes, via press releases, coordination of logistics, managing the data, managing results, and hopefully, summarizing the results of the efforts and getting that information out to the visitors.

Q: How do you see this information helping your park, or helping the NPS?

A3: We have demands by the visitors – we get incredible requests for species lists in this park – we're known for biodiversity, and people come here with varied interests. Continuing the development of these kinds of brochures and handouts at the Visitor Center is definitely one applied use of this information.

Q: Do you think you have reliable lists right now for vertebrates and vascular plants?

A1: Yes, these stemmed from the I&M program.

Q: Are you actively entering data into NPSpecies?

A3: We leave this up to the network, at least as far as the main groups covered by the I&M network.

Q: If you wanted to get a list of the spiders or butterflies in the park, where would you go to get that information?

A2: That would come through Resource Management, and I would generate the list from the Excel spreadsheet that we maintain.

Q: How do you currently keep track of the data that resulted from your FY09 (or other) blitz efforts? Where is this information?

A2: We collect data on who participated, the number of hours of volunteer time – documenting the effort in the program. So in a spreadsheet, internally.

Q: For example, with your spider blitz, you collected certain data elements - - where these housed in a database, an Excel spreadsheet? What format are they in?

A1: Everyone is different; as for the butterfly data, it's maintained in an Excel spreadsheet.

Q: And who maintain it?

A1: Park staff. The data for the butterfly count gets reported to the NABA (North American Butterfly Association), as part of their 4th of July North American summer butterfly count. For birds – the Great Backyard Bird Count is similar to NABA – it's part of their international program in February, so it contributes to a larger data set. They have a format for data collection; we retain hard copies of those sheets, but we login to their database on-line to enter our data.

Q: The efforts you are involved with are not necessarily park-based, but part of larger biodiversity efforts?

A1: Yes, for birds and butterflies – the other projects have been involved with permitted research in the park. For those, the PIs on the permits are responsible for getting the data to us.

A3: Yes, that's right – with the spider blitz – the data management end of that, we assign to the actual researcher who is conducting the work.

Q: They turn the information over to you when they are finished?

A1: That is the plan – they are very behind with the taxonomy of all the specimens they are collecting, and we are learning that this can be a large bottleneck.

Q: Re: your data work flow – we are interested in learning about the various stages that every bioblitz-type event goes through; what information do you assemble, or what information exists prior to the event?, then what information is collected during the event?, and then what information is processed after the event? – can you take me through these various steps? So let's start with the 'prior to the event' – what data

elements do you need to have in place prior to your blitz? – for example, what are your taxonomic requirements?, curatorial requirements?, mapping requirements?

A1: With spider blitz, I worked with the PI on identifying locations that would contribute good data to his overall research strategy – that were accessible to the public, and that would have minimal resource impacts. This was planned ahead of time – we put a dot on a map where we were going to go for each part of the bioblitz.

Q: If you identify those locations, do you go back to them every year?

A1: We repeated the spider blitz twice, and some of the location we did hit again, some, we did not. In the two years, there were three sites per year, and we hit a total of four to five sites over the two years.

A3: All we were trying to do with this is generate a species list for the park.

Q: And the sites are maintained in a GIS?, or marked points on a map? – how do you find them again?

A2: We took GPS readings so we have points that are recorded for where collections were made – that’s standard for specimens – when you collect a specimen, you ideally have it tied to a specific location.

Q: So that data element – that contains the site and description and the point – is that in your Excel spreadsheet?

A3: That will be in the final report that the investigator turns into us at the end of his project.

Q: I’m still trying to understand the endeavor – unlike maybe other parks, it seems like you have PIs that are spearheading these efforts for you?

A2: It depends on the project – the spider blitz was conducted through a PI external to the park, but the butterfly and bird counts we’ve done are park-generated, with park staff – we have volunteers that assist us, but it’s mainly a park-based effort.

Q: And those two efforts, those data are incorporated into a larger effort, correct?

A2: Yes.

Q: Do you also keep records in-house, from those efforts?

A2: Yes, we have that data.

Q: Can someone send me some of that data, so I can have a look at it?

Q: Back to trying to figure out some of the stages that you might go through prior to a blitz – you say you map coordinates, do site descriptions, etc. – how do you deal with taxonomy? Do you work from lists? Is this left up to the PI?

A2: Again, this is project dependant, and based on the goals of the project. Like any research project, the goal and the objectives are going to focus on the strategy and the methods. For the butterfly and the bird count, we're working from lists that are already generated of species that have been documented within the park, or that are most likely to be seen here – it's really a checklist – not just presence/absence, but also there is some element of abundance. Re: the spider blitz – there wasn't any kind of known taxonomic list to work with – this was the goal of the project – to document presence/absence and to confirm with taxonomic verification of actual specimens collected, that we had these species in the park.

Q: Back to the butterfly and bird lists, where did you get them? – from the I&M program for birds, for example?

A1: In the case of the bird count, we have a long time volunteer who has informally published bird lists, and could do the identifications both visually and audibly, so he already had a list to work with; his own list. For NABA, we have staff that are trained to identify butterflies.

A3: There is good taxonomy associated with the bird and butterfly counts – we don't do specimen collections; just observations. The only instance with taxonomy we've had is with the spider blitz.

Q: And for that you had a PI that worked with that?

A3: Yes, to form a list for us.

Q: Let's talk about post-processing; what do you want to do with your data?

A3: We are interested in both maintaining species lists at the park, as well as uploading it to NPSSpecies. Species lists are distributed to visitors at the Visitor Center, for basic park inventory information.

A2: We've also generated photographs of a lot of the species that are on our website – in the photo gallery – we've generated posters that highlight some of the more common species found in the park, and summarized some unique life history aspects of some of the species, so there is definitely an outreach component to some of these species lists.

A1: We've also used some of the data from the freshwater mussels to feed back into working on proposals to target some of these taxa for more ecological research – to understand habitat and ecosystem roles.

Q: What about post-processing – what kinds of information are you interested in?

A3: We have an interest in abundance, species richness, native vs. non-native species, range extensions, species new to the park, species new to science – all information is good, but limited by funding.

Q: Was there information that you wanted to collect, or thought about collecting, but were limited because of time, funding or other – as a means of satisfying the goals of your blitz effort?

A3: For the butterfly information, it would be great to have specimens tied to our species records, but we don't have the funding for that, or to do the curation or ANCS+ entries – so we restrict that to simply an observation count.

Q: But for the spiders, you did do some collecting – are you working with the curator on that?

A3: Yes, we delegated data entry to the PI – all of the specimens will obviously have to be entered into ANCS+.

A2: 400-1000 species were collected (unsure).

A1: Preliminary data showed 100-150 new records for the park; the total count is up to 400 species, but it may go up to 700-800 species present in the park.

Q: The curation is taking place within your park?

A3: Yes, it's taking place here.

Q: Do you have the facilities in place to handle the specimens?

A3: Yes.

Q: Is there a research permit associated with this effort?

A1: Yes

Q: What would be an ideal way for you to be able to get at this information?, from all the various efforts – can you think of, what would be an ideal way to get at it – either web-based, or a report – what would work for you?

A3: Yes, having it on the web in the form of a list with that list linked to an image of the specimen or species - - that together with some basic ecological information tied to that list would be extremely valuable.

A1: Also basic taxonomy that you could do without a microscope would help people narrow down what they might find in the park.

Q: So maybe some sort of key, that would help them with identifications?

A2: Yes, and the overall photo of the organism, and for some species, there are definitive characteristics for taxonomic identification that could be mentioned, especially for commonly confused species.

Q: Would you imagine this kind of data hosted on a website that your RLC would develop, or an in-house effort?

A3: With the RLC would be ideal, but it comes down to resources.

Q: Do you see the audience for this – can you distinguish between a couple of different levels of information? – would all of this be something that the public would be interested in? Is there a distinction between what would be available for NPS people vs. researchers vs. the public? – or all the same level of information?

A2: As long as it's user-friendly, I think the information that is provided for park management is similar to what researchers or the public would like, although with some sensitive species having GPS coordinates or locations; that couldn't be available to the public.

Q: So you do have some sensitive information that you need to accommodate?, in terms of restricting where it was collected?

A2: Yes, potentially.

Q: In the process of conducting one of these efforts, you've got members of the public, and maybe a taxonomic specialist – the public will actually pick up or collect these critters, and take them to the specialist for identification? What is the process of handling and collected these organisms? Can you walk me through the various hands that these specimens go through in this process of conducting a blitz?

A1: For spider blitz, the citizen science component was one day; we did three sessions through the day – for each session, Dr. Wolf (the PI) did a short PowerPoint presentation in our auditorium where he framed the issue, and ended by talking about collection techniques, and then demonstrated them – sweep nets, by hand, etc. – and assured people that they wouldn't be hurt by spiders. We had collection cups and he would sit in the center (of a site) with a tub of alcohol and send people out collecting by hand. Folks would try and collect them and bring them back to Dr. Wolf where he would put them in alcohol for preservation. He would save a suite of them and if he saw something cool he would talk about with the program participants, he would save them and put them under microscopes. At the end of the program, those went back into a common pool for further identification.

Q: How did the spatial component work? – these folks were collecting – how did you relate this information into a point?

A1: Dr. Wolf would take a point where he sat down, and we would work people out into the area. It was not systematic or quantitative.

Q: I'm talking more about location – he was sitting out in the site?

A1: Yes, he was at the center of the site, within a boundary, and would farm out people to sub-habitats in that site.

A2: It targeted specific habitats within the floodplain.

Q: How did you related the animals collected with the site/habitat?

A2: We kept the samples separate; the group in the morning sampled one specific type of habitat, and all efforts were pooled.

A1: We didn't save specific data about micro-environment or niches – i.e., this was found under a log, or this was found on a tree trunk – the whole assemblage was collected together for identification; to represent this cypress/tupelo flat, or to represent this canebrake, or to represent this bluff ecotone.

Q: So there was a UTM coordinate that went along with the site?

A1: Yes, and on the spreadsheet; so if you found a UTM coordinate, you could know that the collections were made within a 50 foot or 100 foot radius of that site.

Q: Were all of the specimens associated with a particular third of the day, given a group of catalog numbers? – how did you work with the curator to keep track of the specimens? What was the link between what the folks collected, and the curator?

A3: There hasn't been any catalog numbers issued yet.

Q: Okay, and some specimens were probably destroyed in analysis?, and then the ones that are kept and identified and preserved, at the end of the effort, those are the ones assigned a catalog number?

A3: Yes.

Q: So Dr. Wolf has some sort of label he's developed for these three different groups, so when he works them up, he's able to tell that they came from a particular site?

A3: Yes, standard fields and protocols.

Q: Does he maintain who collected a particular spider?

A1: No, Dr. Wolf will be identified as the general collector.

Q: So his results will come to you in the form of a report, that is linked with an IAR?

A3: Yes, he's responsible for an IAR, but also responsible for a comprehensive, detailed, final report that lays out all of his collections sites – he's doing more collections other than those from the citizen science component.

Q: How many people participated?

A1: 35 people the first year, and upper 30's the second year.

Q: Do you have future efforts in mind? – how does this happen? – through the RLC, or would they be park-based?

A3: We've talked about other, future wishes and specific taxa groups, i.e., aquatic invertebrates, but it's driven by funding – what our priority groups are?, which groups haven't been surveyed?, etc. We have a local specialist from Furman University who is a specialist in dragonflies, and we've talked about working with him for a future effort.

Q: At the end of a project, is there some sort of reporting on, less of the science component, but more on the social science side of things?, in terms of park press releases, or things that illustrate the public involvement in this?

A2: We have our RLC final report to Congress, where we capture the bioblitz efforts, including the focus on citizen science. Our overall program evaluation is a topic that we are addressing with the RLC; how do we evaluate our education programs? How do we evaluate our bioblitzes? What does it mean to be successful? These are things we are developing; we are a relatively new RLC.

A1: With the freshwater mussel survey – that turned into a public lecture series with 19 participants, and we also have our researchers come to the park every year in a program called NatureFest, where all of our park partners and researchers come out to do programs. Dr. Wolf has done a popular research table there, about spiders, so those are some ways we turned those into programming.

A3: We also do press releases – we get great press coverage whenever we put on an event – for the butterfly blitz, they sent a reporter and a photographer out who mingled with the group, and they follow up with that in the newspaper.

Q: I'm curious, what does your curator think of all of this?

A3: We don't have one; we have a biotech who manages our collection as a collateral duty; that's always the real labor intensive part. For the spiders, the intent was to have

the investigator put the specimen information into an Excel spreadsheet that could easily be migrated into ANCS+.

Q: And at the same time, you also want that information to go into NPSpecies?

A3: Yes.

Q: If, for example, you were able to have a template that showed good ways of collecting and noting data for a variety of projects – certain variations for plants, mussels, spiders, etc. – but overall, if there were a framework for the important data elements that are important for the various collections you’ve made, and that structure could talk to ANCS+, and it could talk to NPSpecies, would that be helpful? It could give you some guidelines in terms of how to structure your data so it could connect easier, with say, ANCS+ or NPSpecies?

A3: Yes, that would be helpful, but I think something like that already exists within our I&M network.

Q: What is your understanding of this?

A3: I thought a template like that had been developed through our I&M data manager; I think she turns that template over to the investigators that are doing inventories; to have them populate these fields, so it can easily be migrated into ANCS+ or NPSpecies. Are you talking about something different?

Q: I’m thinking if we had something generic, that anybody that is planning or executing an ATBI – ‘here’s a good template to use’, and maybe you wouldn’t have to have something that a data manger specifically designed, but a good model to use that will help guide data entry and guide the design of how information is kept and collected, so that those kinds of connections are easily made.

A2: Specimen labeling requirements also – but this information already exists.

Q: Have you used them; has your I&M data manager given them to you?

A2: No.

Q: Another thing that might be helpful, if you are putting all this information into a spreadsheet or database – where you have information about the collector, data, etc. – you could maybe use the system to print out your labels.

A2: There is some debate on what kind of ink needs to be used; specific requirements on the process of generating the labels so they don’t disintegrate in the preservatives they are stored in.

A3: I think the I&M data manger has a program in place to print labels; that was how the vascular plant data labels were done.

Q: Are you using other databases to collect information?, or only Excel?

A3: Only spreadsheets; no other databases are used to house species information.

A1: Re: butterflies, there is a web form used to upload information; and see the Great Backyard Bird Count website on the Audubon site, that shows you the data forms and what data they need for their purposes. When you go to the web form, there are drop-down menus, etc. It's not correlated with specimen label requirements in the NPS, but it's a good look at the type of data one might expect coming from a citizen scientist-based program.

Q: How valuable are you finding these bioblitz efforts?, is it bringing good return to the park?

A3: It's been a great example for us to engage our public; how valuable this information is to the long term management of the park; I am not sure I can speak to that. We use these to generate species lists, and to engage the public, and at least the engagement of the public has been extremely beneficial for us. We have a large group of people interested in CONG, and it's been a great outreach activity. Biodiversity is also spelled out in our RMP. The RLC really helps facilitate research in this capacity.

Q: Are there other partners involved in the area that you share data with?

A3: We're an island surrounded by private land, but there is interest, re: the USFS has done some bat work on adjacent lands; the DNR is an active partner on other projects – they help us maintain a bird banding station throughout the summer, so we get some data from that. There is a host of partners that would be interested, but we've never really pursued these kinds of partnerships.

A2: The mussel work was just a preliminary study; it might not turn into some kind of citizen science component, but that was exclusively with partnerships. We had volunteers from the South Carolina Aquarium, TNC, the USFWS, the University of South Carolina, the South Carolina Department of Health and Environmental Control, and the NPS. So there's a big potential for partnerships for freshwater mussel work, but it's limited by funding.

Q: Do you have problems with working with different taxonomic systems?, re: out West, plant lists are very different by state. In thinking about needs to crosswalk with taxonomic systems, is this a stumbling block?, or is it obscure enough so that it's not that big an issue?

A3: It is not an issue for us yet; we're not at that stage.

A2: But it could be a huge issue with aquatic species in the Southeast; we're so diverse, that depending on who's authority you use, you'll have many more, or less species, so this could be a huge issue.

A1: In any database or list, there should be a source for what taxonomic source you are using.

A2: Is there a push to use ITIS?

Q: Yes, there is an MOU signed with ITIS, and it is the underpinning of the NPSpecies database, as well as USDA Plants. Do you have other electronic lists that you are interested in using?

A2: For aquatic invertebrates, we used the Nomina database; it's solely in an electronic format. (Webpage is Nearctica: <http://www.nearctica.com/nathist/nathist.htm>)

Q: Good information to know. At a national level, we're working on how to be able to crosswalk and reference and use many different taxonomic systems or authorities – this will probably need to be carried into ATBI – it seems like a broad requirement that anyone would have.

Q: Wrapping up – are there any questions you have?

A2: Streamlining the process from the actual collection, to the archiving of the specimens, and even documenting where the specimens are located – not every park has space for specimen storage or expertise for curation, so a lot of specimens are stored off-site in repositories. Documenting the locations of those would be helpful; it could be tied in with the RPRS system and museum curation?

Q: Have you developed relationships with outside herbaria or museums for your collections?

A2: Not yet, but this summer, we had RPRS training, and spent time on how to develop agreements, but ownership is still a major issue.

Q: Has this been a problem for you so far?

A2: One project on amphibians and reptiles here in the park – two repositories would not accept our specimens because of the current NPS ownership requirement, so we had to figure out something else. Which was not our first choice of where the specimens would go. Collecting specimens and being able to use them or review them at 50 to 100 years from now is very important – they must be maintained, with forethought with where does it make the most sense for usability and to further research and science, or even basic maintenance. You have to come up with a plan for this in advance, and we don't have the best answer for this right now.

Q: Do you have appropriate facilities there at CONG to handle specimens?

A3: No, we have a very small collections room in the RLC, but we can't take wet specimens – this same room houses the park archives.

Q: What will happen to the spider collections?

A3: They will stay at Clemson, with the PI.

Q: Is this regarded as the place to go?

A2: They have an arthropod collection there, and we're amenable to signing the agreement. But this isn't always the case, and it is becoming a big issue.

A3: It is becoming more and more of an issue – our plant specimens, that have been housed at the University of South Carolina, just 20 miles away – they are giving those specimens back to us because of this ownership issue. We have to send them down to the University of Georgia – USC said, 'enough is enough' – here are your specimens back; we don't want them anymore.

Q: Any other comments?

A2: One thing we have sort of mentioned is the social science side of this. You were getting at how we evaluate this, but if you're working towards developing standard protocols and guidelines for how to conduct a bioblitz or ATBI, that type of program evaluation for social science needs to be included. Even basic things: what were your thoughts on spiders prior to this even?, how do you feel about the after six hours in the field with them?, were you surprised to find out where spiders lived? These types of questions will help evaluate the effectiveness of a program.

Q: Another question – have you worked with schools in the area?

A1: We tried one experimental exercise with school kids, but it happened in November, with spiders, and it was a bit too late in the season. We have not specifically integrated them into our data collection programs.

Death Valley National Park

ATBI/Bioblitz User Requirements Interview Questions

21 January 2009

NOTE: Original interview on 12th January was accidentally erased – this is a re-do of that interview.

Q: When we talked before, you mentioned you had a scorpion project, and then you sent me some information on a ground dwelling arthropod bioblitz – can you talk a bit more about those projects?

A: The first effort we had was with a Santa Monica college group who came out here and ran a transect with 11 stations. The stations began at zero elevation and went up to 10,000 feet, in 1000 foot allotments. This was in September of 2007. Then the next organized group we had was in March of 2008 – it was with Santa Fe College – they went to one site only.

Q: In this second group – what were the organisms you were blitzing?

A: It was the same as the first group – basically just ground dwelling invertebrates. The intent of the first one had maybe a bit more emphasis on spiders and ants because I already had people arranged to identify them, but that focus was changed well before we got started – since I already had folks to send spiders and ants to, so if we were going to go out and do collecting, it would be nice to collect these other organisms, and they'll just be piles for me waiting to get identifications for. We weren't prepared to collect from water, or night flying organisms, etc. – but ground dwelling organisms; those under rocks, on the surface, on the ground, etc. So the Santa Fe College group went to a different location than the first group – only one location. Then, the third group that went out – we experimented with a younger group – we went to three of the original ten sites that we went to with the first group. We replicated it for spring sampling, but experimented with a younger, group – elementary school fourth graders and had a large group of people, and it was more of a challenge because of the age issues and concerns. No one was identifying anything – just collecting. That was the youngest that we would entertain – and may even set the limit a few years older, but that was an experiment and we did collect a lot of things. The next organized group was a bunch of YCC kids – they were very eager to do YCC activities, but also other things besides just trail building, so we sent the YCC group out there and collected at one location – a new site. And then, other than that, there's been several smaller groups of NPS employees, going out to maybe one or two sites, and collect on a particular day – more random sites and data collections, in-between these larger group functions. We probably have about ten sites that we've completed with NPS personnel – some were reconnaissance trips to see if it would serve logistically for larger groups for later; some of them were suitable to be only for one or two people.

Q: And they were all dealing with collecting these ground dwelling invertebrates?

A: Yes

Q: So all those efforts you just talked about – the data go into one database?

A: That is correct. And then the other function – the scorpion project – is part of the Centennial Challenge money that we received – went into an agreement through the CESU to have the University of Nevada, Las Vegas group, to come out to conduct a park-wide scorpion inventory. Because we apparently have a high diversity of scorpions, including quite a few endemic organisms. We weren't aware of that until fairly recently. And so these school groups that we were taking out there – we were encountering quite a few different species of scorpions and there's a lot of fascination about them, so the thought was to have the University crew do a park-wide inventory, and at the same time, produce a very user-friendly, lay-person, guide and key – for the identification of scorpions. So when these school groups are out there, there's not a lot of expertise – that they could be using this visual guide to id them without having to collect as many in the future. We can also use this for external uses – educational aides, etc. – so the local cooperative association was interested, and they're interested in selling them to the public as well.

Q: So has the scorpion project started? Have they started collecting data?

A: Yes, it is a two year project, and they did the first year, and they collected quite a bit in quite a few areas, though they still have quite a few areas left to collect in. But they've gotten a good start – quite a few scorpions, and several species which are new range extensions and things like that.

Q: What kind of data are they collecting?

A: Well – obviously, the identification, location, habitat information and then collecting the scorpion itself, so they'd have a voucher specimen. And they gave a very detailed, very quality, photograph to go into the photo guide – so we not only have the habitat – that was one of the things that I really wanted to associate with it. This is not just a checklist of species – we are closely associating them with habitat and other information, so therefore, down the road, some habitat/ecological function/relationships could be made.

Q: Can you tell me a little bit about the database for your ground dwelling invertebrate data? What kind of data is this – and I think you mentioned before that this is an Access database that you developed?

A: Yeah, just to temporarily store the data until a more suitable database is developed or provided. I just keep the data in a couple of Excel and Access databases – just simple tables, that could possibly be exported later.

Q: What kind of data fields?

A: Oh just things like, what's the vial number, what the species is, where it was collected, the elevation, and whatever habitat information we can get – you know, just the basic collection information.

Q: And how many records do you have so far?

A: Around 1000.

Q: How do you deal with the taxonomy of these ground dwelling invertebrates? You said you had lined up some experts for ants and spiders?

A: Yeah well, I can get them down to Order, but then, like I sent out the spiders to a person from the University of New Mexico who agreed to identify them for me. And she returned them pretty quickly and said whenever I want to send her more spiders – that would be great – so I've sent her two different shipments, and she's sent them back. And then I had a similar arrangement with a recognized ant expert – he agreed to identify them – but unfortunately, after the second shipment I sent him, he died unexpectedly, so that particular contact; I need to find another person. But yes, he did send in, with the first shipment, the identifications, and there again, there were new range extensions, a new state record – various information on that first group.

Q: So did you also put those data into ANCS+?

A: No, not yet. They have not been cataloged yet – they're waiting to be transferred over to – I touched base with our curator, and asked him if they want them every time we have an event? Or, like, once a year? And it seemed to be that once a year was good.

Q: Do you have an RPRS permit?

A: Yes, I issued the research permit in my name, so currently, all these events are operating under my research permit, except for the scorpion one – we issued a separate permit for them. All the ground dwelling ones are with me.

Q: And so you're responsible for getting those specimens back to the curator, and uploading the data....

A: Yeah, and also before I do that, I'm still waiting for identifications, and once I get them back, I'll go ahead and populate ANCS+ and make sure that that is up, so when I turn it in, I not only turn in the specimens, but also the ANCS+ records.

Q: How many specimens are we talking about? You said you have about 1000 records in your database....

A: Probably the same amount, and not too much will be consumed by analysis, so they'll probably all go into the collection.

Q: Did we talk about NPSpecies before? Do you have a plan to enter any of these data there?

A: This information that we are collecting – my expectation is that this stuff will go into NPSpecies to keep that current. However, at the same time, as I mentioned before, I don't really see – outside of the typical purposes of NPSpecies – that the NPSpecies program is serving much of a need for our all-taxa database needs. So therefore, yes, we'll keep it current – so we'll export whatever information we have – to ensure that NPSpecies is updated, but NPSpecies will not be actively used for our all-taxa effort because it just doesn't serve our needs.

Q: What would serve your needs better – could you tell me about any wish list items you might want, or if they NPS had a system that worked the best for you – what would that look like?

A: Well one of my – the two broad functions, if I could paint a very broad level of what I want a database to have – is not only to keep track and archive the status of what's been collected and where it has been collected and the status of where it is located at the moment, so therefore – like who has the specimens, and who has the vials....

Q: Do you mean like a tracking mechanism?

A: Yes, and the other is a research tool to not only to link it up with habitat, geospatially, and to curate it, but to find out, okay, what are we finding at what elevations? And what vegetation types? And what commonalities between the vegetation types at different elevations? Or North to South lines?, or other gradients that we have here? – what are the commonalities to be able to make a collection a point in the park? – so we're saying that

this species has been found at 100 different points in the park. And make it into a – you know – a model development to be able to make some inferences outside of the areas that we’re actually sampling. So therefore, to get a certain amount of confidence to say that, okay, we may not have sampled this, but based on the vegetation type and the elevation, and various other parameters, that this is the type of organism that *could* be there – or these are the boundaries of certain range extensions, or this is the niche and role that this organism plays, or you only find this particular invertebrate with this species of vegetation, or something like that – make those community and ecological inferences in a more of a two dimensional perspective, instead of just point data on a map. So if so, it’s going to have to have the ability to be geospatially seen and be more of a research tool, than just for more of an archiving purpose, like ANCS+ or NPSpecies.

Q: How do you deal with spatial considerations right now?

A: We have point data where the plots are located – yes - but after we have enough of these points, then we could start reliably making some of these inferences.

Q: What about future efforts at DEVA – do you foresee upcoming events for your ATBI in the pipeline?

A: Yes, well, I mean, the intent is all-taxa, and not just in certain areas of the park, or not just certain organisms or not only just the terrestrial invertebrates, but yes, to be more inclusive, but we have to start somewhere and also, I – to get the level of enthusiasm and visibility to our effort and get a certain momentum going, - - potential volunteers coming in here – they have to come a long way to get here, because we don’t have an urban center close by. Las Vegas is fairly close, but still a bit away, and we haven’t really formed really great connections of volunteer efforts from there. But anyhow, we need to get something to get the level of enthusiasm up and get things rolling. So I thought, well at least we could do it with certain groups of organisms – if I could get at least two recognized taxonomical experts that are willing to donate their time to identify things, and if we could just get groups out here to collect stuff to start sending to them, that would help build a little bit more visibility and momentum, and then hopefully other parties and partners would be joining on up and we could kick it up into a full fledged ATBI.

Q: In our previous interview, did we talk about the I&M network there, or the RLC – are they helping at all?

A: Well, we touch base with them – they know what we’re doing, but so far, there’s not a lot of assistance that comes out of that regard. They are aware, and support what we’re

doing, and so maybe there's ways to facilitate these things more fully down the road, but we haven't developed those yet. But what we have developed is – in order to get to the next level – which I feel we really need to do – we need to kick it to the next level – so I needed to bring in – and also I was concerned because it was such a, you know, locally, within the park, it was really driven by my initiative, and the superintendants' support, and the superintendant was retiring soon, and also, I may not be here – who knows how long? So I really wanted to build more sustainability into it, and at the same time, bring in some entity that would allow us to kick it to a higher level of visibility and support. And so, actually, I was coming back from an all-taxa meeting from Colorado (last July, in Ft. Collins), and I was sharing a bus ride to the airport with the data manager from DLIA. He mentioned that they were in somewhat of a transitional period and in some regards, the all-taxa project at GRSM is kind of winding down to another phase, because they're getting closer to ending that. But at the same time he said that their group - which was originally formed for the all-taxa effort at GRSM – was thinking about having a life beyond that, and not sure what that role is, but the board was exploring things. So I pitched a proposal to him to take back to the board, and I developed a presentation I sent to them, and they considered it and accepted it. And that is to – you know, they were looking at potential ways to expand the vision beyond GRSM, and so I said, well what better way that you guys have a lot of experience with all-taxa efforts, and all kinds of people are tapping you for your expertise as far as all-taxa projects. And at the same time, we need somebody with that degree of background and history and partnerships, and learning curve that they've developed, to help us kick our all-taxa to the next level. And at first, they were thinking maybe just assistance with database management, or assistance with one or two things here or there, but I mentioned to the board, no, I'm looking for a full-fledged partner, kind of like with the same relationship you have at GRSM – to have at DEVA. From their perspective, having the east coast as an example at GRSM, coupled with the wilderness type of perspective of the desert, of a large park in the west – DEVA – would really help forge their national perspective and viewpoint that they have. And from our viewpoint, it would allow a greater degree of visibility and partnership and potential about having them be fully involved - and they agreed upon that – and we're at the stage right now, where, who's role will be what? Because there's four partners in this now – beyond the University partnerships I've established – there's the NPS, there's the local DEVA Natural History Association – they've agreed to be a partner, from everything from fund raising to educational materials and a variety of other things. And our Friends Group, which is a fairly new group – and they have a bunch of heavy hitters as far as potential fund raisers – they're well connected people – including a former director of the NPS. And also DLIA. And so each one could serve different roles – who would be doing what? Those are the types of things that would probably have been fleshed out by now, but it's been delayed because of all the change over in staff at the park. You know, the superintendant is retired, and the new superintendant was just

selected, but won't be here until March. So therefore, if we're going to be launching this major new initiative, including bringing on more staff – specifically for the all-taxa effort – through this fund raising campaign we hope to hire two more people.

Q: So you foresee DLIA taking on your park, in a similar manner that they are doing at GRSM?

A: Yes, well, but because of logistical things and other aspects – there may be different roles in how we do things, but by and large, yes, we'd be a fully functioning partner, in a very involved sense, though their roles might be a bit different than they would be at GRSM. But yes, we foresee them to be a major player.

Q: Going back to something you said earlier – about the turnover, etc. – so again, I'm trying to focus on the data, and how not to lose it – say for your ground dwelling arthropods project. You say you have this in Excel spreadsheets and an Access database – then you would envision maybe turning that over to the DLIA folks, and have them sort that into their own data system?

A: Well, the vision was that – you know, ever since that meeting last May in Ft. Collins – is that we'll be using the NPS database.

Q: The interim ATBI database that was developed last summer?

A: Yes, that seems to – it will serve our purposes, as it was outlined in that meeting in Ft. Collins. And I've not converted our data over to that yet, and.....

Q: Have you worked with the database at all?

A: Not outside of that meeting

Q: But that is your intent – to put your data into that database?

A: Yes. And so I, in DEVA, will fully support that NPS effort and hope that it will – that level of support to that database, will continue. One other thing – as I said a portion of the Centennial Challenge money went to the scorpion study, but the other portion, I didn't mention.

Q: Oh excuse me, I thought that was the ground-dwelling insects?

A: Just to help with transportation, but no, most of it went into kind of a follow up to that – as I said I had ant and spider people, but I was developing more and more of the backlog of these other organisms – a few centipedes here, a few Orthopterans here, etc. – it almost didn't seem – we didn't have a quantity of any one of these to seem worth to try and send out a batch to somebody at this stage, but then again, I didn't want to wait too long to get the identifications on this backlog, so I, through the CESU and NAU, got an agreement to take the collection of non-ant and non-spiders – the miscellaneous groups that we collected – and do some identifications to get caught up. And so having that caught up, hopefully would, and whatever results we found – would provide the seed information to get some of these other groups down the road excited to say – whoa, look, they found some interesting springtails in that few collections that we've had out here – so maybe more springtail experts would be willing to entertain partnering with us down the road because these preliminary results piqued their interest. So this was a seed effort to get things caught up, and also to pique the interest of others down the road.

Q: So that is Neil Cobb who is doing those identifications for you?

A: Yes – I've talked to them recently, and they think it won't take too long to do all the identifications.

Q: They have the remaining organism besides the ants and spiders?

A: Yes, and then we'll take that information and put it into our spreadsheets.

**George Washington Birthplace National Monument
ATBI/Bioblitz User Needs Interview Questions
2 December 2009**

Q: What are the goals of your blitz activity?

A: You probably need to check with Resource Management for the particular goals at GEWA.

Q: What do you call the effort at your park?

A: A bioblitz.

Q: Is your I&M network involved in your park effort?

A: Yes, the park approached me to be the data manager for this project after receiving Centennial Challenge money, and knowing that I had an interest in biodiversity.

Q: Is your RLC involved with the park effort?

A: No.

Q: Is there a vision for future efforts at the park?

A: The park is very happy with the bioblitz effort, particularly with the entomology aspect. They want a more scientifically involved effort. Resource management is working with Neil Cobb at NAU – Neil hopefully has a student coming to GEWA to do Masters thesis, which will involve some sort of ATBI work.

Q: Who uses, or is planning to use, the data from your blitz efforts?

A: The park Interpretation staff – they would like to develop more checklists for the park and be able to give more natural resources information out to park visitors.

Q: How do you think this information will be used long-term?

A: For visitor education and park management – the park has not been well surveyed.
Re: the mycology survey – it identified 30 new fungal species for the park via the bioblitz.

Q: How do you currently keep track of the data that resulted from your FY08 (or other) blitz efforts? Where is this information?

A: The data is with the network NPSpecies data manager – she is still massaging data. Also, the park (resource management) has the bird data. All data will eventually go to the network data manager, and she will incorporate this information into NPSpecies. The data will then go back to the park in a form that they can use to develop checklists if they want. Data will be stored and archived at the network as Excel files.

Q: What types of information did you collect during your blitz?

A: We tried to identify all organisms to the species level, a location – no GPS units were used. Photos were also taken for experts, if they needed it.

Q: Was there information that you wanted to collect, or thought about collecting, but were limited because of time, funding or other, as a means of satisfying the goals of your blitz effort?

A: Yes, we would have liked to have more taxa groups – as it was, herpetofauna, fungi, birds and vascular plants were the targets. The park doesn't have a lot of historical data about natural resources, so almost anything is great in terms of adding information. However, they are limited by expertise in the area.

Q: How/where are data entered for your blitz project?

A: We attempted to use the ATBI interim database, but it wasn't easy to do that on the spot. So we had to use the field sheets from the database, but they weren't particularly useful for vascular plants and birds.

Q: Why?

A: They were way too detailed – they (the PIs) just wanted a species list for vascular plants – to try and fill out one data sheet for each species was much too time consuming. The botanist didn't want to fill out every single field – he just wanted to say he saw a particular species. If he was unsure about a species, or if it was rare – i.e. – it wasn't on the NPSpecies list, then he would fill out the whole field sheet. We printed out the NPSpecies list for plants, and he just checked off what he encountered. As for location information –it was all on one trail, approximately ½ mile, so all observations were deemed to be part of the nature trail. This was not my choice, but there were no GPS units available.

Q: Did anyone take time to make themselves familiar with the database (the ATBI interim database) in advance of the blitz?

A: Yes, we spent about six hours working on the database. We pre-populated the interim database with the names of vascular plants from the networks' NPSpecies backend file, in preparation for the blitz. First, we attempted to use the ATBI database at the blitz, but after talking to park staff, it was obvious – they just wanted the botanist to go through the nature trail and identify everything they saw – so after we learned that, we realized that this would be hard to do with the field form. So we simply printed out an NPSpecies vascular plant list for the botanist, so all he had to do was check off whether or not he saw the plant on the trail.

Q: So then data were entered after the fact from that list?

A: Yes – the botanist saw 88 species. The data sheets worked fine for fungi, because there were all new species. Several groups were running at the same time.

Q: Please describe how the data work flow proceeded during your blitz activity. (i.e. from initial data acquisition through to project end or archiving).

A: There was only one person doing the data entry – it was a small group. For birds and vascular plants – they were given lists of names from NPSpecies, and also given field data sheets for anything they noted as unusual. Simon (from Ft. Collins) asked us to beta test the database during this blitz, so we used the field form associated with the database – otherwise, we probably would have used something else – we wanted to help Simon.

Q: Did the bird data work in the same?

A: Yes.

Q: What and where is the data?

A: We have a single Excel spreadsheet with tabs for each taxa group.

Q: Why did you use Excel?

A: We collected all the paper copies from the participants and entered everything into Excel – it was just easier that way. There was a failed stream ecology thing that happened too, but there was no focus to that part of the blitz. Things were collected, but couldn't be identified.

Q: Were animals/invertebrates saved, or collected?

A: I don't know.

Q: Back to the spreadsheets – what are you going to do with them?

A: These are what is going to help us get data into NPSpecies, which is why we ultimately did it this way.

Q: How do you think data entry should proceed?

A: First, the blitz effort needs to be very organized – this was the first bioblitz for GEWA, and it wasn't a very well organized event. But it spawned money and lot of interest. If we were to be involved in another bioblitz effort, we would want location data, so we'd want a GPS to be used, and we'd also like to know what taxa are we dealing with up front, ahead of the event. What are the resource manager's goal from the data? Is it to find rare species? Common species? We need to understand this ahead of time.

Q: Is/was your effort collections- or observations-based, or a combination?

A: Mainly it was observations-based, but there was an attempt to make collections – this was very roughly done. Fungi were collected, and we're waiting to hear back about that data, but we don't have anything yet. We've been in contact with the park resource management, but they haven't heard back from the PI who collected them either; I don'tt feel like this will be forthcoming.

Q: Do you think blitz data should go into NPSpecies?

A: Well, some of it could – i.e., the vascular plant data. The fungi data remains an unknown – as of now, we can only go in to Order, since we don't have the rest of the data. The herpetofauna data is questionable – we had problems with identifications. The data that is going into NPSpecies, will go in as observations data only.

Q: What is the quality of your blitz data like?

A: It's very messy in some groups (herpetofauna), but okay in others, such as the vascular plant data.

Q: How do you use, or will you use, this information in the course of your work?

A: GEWA wanted to produce a fungi brochure – but if identifications can't be made down to species, then it's doubtful that brochure would happen. Observations will be used as reliable data in NPSpecies, but common species only. In other words, for a lot of the vascular plant material in the park – these are common species, but we don't have any references, observations or herbarium vouchers to support their presence in the park. So the bioblitz was useful in that it helped us document the very common species, that didn't have any other type of documentation.

Q: How do others in your office or workgroup use the data?

A: Photo images were taken of the herpetofauna, but they weren't up to I&M standards, so we wouldn't feel comfortable entering them as supporting evidence (vouchers). Photos were also taken of all the mushrooms, but were also not up to I&M standards – all of that could only be used as observation data in NPSpecies.

Q: What will you do with the photos?

A: They will be stored in the I&M archive for the network – if they can get better identifications, they would maybe be used in a publication of some sort. For the fungi – both collections and photos were made. But I don't feel like the collections will ever be turned back in.

The parks want to know what species are affiliated with a particular trail – they want lists of species for those trails – more from an interpretive or educational angle.

We found it difficult to enter one record at a time in the NPS interim ATBI database. With NPSpecies, I can enter data in large batches – this way is too time-consuming.

Q: How could this be made easier?

A: It would be expensive, but sent bioblitz folks out with Blackberries, or field data recorders/hand-held devices to collect data – this way, data wouldn't be lost; it's easy to download, and easy to make multiple observations.

The interviewee also mentioned tools she would like to see the NPS develop – especially since this was a first time effort for both her (from I&M) and the park running the blitz. She'd like to see a website that had templates developed for each taxonomic group – how are bird data collected? Herpetofauna? Vascular plants? She would like to see example templates for each group. She'd also like to see how-to's for all the varying efforts, from a quick and dirty bioblitz, up to having focused scientists coming into a park to do a natural history survey. Any and all tools on an ATBI website, stored in one place, would be helpful.

Joshua Tree National Park
ATBI/Bioblitz User Requirements Interview Questions
8 January 2009

This park is currently in the planning stages for a potential bioblitz program; and the interviewee is also new to her job at JOTR, and has been tasked with starting the program up.

Background discussions on the I&M program, IRMA, the status of inventories, and the scope of the project I'm working on.

A: In thinking ahead, as someone that hasn't run a bioblitz yet – what might I anticipate that I need, is maybe how we can approach this interview?

It seems that the inventory part of I&M might have gotten dropped a bit? It seems that most of the inventory things I've seen are just lists of stuff? And they don't really describe the natural history of an organism, or allow you to get information about that organism – mostly, it's just – here's a voucher specimen – ok, so it came from the park, but there's just a little information about them. Which is okay maybe if you're just looking at a list and maybe the important bullet points that you need to know, but it doesn't tell you anything about where it is in the park, where you can find it, how many there are, the frequency, natural history information – in terms of that, I think the I&M program dropped the entire *meat* of the species inventory information.

Q: And there doesn't seem to be yet a common place to go to get all this disparate information, unless it's information on vertebrates and vascular plants.

A: Yes, do we only need information on the charismatic mega fauna?, or the most visible?, or most endangered vascular plants? With invertebrates, we're now finding out they occupy a very high percentage of the totally organisms in a park – and those got totally ignored! Saying that invertebrates can be done later – well, later came never, because the I (Inventory) part of it ran out of money, and because of the time table - they were forced to go into the monitoring portion, and they had to get that off the ground and moving forward. So the I (Inventory) was like – okay, well, we have vertebrates and vascular plant data, but it really hasn't been good enough. You can say we have this many species in the database, but it's limited information about limited groups of organisms, and we don't have the important stuff we need – like where they are geographically located – the frequency – what time of day do we see them? etc., and not for scientists and researchers who are working on these organisms – these lists are just that – they're lists! It was a valiant effort, but I don't know that the right people were involved in developing NPSpecies – it seems to be done more in a data management way, as opposed to scientifically sound way – what is it we want, how do we want it, etc. But I guess they had to start from somewhere.

Q: Thanks for expressing these thoughts – I have similar feelings. I hope to include some of your comments in a report –

A: I would say that the I&M databases are useful as a *starting point* – just getting that list down – but that list has no real content in it that would help researchers or scientists, and I feel like the information that you can get out of doing an ATBI or bioblitz – if it's done correctly – and linked to NPSpecies, or is used as the informational meat that will give you the natural history, the geographic location, pictures, about each individual organism or taxa group – then that would make the I part (inventory) – you know, NPSpecies, more robust – more useable. That's the starting point, but there's no content in there. That's where I see the bioblitz, if it's done correctly – not only do you start off with a species list, but if people are doing research on them, then they're getting pictures, they're doing the specimens, they're getting morphological information about them – and the scientists are keeping up with their websites, then they can connect that information to NPSpecies.

Q: So let's talk a bit about what you're planning with your park efforts – what was the genesis of the idea – did you have project goals?

A: No, I know that the park has wanted to get the public more involved with projects in the park. There's a push of sorts, to get more of the local public, and community involved. And the resource division here is growing – so there are ideas about ecological restoration and monitoring projects for the park, and all the things that the I&M program is doing across the network here. They often borrow time from the biologists in the park to help them in these monitoring projects, so there is a lot of time given to the network and then projects that are done here (Resource Management), which the staff is involved in, so there are other projects that can't be done because of the lack of manpower and money – to do everything that Resources wants to do. So one of the ideas is to get help from the public – so to volunteer people – so one of the ideas is to develop a citizen science program, which gets the public involved, it gives back to the public, because you can educate them, and it also gives you manpower. And it also – in the citizen scientist part for us, we want to address some park goals for management. In utilizing the manpower of the public, we can then answer question that we need to have answered, in order to manage our parks better.

Q: For instance?

A: (Laughs.) So for example, the bioblitz. People of course always ask about what resources are being impacted – how are we going to manage them? We don't know what all the species are, that are out there – we know the ones we can visually see, but not all

of them, so species inventory becomes important – to map what’s out there, so that we can make some prudent decisions.

Q: How do you envision using the data coming out of a bioblitz? How could they help you in managing your park?

A: In thinking about some of the research grants that have recently been submitted to the park through the RPRS system – this park is a Class 1 air shed. And there is a lot of pollution; ozone levels are high, nitrogen deposition is high, because we’re close to Las Vegas and L.A. Because of the high nitrogen deposition, we get a lot of invasive plants here – species get dumped here, and when fire goes through and kills everything - and because the invasive species are opportunistic plants - they end up seeding really well, and coming up before the native plants. So this is a major problem for us. So now, we don’t know whether it’s just the increased nitrogen deposition, or other factors that are important for allowing the invasive species to populate an area, better than the natives. So we don’t know the interactions between invasive species and native plants; whether we can do anything to help the situation out, like what organisms are there – whether we can do something to eliminate some of the nitrogen deposition, or add other organisms in there to help the natives regain their ground, etc. I think what happens is, you do this inventory, and you get an idea of what is there – native plants, etc. – to give you healthy integrity. So we’re dealing with a totally opposite situation where there’s something disastrous going on ecologically, and if you want to bring that back, you need to have baseline information. Now I would say that the baseline inventory information is long, long overdue, and we really need this for anything involving park management.

Q: As a result of the I&M program, I imagine you have vegetation maps and soil maps, etc., right?

A: Yes, and I think that’s what’s prompting – because all of that has been done – that’s what’s prompting a buildup of a lot of information that’s going on in a more scientific manner, but it’s not complete. So we’ve got a soil inventory, you know, the texture, the depth, etc. but you don’t know the organisms that live there – what plants, etc. – yes, we have vegetation maps, but now we have to look at the association of each layer upon each other, and then put other layers in there as well, because all of them separate don’t give you enough information, because ecology is about one thing interacting with another thing and another thing, and another thing, to give you results of a healthy environment.

Q: So other than knowing the vertebrates and vascular plants – and actually you wouldn’t even know that as a data layer per se, because they are simply lists for the parks...

A: Yes, they're just lists, but if you go further into the natural history about what is going on, and you're going in and finding information about frequency, let's say, if they're catching some invertebrates or birds – you see more sightings at this particular location, or you have an elevational gradient, etc. – if you can collect that information – more information rather than ok, we just saw five loggerhead shrikes here – that's not useful information – it's just an inventory number. But if you say, hey we've caught this, and this is the GPS point, and this is the elevational gradient and we know that there's this particular type of vegetation, and this particular type of soil texture, etc., etc. – you now have layers upon layers upon layers that you can now look at. And a lot of times, one piece of information by itself is not going to give you much, it's got to be in context.

Q: In running this bioblitz that you're thinking of doing, clearly, you're going to want to maximize the data that's coming out of it – do you have any ideas on how to capture that?

A: From the DLIA conference in Gatlinburg last December, it seems to me that the targeted taxonomic species ways are the way to go – it seems to me that to do a 24 hour bioblitz on everything is just too big. With too much information to get. However, if you can target a group, and do it in small little bits, and do it at different times of year, and work with a reliable groups, like a TWiG, where they can organize some of the expertise and train the volunteers, and go out into the field, and do it with scientific integrity and methodology, that will allow you to get the highest quality of information.

Q: So you might not have a bioblitz per se, but a more public outreach component to a RPRS-type study?

A: Yes, right.

Q: So RPRS seems to be a hook of sorts, I know there's talk of getting RPRS into the IRMA system, and this seems to me to be a key piece to help track information – over and above the IARs....in other words, to organize the data that come from these small, targeted efforts, we have to know that the data is there – how else do we know there is data, except through RPRS? So I'm trying to think creatively – how can I help the NPS see that there is this disjunction between these small little biodiversity efforts going on, and then you've got this huge I&M program and they each feed into each other, so how can we make this all come together in one place?

A: I know that I've interacted with the museum curator here, and she's always – not necessarily complained – but one of her peeves is that when the researchers with permits come and hand in their IAR reports, they often hand it in, or email it, and it never comes with any data – where the specimens are located, little pieces of data, field notes. So first

of all, it only comes with the report – and not the data. And so, they sign a little thing in their research permits, that they’re going to give all this data up, when they’re done, but there’s no enforcement for that. Now if that information was available – that could be place up on the web – in a reasonably high quality form – you would want a report, the actual data collected, in a nice graphic spreadsheet of some sort, you would want what specimens were collected, where their locations are, and the voucher specimen information – you’d want it to be connected to ANCS+ - you’d perhaps want them to fill out, if they’re collecting specimens, you might want to know the GPS points. Because eventually, if everyone is doing these collections from various locations for a particular organism, or taxa group, you could then put it on a spatial map with a data layer, and if you could take all that GIS information, you could make a data layer for a particular organism on a spatial map. That information, if somehow you could get them to fill out standard information, and make it available, you could get that information up. Now that I’m the research coordinator, I will eventually be in charge of the RPRS system, and our curator has always told me that there’s no enforcement, and that there’s such a backlog of trying to wrestle information from these people, because you send them a letter, and they haven’t gotten around to it, or haven’t published it yet, and sometimes it’s years and years and years, and nothing ever gets done about it. And then it comes back in scattered pieces of information, not as a .pdf, not organized, so it comes at different times, and there’s a whole bunch of permitters, and they have their files, and they should really go in one place in the archives, but since they come in, in such drips and drabs, it’s really difficult to keep it all organized.

Q: Do you have any plans for how you might change that system?

A: That’s a big question – right now, I’m trying to get all the permit information, just off the RPRS, and into an Excel spreadsheet and get it laid out, and figure out, who has completed their files? Who has given back all the information? And cross reference that with the archives through our museum curator, and then figure out what is outstanding, and at that point, I can make an argument with the higher ups and say, hey, you know, if we want some enforcement in this, then we need to get this information. Plus now that we’re getting all this information, where do we want to put it? How do we want to organize it so it’s accessible to other people? And that would be something that could be useful to other scientists, who don’t have to duplicate that information, and can draw on what other people have done.

Q: Do you see the I&M program being involved with this effort?

A: In the Mohave Network, the data mining effort only went on for two years, in Joshua Tree. So all the natural resources information was collected by the I&M program, but

only for two years. So it's not totally complete – with Nature Bib, etc., but they had to change the direction a bit, because the money had to switch to the monitoring part of the program. I know that the Mohave Network – their spring inventory lists – they had a soil survey, vegetation mapping – all that information – the spatial maps and data layers – all that data should be somehow accessible to everyone in the park!

Q: Yes, and that's what the IRMA project is doing, so that is coming!

A: Ok, because I know that the network has that information, but it hasn't been distributed or available for – I mean we're almost ten years down the road – and it's still not coming, and I don't know when 'coming' is 'here'.

Q: Yes, I understand the frustration – the I&M program has been saying it's coming for a while...

A: So ideally, the information we have coming out of the network, with all the pieces of the I and the M – that inventory should be out there and made available – that would be one of the first things, and following that, all of the information coming out of bioblitzes and monitoring, is kind of the ongoing meat and content of the science, that should be connected to that I part.

Q: Wrapping up, do you have other questions, needs, wishes?

A: Do you know when IRMA is coming up?

Discussion of the I&M data portal – will send you the URL for that.

A: As for wishing – it would be nice for one to be able to see what other parks have done with their bioblitzes, and then to be able to catalog information of your stuff....because if something is in place, then when scientists come in, and they're doing their thing, they're going to be prompted and want to put their information out there – maybe there should be some NPS journal of sorts? If you submit something to a scientific journal, one of the things you have to do is submit your data to a site (in my field) – like to GeneBank, and people added sequences to it, etc. – so now you can look at proteins, who all is doing research on a particular organism, etc...all the information is in one central location, which is what we seem to need – a framework.

Q: Yes, and I think the thought is that NPSpecies was that vehicle...

Q: Wrapping up – any other questions?

A: Thanks for being a resource for more questions.

**Point Reyes National Seashore
ATBI/Bioblitz User Requirements Interview Questions
7 January 2009**

Q: General discussion on the scope of this project.

Maybe you could give me some general background on your biodiversity efforts?

A: Here, at the RLC - we began the ATBI around 2002 – it may have been 2003 before we really got off the ground. It was initiated as just a marine ATBI, in one particular bay here at PORE, and from that we came up with the name, Tomales Bay Biodiversity Inventory. We did a lot of field work around that for the first few years – it's supported by the park; the RLC is inside of PORE, but most of the funding for it – all of the funding really, has come from soft money donations and grants, primarily comes through our Friends' Association. They've been very instrumental in helping us find funding for projects. And that was highly successful from about 2003 to 2005 – we did a lot of the fieldwork at that time. Since then, we've been focusing more on trying to get some inventories started in the park that are actually outside of that bay. So then, it's more like an ATBI. For instance, with the Centennial Challenge, we've been trying to focus on fungi projects, and a new lichen project.

Q: Yes, I've seen the fungal bioblitz website – it's pretty impressive – so that came out of this initiative?

A: It was under the same umbrella. That first website you went to (<http://www.tomalesbaylife.org/>) – The Tomales Bay Biodiversity Partnership website - was focused just on Tomales Bay, but we're kind of with the same program – expanding it out to more of an ATBI for the park, or at least, a series of bioblitzes.

Q: So there seem to be a few different efforts going on – you've got this the non-profit association – the Tomales Bay Partnership....

A: That's not necessarily a non-profit association – the non-profit association that helps with the funding and coordination, is our parks' Friends group.....

Q: Ok, so I'm interested in talking about the overall effort as well as bioblitzes – can we start by talking about bioblitzes? How do they come about? What stimulates the need to go out and do one? Are they structured?

A: They are primarily decided upon – initially, back in 2003-2005, they were decided upon more by the RLC and what some priority areas were, where we had a lack of knowledge. Now, they are more decided upon by finding an interested project coordinator who is usually a person from a university; a taxonomist, for example or mycologist, or someone interested in getting species diversity data.

Q: Do they all tie in to the same database? I noticed on the Tomales Bay Partnership website, there's a link to a database, and it's pretty nice!

A: Yes, so we have that database still existing, and our plan is to bring the new fungal information, the new terrestrial data, and the new lichen information, into that same database. Right now, as projects present themselves, our main goal is with the Centennial Challenge money, is to try and get all of our legacy data, into whatever NPS database is being put together.

Q: Before we get there, can we talk a bit about your overall project goals? Does the RLC spearhead all of the inventory events, independent of the PORE Resource Management program? or, does Resource Management also conduct biodiversity inventories?

A: It is independent of the Resource Management program.

Q: So where does your I&M program fit in with this?

A: Not very closely. I mean they are interested, but there is no real support. We've talked in the past about how could the I&M data managers help get some of our legacy data up into NPSpecies, but now with this ATBI effort, the plan would be that since there is supposedly going to be a national ATBI database, I can get our information into that, so that's actually my big goal for our Centennial Challenge funding. That's what I hope to have accomplished, shortly.

Q: Is to get these data from your marine inventories as well as your terrestrial inventories into a national type database?

A: Yes.

Discussion: Gives overview of where the “national effort” is. i.e. parks might not want a national database, vs. NPSpecies.

A: Yes, I kind of suspected this since I haven’t heard too much about moving forward with a national database. For my goals, I would just like this data to be available, at least on the same level as NPSpecies.

Q: It seems like you met that goal, in terms of the marine database that I was reviewing on your website....

A: Yes, but I don’t think that is all uploaded into NPSpecies.

Q: That was my next question – so you do intend to get all these data into NPSpecies?

A: Yes, part of the Centennial Challenge grant had about two months of time for our database manager to do that exact task, and I’d like him to be working on that, really now, over the next couple of months. His job will be to try and spend as much of his time as he can to get our database in order, and do whatever it takes to get it up into the national level – and I feel strongly that it should be somewhere where it has a little more utility.

Q: Then too, right now, NPSpecies is only available to the NPS, whereas I can go to the Tomales Bay website and get data without restrictions, so it’s kind of a double edged sword...

A: I remember seeing the IRMA presentation – so won’t this eventually be publically accessible?

Q: Perhaps, maybe years down the road?, though I believe at this point the focus is on getting it up and running for the NPS. That’s not to say that the public component won’t happen, but I don’t see that any time in the immediate future.

A: Okay. So knowing all that, and knowing our time constraints with the funding and everything, I think the short term goal is to – and to fulfill the obligations to the Centennial Challenge funds – is to get these data into NPSpecies.

Q: Do you have other goals, other than NPSpecies? Speaking about the overall program?

A: I think we’re a little bit quiet now because of the funding situation, but if funding becomes available for more intensive work, or if researchers become interested in

additional bioblitzes in the park, we would like to continue our framework. We have almost like a quiet ATBI – ‘oh yeah, we’ll help support you, we’ll help with the database, we’ll help round up people to do the bioblitzes, all the coordination, we’ll help fundraise if we can’ – that’s kind of how we’re taking it – so we end up doing one or two things a year. Bioblitzes or projects – more focused studies.

Q: What kind of staff are involved? Do people go through the RPRS system?

A: Typically, everyone does get a permit, and in terms of staff, I spend some of my time doing coordination, then there’s a data manager who spends his time doing data management, and if a researcher needs a data template, or if they need to get their data into our database, he facilitates that, and helps maintain that website and database.

Q: So basically, the PIs bring their own staff, or students...?

A: Typically, yes.

Q: Yes, I have plans to talk to the data manager re: data management things. Can you tell me a bit about taxonomy – do you have problems with it? Do you use lists? Do you depend on the PIs to just be knowledgeable?

Q: We depend primarily on the PIs – but when things can be linked with ITIS – that’s done – and when it can’t, then we rely on the PIs. We don’t have the taxonomic expertise in-house, so we rely on others.

A: What about any kind of curatorial considerations do you have, and interfacing with ANCS+?

A: So we have not been that good on the ANCS+ in the past; we’ve been letting things go to museums – if a PI is associated with a museum, things will go there, but we have not been that good on the ANCS+ side of things. My hope is that with both the fungi and lichen projects – now we have a much better relationship with our curator, and I think the cataloging that is being done on the projects will make things better.

Q: So PORE has a dedicated curator?

A: Yes, we actually have three staff in our museum. But things aren’t stored here – we don’t try to keep stuff. Just a small component of the museum is devoted to natural history stuff – most of it is cultural.

Q: So this beautiful mycological database you have, with these gorgeous photographs –

A: On the Berkeley website? (See

<http://plantbio.berkeley.edu/~bruns/tour/mycoblitz1.html>) yes, for us, it's great – because we helped facilitate all that data collection and they have done a very good job of doing the cataloging, so for that project – it was very easy (will be very easy?) for them to port the data over to ANCS+.

Q: So all those specimens that were collected and photographed – where are those?

A: Everything is at and maintained at Berkeley.

Q: And so, there needs to be a record in ANCS+, and so you're in the process of exploring that?

A: Yes.

Q Can you talk a bit about a vision for future park efforts?

A: I see the ATBI continuing at a steady rate, and having our RLC continue to be an umbrella for an ATBI at PORE. When there is an opportunity - to do blitzes to support that, or more inventory work, or targeted projects that continue to support that, or to continue supporting some public outreach, and continue helping PIs raise money, or raise awareness, and also help to keep it on the table.

Q: How do you envision using these data?

A: So I think that a couple of ways – one is identify new species to the park, and to science, so it adds to our species lists so we have a better idea of what is here. Another way is that, like with the fungi and lichen – we start finding rare things, it comes a little bit into our management plans – that there's trail work that needs to be done, or restoration work on buildings, where we have these rare lichens growing on – that's already come up, as an issue. Along Tomales Bay – we haven't quite gotten there yet, but having a little bit of an understanding of where there are hotspots of biodiversity, can help us a little bit in planning – what species are where, are they sensitive species – this helps us with our planning. Under this umbrella, we have some datasets that typically would be developed by Resource Management, like sea grass beds, or sea floor bathymetry – sorts of things that can be used for delineating marine protection areas, and other types of management actions that wouldn't typically be collected, unless they were collected under this ATBI umbrella.

Q: So basically, using the data to help support resource management actions?

A: Yes, though I'm not going to say this happens all the time.

Discussion of this topic.

A: In some ways, I agree with what you said – about resource managers not really knowing how this information can really help out with a management issue – but the data that becomes the most useful, is not always – “we have 100 species in this spot – it’s, when we were out doing this inventory, we also mapped this one particularly important species, that wouldn’t have been mapped before, like, sea grasses.” Or we mapped the sea floor, so we know what the bathymetry is – if you’re going to do some sort of construction project where you need to bring a barge in. So it’s almost ancillary research products, not just about biodiversity data collection. And actually, the way we structure a lot of our projects – because a lot of our researchers will be more ecologists, than taxonomists – we support a lot of projects that are on ecology, marine ecology – like the marine ecology of sharks, or something – then, they’re doing their research project, but we also glean all of the taxonomy data from the project, so at the same time, in the name of an ATBI, we are supporting research that gives us some answers to some ecological questions, that may lead to research management questions further down the road. But ours is very much mixed together – ecological research, and just, what is there – taxa.

Q: Do you have any wish list items for data? Are there things the NPS could help out with?

A: Being able to visualize the data that we have within our parks – you know, biodiversity data. And then, being able to visualize it among parks, and to me, having a national database, with a spatial component, so we could say what’s where – that was kind of a wish list for the original database idea which seems to be petering out.

It almost seems like the next step should be, that everyone, like GRSM, needs to get their data into either GBIF (a worldwide data portal), or somewhere else, so that it can be used! I think a lot of these ATBI efforts are done very ad hoc, or very on the fly – so it’s difficult enough for I&M to keep their data in a format where they feel they can paint a regional or national picture.

Rock Creek Park

ATBI/Bioblitz User Requirements Interview Questions

10 December 20008

General discussion:

My involvement with bioblitzes began in 2006 when POGO conducted a bioblitz (this also included the George Washington Parkway and the C&O canal). The actual running the bioblitz was contracted out to TNC – they in turn, hired a PI to run the blitz, which focused on the underrepresented taxa in the parks. This effort was more rigorous than the National Geographic type blitzes in that they were looking for very specific taxa groups. The effort was primarily focused on invertebrates/insects. This effort was unconnected with the ROCR effort – but since we had experience with a bioblitz - this was the reason why we were brought in on the ROCR National Geographic effort.

For the POGO effort, I built a database that “crashed and burned” for a number of reasons. When the ROCR effort came up, they turned to me for data management input – but for various reasons, it was decided to not use a database for this effort, but use a very simple spreadsheet instead.

I was also a part of the May 2008 meeting in Ft. Collins, and helped to hash out fields for an interim database.

At the workshop, it seemed that people had varying degrees of needs and desires for the database – some folks wanted to use it as their means of cataloging everything in their park; it varied from project management, to almost functioning as an NPSpecies-type of application. My concern leaving the workshop was that it was going to turn into something bigger than it needs to be, which is one of the reasons why the database I built for the POGO effort didn’t work – it was too complicated.

Q: How did data entry flow at the ROCR effort?

A: The whole reason I built the database for POGO, was because folks doing the blitz told me that they wanted to be able to track what they had coming in, and at certain intervals, they wanted to be able to click a button to tell them they had 15 species of spiders, or 94 species of aphids, and at the end they wanted to have a big ‘to-do’ where they wanted to be able to flash up on a screen, the results: we found 650 species, in these groups, etc. The database that I built did all that, but no one wanted to enter data into it during the blitz. TNC gave us a bunch of laptops to use, and I and tested the database on every one, but they simply weren’t used.

For the ROCR effort, National Geographic supplied the hardware – my concern was they wanted just anyone to sit down and do data entry, but depending on their computer skills, the database was somewhat intimidating. The most important thing was to get the data in there – it could then be sorted out later – but there should be enough entries so that a tally could be generated. So we decided on a formatted spreadsheet instead – as long as users followed very basic data entry into certain columns, they could summarize very quickly, to some degree, how many things were found.

Q: Tell me about the spreadsheets?

A: Each of the field crews had datasheets that they were provided – these were adapted from the POGO blitz. One thing that happened that surprised me, was that for the ROCR effort, a couple of people sat down and literally entered data for 24 hours – someone was always entering some sort of data. I was skeptical that this was going to happen – based on the POGO blitz – and in hindsight, I thought that a database would have worked better.

Q: As field crews collected information on their target group, they would fill it out and bring it back to the laptop area, and someone would enter data?

A: Yes – that worked to some degree, but there was still a ton of data entry to do after the fact because many data sheets weren't turned in, in the time allotted for the blitz. Therefore, me and a guy from National Geographic (Nate?) split up the work and entered the data afterwards. We only got maybe 50% of the total data got entered during the blitz.

Q: What kind of data were you collecting?

A: Very basic information – what team were you on? (moths, beetles, etc.) What species did you find? If a species was unknown (i.e. morpho species 1, morpho species 2), a voucher specimen was collected. To my knowledge, those data have never been turned in. The majority of data that was entered on the spreadsheet was what could be readily identifiable in the field – at least to genus. Anything that was unidentifiable to genus level – and even above that – the team leaders for that group held on to them to identify them, and they were supposed to have turned in that data over a year ago. In talking to Tim at National Geographic – he also has not received any further data, and he's since then, been involved in other blitzes. When we went into this effort, this was a problem I warned them about – there must be a mechanism for team leaders to understand that this information is useless unless we get it back.

Q: What can we do to avoid these types of scenarios in the future?

A: No – it's frustrating. Setting realistic deadlines could be one possibility.

Q: What do you mean?

A: The ROCR effort was run in June, and National Geographic wanted to have everything back at the end of December (Tim, at National Geographic). And this was what he told the team leaders. At the time, people (the PIs) that wanted to be involved will agree to that – but the majority of the vouchers are still out there. The problem with setting time lines – the more leeway you give people who are volunteering their time – the more leeway you give them, the more time they will take. I really don't have a good answer for this – maybe giving them a small honorarium would help? It took awhile to

get the data in from the POGO blitz, but it was eventually accomplished. This was because the guy running it – the PI that the TNC hired – stayed on top of everyone – he wasn't paid until this happened.

Q: When you say 'get the data in' – what do you mean? Into what? The database you developed, or what?

A: There were two parks involved – half of the specimens (from one park) came to me and half went to the other park. There was a little bit of money left over to hire an intern to catalog some of the vouchers. That intern spent a couple of weeks with me and a couple of weeks at the other park – she entered everything into NPSpecies for us.

Q: Such as invertebrate data?

A: Anything – mostly invertebrates; some plants, fungi, mosses – she only entered voucher data.

Q: So she entered voucher data to support the presence of those taxa in the park?

A: Exactly. So the database that I built was completely by-passed altogether. We are still awaiting the final report from the POGO effort; if and when we get it, it will be entered as a reference in NatureBib, and anything that was observed, we will go back and fill that in, in NPSpecies.

Q: So was that an objective of the POGO blitz? To get information into NPSpecies?

A: No, that wasn't the parks' objective – they just wanted the data. They hired the person to do the voucher processing, but for all I&M projects, we have developed SOPs after working with curators in our network; to make sure data are properly entered into NPSpecies and also into ANCS+. So we went to POGO and said, if you're going to hire someone, can you at least enter the data into NPSpecies?, then we would help format that – so as to give the curators pre-formatted data sheets so they could upload directly into ANCS+. That was the agreement, but the goal was not to get everything into NPSpecies when the project started, but when it came time to process the vouchers, this was the deal that I made with them.

Q: On the POGO effort, were their collecting permits issued?

A: Yes. The two parks agreed that they didn't want to collect more than five of anything – they didn't want multiple collections of the same beetle, for example. But, sometimes it's impossible to limit the number of collections taken with traps. Both POGO and ROCR had collecting permits.

Q: Back to ROCR – are there physical specimens that came back to you?

A: We haven't received anything yet – I haven't and I don't think National Geographic has either. As far as I know, all of the voucher specimens are supposed to come to me, since there is no curator for ROCR.

Do you know how did SAMO deal with this? I heard that they had a much better database, and that the effort went off fairly well.

General discussion: I have talked to their I&M data manager, but no one else so far. I start out these interviews asking what the goals for the blitz are. In their case – they said the goal was to get school kids involved, and that that objective was met, so they considered the blitz a success. But similar to the ROCR effort, they weren't sure about collections – they wanted their team leaders to do observations only, but when it came to, for example, stream work – they needed to collect specimens. The specimen collection came about after the fact – or during the fact – what I've been able to determine is that the data manager has a bunch of collections sitting on her desk, without a clear plan for what to do with them. She also told me that other people collected stuff and walked off with them. This seems to be a common thread – no one seems to have a firm accountability mechanism for collections.

It was a good thing to have the POGO blitz first – there was no question as to whether or not there would be collections – it was understood from the start that there would be.

Q: So the curator was involved? They knew material would be coming in to accession and catalog?

A: Curators were never at any of the meetings that I attended, though the curator for the park is very good. I don't know how or if they were involved with any planning, prior to this event. The natural resource managers were the ones that said we only want you to collect x number of animals/plants. But I don't know if curators were aware of this – I only started working with them after the fact. For the ROCR effort – there was a learning curve for National Geographic when they found out what was going to be involved – re: permits, specimens need to be accessioned; this is NPS property, etc. Photos were also a big problem – if things were photographed and not collected (which ROCR encouraged) – if National Geographic photographers were doing this, they considered it their property. This was a shock to them – understanding that anything collected in the park must come back to the park. We eventually came to an agreement on pictures – ROCR just needed a copy to document – National Geographic was okay with this.

What complicated things – as an aside – one of the main places to draw on expertise in the area, is the Smithsonian. The NPS and the Smithsonian haven't been seeing eye to eye on collections management – so there was some bad blood left over from the POGO experience. As I understand it, a lot of these taxonomic experts wanted to keep specimens for their personal collections – trying to get it across to them that no, everything must come back to the NPS – that created a bit of a dilemma – some folks didn't want to be a part of the ROCR effort because of this. This seems like it will impact other blitzes around the country.

Q: Yes, this is a common thread I'm finding. Back to ROCR – did you have permits, and the intent to get data into ANCS+?

A: Yes, this was always the intent. I was working on the impression that once all the data came back, I would take the spreadsheets and get it into NPSpecies, and then into ANCS+. All of the team leaders were given copies of an Excel spreadsheet, formatted in a Word document as well as field data sheets for location, etc. information. That was supposed to be dropped off at the base camp (the field sheet), and there was an additional Excel spreadsheet for observation data. When the blitz was over, team leaders with Excel spreadsheets often took data with them, so that they could enter data themselves. But I don't know if this really happened.

Q: Was the goal to take the data from the Excel spreadsheet and put it - - where? Into a ROCR database, into NPSpecies, to archive, what?

A: Sort of all of the above – Excel spreadsheets were to have been archived, all of the hard copy field sheets should have been accessioned with the collection, but people didn't realize this, so half of the field sheets were thrown away.

Q: Did you get any useful information to put into NPSpecies for the ROCR project?

A: Yes, some. I have a compiled Excel spreadsheet that I developed together with the National Geographic folks. (Will send me that spreadsheet). To be honest, it's probably not enough data for me to get the information into NPSpecies - I need, for example, TSNs so I have to match up the names – I think this is a really big mess.

Q: Was there data you wanted to collect, or thought about collecting, but you didn't because of time, funding, etc.?

A: In general, during the meetings we had, the resource managers weren't very vocal on what their needs were.

Q: Interesting, since this isn't an I&M effort, but a park-based effort.

A: In our region/network, for these larger projects, since we are co-located with a regional science office – if someone from the regional staff is involved, we (I&M) often get pulled in. I'm not sure if this is common in other areas? But this is how we got involved.

Q: Was there a contact at ROCR you were working with that was engaged in the data side of things?

A: Not at all –it was all me.

Q: What was the goal of the ROCR effort?

A: More along the lines of what Lena (at SAMO) mentioned – much more of a publicity type endeavor. A lot of good people were there – E.O. Wilson; a lot of other big names, etc. – but the POGO blitz was geared towards ‘let’s identify the data we need and go get it’. The ROCR effort was focused on ‘let’s get a bunch of people together, and send them out, and it will be a big foray into Rock Creek Park, and see what we get’. It was much more of a public interest endeavor than a science-driven endeavor.

Q: Are there plans to do anything else in ROCR?

A: No, not that I am aware of.

Q: How would you be using any of the information that came out of the ROCR effort?

A: As for me, I would make sure data got into NPSpecies and is archived and accessioned, but this is just my personal assessment – not sure if this is going to happen.

Q: Did ROCR express any thoughts on how they might want to use the info?

A: Not that I am aware of. The park folks are so overwhelmed with their own projects, which is why they turn to I&M for help, but then go about their day-to-day business.

Q: So you pull out what is meaningful for your program? For I&M?

A: Yes, but re: the blitzes, I really don’t know what will be useful.

Q: Will you be populating NPSpecies?

A: Yes, but overall, to make sure the data is archived – but as far as producing any type of report or web highlight – I&M hasn’t taken any role in that.

Q: And neither does ROCR?

A: Right – there might have been some public interest highlights they put out. POGO will publish their results in an entomology journal. I don’t know what National Geographic wanted out of this effort. My office simply took the lead on data management and making sure specimens were accessioned.

Q: Is there anyone at ROCR I could talk to?

A: Yes, I can send you a couple of contacts – but I was not involved in meetings at the park level. The resource managers have contacted me and asked me if I have received any data from Tim at National Geographic – so I think I know more than they (ROCR) do.

Q: I'm also curious as to why National Geographic ends up with NPS data? – I didn't get that impression from the SAMO blitz.

A: What happened to the data at SAMO? Who took care of that?

Q: Their I&M data manager did.

A: And she has all the data?

Q: As far as I know, she has it. General discussion about that scenario.

A: And they were able to get everything they observed into their database?

Q: I'm pretty sure that was the flow.

A: That's impressive; maybe they learned from the ROCR effort?

Q: Did National Geographic hint that you should have a database developed prior to the ROCR blitz?

A: At one of the initial meetings, they asked about a database, but it was my experience, based on POGO, that no, let's not use a database – I didn't want to take days and days to develop a database and not have anyone use it. Re: the POGO database, after I developed it, I waited for comments back from the park, and only received them the day before the blitz, so they obviously didn't consider this to be a high priority, and it wasn't, since they didn't use it. What I told ROCR was, that if no one is trained to use a database, they won't use it, and since everyone is familiar with spreadsheets, let's just enter data that way? In hindsight, if I had known that one or two people would be available to enter data, I probably would have gone ahead and developed a database, but from my past experience with POGO, I just couldn't count on that.

Q: The common thread I'm finding is that databases tend to be too complicated for a 24 hour period of use – the onus is not necessarily on the data, but on collecting – all the data stuff seems to happen after the fact.

A: That's it exactly – people don't want to be bothered with entering data, they want to spend as much time as possible in the field, collecting the data. There is a practicality side (data entry needs) and a deliverable side (what National Geographic needs), and we have to find a happy medium.

Q: Can you give me some input as to how this might happen?

A: For the glitzy/glamour part of these blitzes, where they want to flash up numbers, they're not going to be able to do this unless they have some way to electronically tally the information. In the case of SAMO – that simple database that their data manager built – if that is what worked, then it would be great to continue to use that. As long as you

can get people dedicated to using it, and have people knowing that this is what they are going to be doing – enter data – this might be a best practice. If we are going to run blitzes, we go into it knowing that a certain number of people need to enter data, and if specimens are collected, there is an SOP for that. There is no give or take on this – this is the procedure. You have data entry personnel, you have hardware provided, you have collections permits, you have collections standards, etc. – since you know you are having people entering data, have the database ahead of time so that they can practice on it. Have you talked to anyone at NG?

Q: No.

A: I heard at one point that they had their own database development going on to possibly maintain a lot of the information coming out of these park Centennial Challenge efforts. I haven't seen it, and don't know much about it, and may have been mislead on that, but I thought someone mentioned or emailed me about a database that National Geographic developed for these efforts.

Rocky Mountain National Park
ATBI/Bioblitz User Requirements Interview Questions
14 January 2009

Q: What kind of biodiversity efforts do you have going on at ROMO?

A: We've done two efforts that I would classify as an ATBI, but they're not classic in the sense of "let's describe all of this category of organisms you find in the park". Well, we do have one that fits that category, and that was a mycoblitz – we did do one event last year in partnership with the Mycological Society of Colorado, which is based in Denver. We had a partnership with them, in which we transferred a modest amount of money - \$1000.00 – and they organized a beautiful website, got their members together, had a registration process, got them up here over a weekend, they did most of the training, though we provided park-specific training, and they collected, about 3000 specimens of fungi. And so they have now gone back to Denver – and I just realized we should probably check in with them – verifying identifications – they had an identification team here, but they were going to continue doing their verifications, photographs the specimens, curate them appropriately, and label them. The money we gave them was supposed to buy supplies, and they are residing right now at the Denver Botanic Garden, so that was our academic partner. So we have the club, which is a membership, volunteer organization, and then we have the DBC which is more of an academic type institution involved. And we're waiting to see – they said they want to do it again – obviously one mycoblitz doesn't catch it all, and last year was a pretty dry summer, so we're no where

near topping out on our species curve, so we would expect to conduct one or two more of these – maybe one to three more – in different years, and perhaps at different times.

Q: And so that would be with the Denver club?

A: Yes, but our caveat is that we're waiting to ensure if they actually curate the specimens appropriately.

Q: Yes, and so along those lines, did they go through the RPRS system and get a collecting permit?

A: They did.

Q: And then, was your curator involved with the ANCS+ side of things?

A: Yes, she was.

Q: So they have an allocation of catalog and accession numbers to go along with those specimens?

A: Yes, they do.

Q: And you said there's about 3000 or so, and they're in the process of being identified and then at that time – what? – they'll turn around and the park will get....

A: Let me go grab the research permit file to be sure. We don't have an IAR yet for this project.... so I way overestimated how many specimens – so it says that they collected 279 individual collections of mushrooms, of which 88 are duplicates, so they collected not quite 200 unique species.

Q: And they are currently identifying those, and will return them to the park when finished, or maintained at the DBG?

A: We are doing both – they are providing voucher specimens for every species in ROMO, here at our museum, and then duplicates that the DBG wants, they will be allowed to keep.

Q: And you said you want to repeat this effort?

A: Yes, you've seen those species curves, and so if you do it once – especially if you do it in a dry year – you're not capturing everything – who knows, we're probably at 80%?

Q: Can you tell me a little about the spatial considerations? Do they use GPS, hard copy maps, or?

A: So they used GPS to record the coordinates, and also took photographs in situ, and the habitat, and made habitat notes, so they did have – let me see what kind of fields we had them fill in –

Q: Yes, I'm interested in the types of data they collected.

A: I might just send you some stuff.....

Q: That would be great...

A: Here's all the kinds of things I have – let me look in the compliance section – there was a specific question I was trying to get to – oh, what we were asking them for? – the types of data? It seems the key official on this is gone for the day, but it looks like on the 31st he actually got a report from them – we have 281 species, so there's a disconnect between the note in the file, and how many specimens were actually collected. So right now they have told us that they got 281 different types of unique species, and if I send you this – that should work, because it shows you the fields.

Q: Thanks, that would be great. Let me ask you how they collected the data? Did they say they would submit it in an Excel spreadsheet, or hard copy field forms, or maybe a database?

A: I believe that we required both – that we get copies of all the collection forms, but that they also put the data in an Excel spreadsheet –that's what I'll attach to my message. It's actually more straightforward than that because we basically used the PORE experience and got all their materials and tried to follow their model.

Q: Yes, I've seen their website – it's really quite phenomenal.

A: We also do have a nice website, so I should send you that link

Q: Yes, please do – that would be a big help.

A: Ok, so I'll send you the spreadsheets, and the link –

Q: A few more questions – what about NPSpecies, do you foresee that data going there?

A: You know, NPSpecies has been – is a lot more problematic, I think, in terms of taxonomy, especially for groups like fungi that are so taxonomically specific. We did not - we were not thinking ahead on that – so it's not like we couldn't put it in there – all I can say is that we haven't considered that to this point. And we have too many projects, and right now, getting it into....if it gets into the db like PORE uses – is theirs in NPSpecies?

Q: It's one of their goals.

A: So yeah, that would be desirable, but we haven't done anything about that.

Q: So you mentioned two efforts, what is the other one?

A: So the second effort is what we call a Waterblitz. On that occasion –

Q: When was this?

A: It was in July of last year – again, let me pull up my file on this. We sampled a couple liters of water – I think two from every location, at 168 points in the park, and then they are – by the way – do you want pictures?

Q: I'll take anything you can send me...

A: We actually had great media coverage on both of these events.

Q: So back to the Waterblitz, was that a public effort? Did you have another group involved similar to the mycological society?

A: In that case, we needed to have 200 people, and we did it in the backcountry – oh, they were trying to sample 250 sites, and I think what happened was, they only got 180 because some sites were dry.

Q: So what were the goals of this project?

A: So more than 100 individuals took these samples, it was split between park staff and university folks and volunteers, so it was a real mix of people and the idea was to get a snapshot of the chemistry of the park at one time, and then to compare the spatial

distribution of things like nitrogen, pH, etc. And in this park, we have a concern that we have pollution primarily reaching us on our eastern slope, because it comes from Denver. And on our western slope tends to be more consistently baseline. And so this is helping us see, in a spatially intensive detail as we can get – where our hotspots are. We know we've had episodes of acidification, so we're going to see what are the hot spots, what are the cleanest spots, and the bulk of this project is being paid for by the University of Colorado, Center for Limnology, and they're interested in more theoretical questions. The park has the question – where do we have water quality concerns? – that would be one of the questions that the park could answer out of this blitz. And what are the most pristine areas, and the reason that matters is because our I&M network is actually using what we gathered to identify where they want to put their sentinel monitoring sites. But the University has some more theoretical, ecological questions to answer, like how do nutrients vary through watersheds? From very high, alpine areas, down to the montane.

Q: So you collected water samples and then they were submitted to a lab?

A: Yes, so the University of Colorado is handling all of the analysis of this.

Q: And do you have any results back yet?

A: Just preliminarily ones – for instance they do have pH and maybe some nitrogen data, but the investigator on this project, last July, just sent me an update to tell me it's going forward, and that they hope to have more results for me later this month. He's going to be doing a poster for George Wright Society.

Q: What about – again, the data storage method?

A: They did it themselves – we'll get this is the point, this is the coordinate, this is that nutrient reading.....let me look at my information.....I don't remember seeing a spreadsheet, but he also talked to our curator.

Q: Would you need to have a collection permit for water?

A: Yes, in this case, this is part of a bigger effort. The Waterblitz is only one of them. Over time, he's trying to understand nutrient flow through watersheds and how that plays out with aquatic organisms. Because the media did stories on this – let me pick out some things to send you. We were excited about that, because to the best of our knowledge, no one in the U. S. has ever done such a comprehensive water sample on a single day in a quote, pristine area. So I guess you could say that out there in the real world, people do snapshots of a water system, but this is really the first time something like this was

attempted. The logistics were really complicated because we needed to send people up over night, and safety was a concern – but I think the results will be very interesting.

Q: And what do you think you'll be doing with the results of both of these blitz efforts? How can you see using these data?

A: One immediate thing, as I mentioned, is that the I&M folks are going to use the water quality snapshot to site their long term monitoring locations. And for the water, they will be publishing it, so they will find out where the hotspots are, and why – how does bedrock or vegetation influence what you're seeing? And then they have additional projects going on, looking at invertebrates – they'll be publishing on how the organisms that live there are influenced by these perhaps changes in water chemistry as you descend through a watershed. And this guy – I think he's probably – he came to CU from Hubbard Brook, and I think he's pretty hot stuff in his field, so we're still waiting to see what he's going to find from this blitz.

Q: And what about the mushroom data?

A: The mushroom data was very much just to get a species list – but conceivably – would we ever manage for mushroom? I don't know, I guess if we had some really rare mushroom, we'd probably want to make sure we didn't do anything to jeopardize its presence in the park, but it's hard for me to imagine that we would be changing our management strategies.

Q: Is there a vision for future efforts for biodiversity type studies in the park?

A: Not much of a vision, I have to say. You know it's interesting, ROMO now has good mammal lists, good vegetation lists, its has a vegetation map, a soil map, now we're actually going to have a water quality map, in a sense, and we are – a couple of things – we are planning to cooperate with CU on future blitzes, and the reason that matters, is that if you're really trying to answer those big questions, you need to sample at different points in the water cycle. You'd want to do one at high flow, at low flow, maybe one in the fall and one earlier in the spring, so you get a picture of how the water quality if varying through the season. They're costs are approximately 40k to do the analysis – we're going to find it's about 8k for us to get our staff out there for the day. The mycoblitz – we do not have current plans - - I am sitting here, and I am besieged with project ideas – but I'm pursuing ones that have more concrete management implications. So two that I'm going to work on in this upcoming year, is that we are going to count beaver dams, and that is an index of beaver population, and the beaver population in this park has crashed because of the number of elk – we're going to start culling them out,

and we're managing our vegetation, and so we're hoping we'll see a rise in beaver numbers over the next decade. So is that a blitz? Not really. There's no biodiversity component in beaver. And we're going to do that for pika and marmots, with the idea of documenting a baseline, using volunteers, so that we can assess changes that might be attributable to climate change. And I shouldn't forget that we've had one very long standing blitz effort that is volunteer run, and that is butterflies.

Q: Are you involved with the North American Butterfly Survey count?

A: No, we have a team of - we have an avid butterfly guy come here, I think almost 15 years ago, who set up a project under Paul Oplers' direction, and so we now have a very good species list, but we're continuing to do transects to watch for year to year variability in those butterfly species.

Q: Is that just a one-man operation, or does he...

A: No, he has a team - probably about five people - and he's actually into his 70's now, and has been doing this so long, he doesn't trust himself to be out in some of these remote areas. I know he has at least three individuals that partner with him who are continuing the work, and he does some, and we have a very definitive list of butterflies.

Q: And where do you keep that list?

A: We keep it in ANCS+.

Q: So as specimens only? But if someone wants to keep a list? Who is the keeper of that?

A: It's out of that Northern USGS group.....let me find it. Yeah, so that's one that - and again, over more than ten years, he's tracked changes in species and how that's changed with warmer years or drought years, and he has some folks working on that - trends - he himself is not publishing, but other people are working with his data.

Q: So does he keep that data set, or does the park have a copy of it?

A: Well the park is supposed to have a copy, and he does send us some things, but there are compatibility issues - he works on Macs, and of course, we don't - and he is not a scientist, so he thinks about data in different ways, but we do have the data, and we get detailed reports from him each year about what he found on each transect so we basically get all of his data.

Q: And you have specimens as well?

A: We actually have a voucher set of specimens for the museum, and a study collection that is available to, for example, interpreters, who are trying to learn their butterflies.

Q: So that's not open to the public? When he comes to run the transects?

A: Yes, this is not a blitz effort – he's had a lot of people help him over the years, for example, a girl scout troop gets interested, and so he'll take them out on a transect and teach them, but the reliability of the data isn't the same. So we do, do, is a lot of education from that project, but it's not a bioblitz. So I'm checking the USGS – yes, it is – it's the USGS Butterflies of North America, so our information is also going there.

Q: Ok, so just to recap, you've got the mycoblitz, you've got the waterblitz, you've got the butterflies, and the what else?

A: The beaver and the pika and marmots, but those are targeted studies. So what I'm saying is, we're choosing to put our energy into those groups, rather than saying "wouldn't it be great if we new all taxa?" For us, it makes more sense to address specific questions.

Q: So I'm particularly interested in the data and the data components of blitz efforts, so other than say, ANCS+, and *maybe* NPSpecies, once you get the data, you just archive them there at the park, and call it good? Are you having any problems with the data, or getting it?

A: Not on the bioblitz stuff – we aren't encountering difficulties, other than the butterfly project. Paul Opler has collected some phenomenal amount of moths, and he's getting old, and it's not clear that he will ever get all that data sorted out. Tim, my curator, deals with him more than I do, and that's under a permit that is no longer in existence, though we'd still like to get the final, definitive list from him. But, we've been careful – that is a concern – that if we are going to work with they Mycological Society – that we're going to get good records.

Q: Yes, and even though this is not an I&M program, the Ft. Collins office is still interested in seeing that the integrity of these data are maintained, and that collections are maintained, even if it doesn't go into NPSpecies.

A: Oh absolutely.

Q: And so in that respect, there is this other database that has been developed, and I'm wondering if you would be interested in using it?

A: What database is that?

Q: As I mentioned in the beginning, I'm working on a national ATBI/biodiversity program, and this is a tool that was developed to help parks with blitz type efforts – to store data, so that they aren't lost or mismanaged...

A: Again, I think the one that seems most appropriate would be our mushroom data, so we could do that, but for upcoming efforts, we are working on more targeted species, and so it doesn't seem to fit with what you are talking about.

Q: is your I&M program involved with your biodiversity type efforts?

A: yes, our I&M program is interested - - they sent staff for water blitz; for butterflies – butterflies are not a Vital Sign for them, so they don't participate. And they didn't participate in the mycoblitz either.

Q: Do you have an RLC involved?

A: Yes, the Continental Divide RLC. So this brings me back to the other part of our future – we do continue the water blitz; we expect that we will probably do more mycoblitzes, and once we're confident that we have good partners, we want to talk to Great Sand Dunes, to offer to help them facilitate a mushroom blitz there, and the club is interested in that. And we also have one to two individuals doing slime molds. We got involved with this through the RLC network – there's a guy in Arkansas who is in charge of the planetary inventory of slime molds. Again, this is not a public event, but our person who has gotten into slime molds, who has presented in public forums, and she came and did a little tutorial on slime molds for the members of the mycological society. So we are doing an inventory of slime molds, using a volunteer, but our slime molds are too obscure – it's not like you can say – ooh, it's slime mold weekend - - it's basically been the one person. And she has made collections, and she's worked with our curator, and it's part of this planetary inventory.

Q: Any information you can send me, would be very helpful in helping me flesh out data requirements.

University Professor of Entomology
ATBI/Bioblitz User Needs Interview Questions
8 January 2008

Note: Not a member of the NPS, but does contract work for the NPS.

General opening remarks; discussions about ATBI, I&M, entomology.

A: One of my – what I’ve been trying to promote is – to not have the NPS spend an inordinate amount of time and energy on things that other people, either are doing, or are willing to help with. The way I see this happening – especially in these horrible economic times, is to really leverage resources and I really don’t see the universities brought in as much as they could be, and to use university resources to help move this along. That’s with not only the development of a database, but also in running the ATBIs – I could really see the parks focusing simply on making sure that scientists don’t screw up archeological sites, and are working within the guidelines of the park, etc. I’m just a little bit concerned that the NPS is trying to do too much on their own. With regards to the interim database, I really think trying to promote having the NPS work with Kansas – working on the Specify database – because, for example, that’s what we are committed to using. If we were to use anything else, it could potentially be a burden. One of the reasons why we’ve been able to operate is because we either deal with people who are not adamant about us putting everything into ANCS+, or, we send stuff to people like the curator at ZION – she’s been great at converting our Excel files into ANCS+ data. So whatever is developed, all I can say is, please make it compatible; please make it easy.

Q: With your Specify database?

A: Initially, when they talked about creating an NPS database, it was simply to deal with these bioblitzes at these 8 parks that had received Centennial Challenge funding. And not so much of a long-term thing. I was just saying, it sure would be nice if you could adapt something where, for the long-term, we could use something like Specify, or at least make them compatible so that it’s no big deal to share files. I’m happy to do whatever – if the NPS wants to go a certain way, I’m more than happy to provide input and collaborations. With the extremely limited amount of funding, I think we have to be smart about how we do stuff.

General discussion about the interim ATBI database, and the individual efforts that parks are doing – and the scattered efforts of park-based biodiversity studies, and lack of advocacy for the program.

A: I’ve really been gently trying to nudge Ft. Collins into that role – to be the advocate. I know that Kirsten Leong is heading up the Steering Committee – I get the sense that there are a number of people that want to help, but there truly isn’t that one advocate for the program.

Q: If we're trying to put together a strategy for various parks doing biodiversity programs, it seems that the RPRS system – which are typically managed by Resource Management – this system could at least highlight the other efforts going on in the park, if it were maybe part of the IRMA system in development. There seems to be a large lag between the little, individual efforts, and the larger I&M efforts, and I think it's largely due to turf type battles – I&M has got their turf, and Resource Management has their's, and everybody wants the same, single receptacle to pull and push data into, but no one really wants to give up the turf to make that happen – is an impression I get.

A: Yes, right. In a lot of ways I feel that scientists are in the middle of all this – Ft. Collins gave us some money to do some legacy work, and so CSU has been trying to get data from stuff they've identified, and the people at the parks they need to talk to, were somewhat resistant – I think they were resistant because they just didn't care – it was just lists of insects, and not on their high priority, so I'm concerned that when people go through these standard research permits, and put stuff into ANCS+, that it gets lost in the system, and nobody has access to it. And yet the I&M is important to ATBI efforts because we don't want to just have these things be species lists only – or at least I don't – what I'd like to do, and have spoken to others about this, is to start doing species distribution modeling and climate change modeling, and we think we can do this with certain taxa. It's going to be really important to tap into some of the data layers that the I&M program is developing, and so in one sense, it's tough because this could really be a successful program, if say, Steve Fancy did embrace it, and Bert Frost paid them an extra million dollars a year to do it. So really, it's unfortunate, because it comes down to funding, and I can completely understand Steve Fancy's point of view on this. It's unfortunate because I really think that this is such a natural fit, for the scientists to be working more with the I&M people on this, than the Natural Resource people, but we could still provide the Natural Resource people with information if they want it. Frankly, I don't know a Natural Resource person that would know what to do with a lot of this data. George San Miguel is extremely interested and supportive of this – at MEVE – everything from Zion to Bryce to wherever – probably John Spence is the closest person that would really know what to do with the data, or how important the data is. And they shouldn't be expected to be – when they became resource managers, it wasn't to really appreciate a lot of this ATBI data.

Q: Can you explain a bit more?

A: For example, if they saw a scientific name of an insect or a fungus – they wouldn't know if it was biologically important at all. So I've tried to keep a fairly low level in a lot of the national stuff. My other perspective is – what they've done at GRSM has been incredible. And it's sad that the NPS can't seem to take that model and nationalize it, because I think they'd really get a lot of good things from that. But they haven't been able to do that, and in turn, I don't think DLIA really knows what to do, in terms of going from a more regional organization to a more national one.

Q: I agree – and it seems to me that other people that have started down the ATBI path – they also have a non-profit associated with them, much like DLIA.

One question I ask a lot of resource managers is, how do you envision the data you are collecting, will help you in managing your park. I'm finding that not many people can answer that question.

A: I guess I would argue that most of them don't have real training in biodiversity that would allow them to address that – and I think to a large degree, we're all kind of learning as we go. When I talk about this, I start off by saying that I think biodiversity in and of itself, is a resource that needs to be protected. If you accept that as a value in and of itself – all the slime molds, insects, etc. – are a valuable resource just by their presence, then I think a lot of things easily fall out. If your number one goal is to preserve biodiversity, or at least understand the threats to biodiversity, you simply have to know what biodiversity you have – you have to do inventories. Once you have that inventory, you can ask a bunch of questions, for example, how is climate change going to affect the biodiversity in my park? If your park that has an elevation gradient, you would really target the very tops of the mountains, because they have nowhere else to go.

Q: These are exactly things they are working on at GRSM. But what I'm getting from resource managers – including those at GRSM – is that, how is the presence of this species of beetle, located on this shrub, going to help mitigate the effects of a road that needs to be put in, etc.? I'm playing devils' advocate here – but in essence, I'm hearing these types of comments from resource managers – if we know we have this assemblage here – is that really going to prevent a management action from happening?

A: Yeah, but I think that that's actually too precise a question to be asking about this program –

Q: Well wait a minute – I'm not asking this, parks are offering this up! I ask them how they envision using these data....

A: I guess to me that's a very reasonable question to ask – how is the knowledge of the presence of a beetle, going to affect how I manage day-to-day stuff, and I guess I would come back and say if that's going to prevent you from initiating a biodiversity program, you're going to run into problems in justifying it right off the bat. I guess the way I look at it is it may or may not have an impact on how you determine what you do on a daily basis for any given park – it may be 20 years before you have collected enough information on biodiversity, that you can be able to answer that question. And so the problem that we're faced with is, that to assess the biodiversity of a park is a huge task, and so what is our decision? Well one decision is, it's so big that we can't even deal with it, so we're not going to deal with it. I guess where I'm coming from is – if you follow GRSM – rather than ask the question why? They always ask the question, why not? Why can't we do this? And they've found ways to develop their biodiversity program, that I think is extremely inspiring. What they've done is – and one of the reasons why I think they're so successful, is because they've embraced all these local schools and faculty at small colleges, that want something to do in the summer – they've given them a little bit of money, and they've gotten a lot out of it! And so I think, for the NPS to replicate that

– they really have to do the same thing – they have to embrace local schools and colleges; they have to not be so concerned about - if we sample insects on this shrub, next to this roadway, how do I have to account for that for determining whether to widen that road or not? I think the bigger threats are simply – and one of the things that I see as so important for national parks and monuments is they really could be one of the few places where we can maintain biodiversity – especially with climate change. But we don't know how important they are until we really do biodiversity assessments of parks and monuments, and compare those with biodiversity assessments in adjacent areas.

Q: So that brings up another point – what do you think about all these biodiversity portals out there on the web – like the Global Biodiversity Information Facility (GBIF)?

A: I'm one of these people that has almost no patience at all – after about 10 minutes I get frustrated, because I want all of the data NOW. But those kind of efforts are happening – there are so many efforts out there. But I view those types of efforts as good, and I really haven't spent that much time with them – my students do. To me, I look at the positive side, and they underscore the fact that there are so many things going on, that you could leverage resources for a biodiversity program for the NPS – probably the number one group I look at would be the data from the ant people – they are already self-organizing.

Q: The ant people?

A: Yes, the ant people.

Q: As in Formicidae?

A: Yes.

Q: As in E.O. Wilson, et al?

A: Yes – and so I think there's enough of them, they have good data, and dedicated people – they kind of have an answer to the GBIF thing going on, that embracing them, and – for example, the Harvard people are involved in the BOHA ATBI – but that entire group can be and should be brought in to address the question of 'how can we fill out all these blank spaces about information about the ants in our national parks and monuments?' So they would be a prime group to work with to do a lot of this species distribution modeling and climate change modeling, and promote additional inventories that are not on the NPS dime – there's funding from other places.

Q: Speaking of taxonomy in general, many parks are constrained by taxonomic expertise – they want to do these bioblitzes, and do them and collect, say, aquatic invertebrates, and then they basically sit there in alcohol on someone's desk, because they don't have the collaborations or taxonomic expertise to get these things identified. So these bioblitzes can be great for public outreach, but when the rubber meets the road – we're collecting things and not getting the information out of them.

A: One of my other concerns has been that this differentiation between and ATBI and a bioblitz – I argue that a bioblitz can be an important part of an ATBI program – I’ve actually thought we should just scrap this ATBI word, and just refer to them as biodiversity programs.

Q: Yes, I agree.

A: It can involve anything from doing inventories to more involved, more research kind of program. At GRSM, the vertebrate work they’re doing – looking at bird distribution and air pollution – all of that I think is eventually where a lot of this ATBI data needs to go to make it meaningful. In my mind, the inventory part of a biodiversity program is just phase one. I really think that these bioblitzes have kind of been taken over – there’s this great rush because of the National Geographic funding – I was really pleasantly surprised to hear from the guy from SAMO that as a result of that, they had developed collaborations and relationships with other scientists from nearby universities to continue the work, and so I think that doing a bioblitz in a vacuum is – the only value it can probably have is educational, but in terms of scientific value – they are just horrible! If you talk to scientists, and say, do you want to go out and do a bioblitz? – most of them will just grimace! For a lot of parks, a bioblitz is not feasible. We did sort of a mini bioblitz in Canyon De Chelly– it really wasn’t that productive – I would have done a much better job with three students. I spent so much of my time driving people around and making sure they have everything, and then they end up losing stuff, so –

Q: When was this?

A: Oh, about 3 years ago.

Q: So did you collect all taxa, in like a 24 hour period? Were there collections, or was it observational? Can you tell me a bit about it?

Q: We collected – I had my entomology class out there.

A: So it was basically an insect-based blitz?

A: Yes.

Q: What became of those data?

A: Oh we have them, and we’re working them up, slowly – I have an undergraduate who is coming back from Harvard tomorrow, and he actually showed some of the ants to Gary Albertson – E.O. Wilson walked in and they think we’ve got a new species, but the problem with that blitz was, they went into the students’ collections and we just never recovered them from the students at the end of the semester.

Q: And what about ANCS+?

A: We didn't do any, and we couldn't, because we didn't have any funding!

Q: How did you get the permit, if there were going to be collections made – didn't they insist that you return at least the data?

A: The only place that we've done ANCS+ has been ZION and BRCA, and ZION has basically put all that stuff into ANCS+.

Q: So otherwise, you have actually done collections in parks, that you haven't really had to be accountable for, for your specimen tracking?

A: Yes.

Q: Do you house things from parks at your university?

A: Yes.

Q: And you record those data in your Specify database?

A: We're going to – we're waiting on version 6 to come out. All of our NPS collections are housed in the same cabinet, color-coded and number-coded. So for the ZION and BRCA material, those are really the only ones that we have NPS catalog and accession numbers for.

Explains the contract he has with ZION to identify and steward the parks' collections.

In trying to find solutions, identifying people like the folks at ZION, is critical – even though they are not biologists, they've been great and extremely practical about it – for example, they said, there's no point in storing these insects at ZION – they've been here for decades, and no one has ever looked at them – they're just collecting dust. So we can get them identified and we can have pictures taken of them - we can actually do something with them, and we can go back and provide ZION with a synoptic collection they can keep. So I think that in attacking this – I see enough champions in the NPS and various universities to make it happen and I think that's what needs to happen, because there is just not enough money out there.

Q: Switching topics a bit, I talked to the folks at GEWA, and they told me that they're going to be getting a grad student from you to help them with their insect-based ATBI – is that in the works?

A: I'm hoping one of my undergrads, who has applied to grad school in Maryland– she wants to do her research on horseshoe crabs, but also knows insects stuff really well. Right now we're training her how to do what we call these travelling arthropod shows, basically, taking live or dead material to elementary schools and Elderhostel's, etc. So

we're teaching her about outreach, and hopefully, next summer she'll actually stay at GEWA and do an inventory and outreach for them.

Q: Can you tell me what's going on with the Colorado Plateau biodiversity effort?

A: It's basically – whatever resources we can get, I think we do a good job. Right now, we're putting together legacy information from the CSU collections, the UNM collections, and NAU collections. We're doing a separate project at NAU with Lisa Thomas at MEVE on ground dwelling arthropods, which is actually a fairly major project, and then we've just started this collaboration with Harvard to focus on ants. Besides that, all the museums are all doing some stuff in some parks – kind of doing things on the fly, depending on funding. This additional 20% park fee money that Ft. Collins will get, will be used, and we'll target parks that are really supportive, like El Malpais, Parashant – parks that have the capability of hosting an ATBI effort.

Yellowstone National Park

ATBI/Bioblitz User Requirements Interview Questions

17 December 2008

Q: This is a bit of a different type interview, since you haven't started your blitz activity, though you do have the MATBI going on, and while I thought your presentation at the DLIA meeting was really cool, I'm thinking we shouldn't focus here on the MATBI, but more on your upcoming blitz?

A: Yes, but could you first explain what you meant in your last email, saying you guys have changed the direction of the information you're gathering, and what you're doing – can you give me a summary of what you think you are doing now?

Q: At the start of the project, I was more focused on looking at database functionality – what sort of database fields are needed for more of a national type endeavor. It's become fairly clear in my discussions with parks, and certainly it was borne out in that closed door meeting we had at the DLIA conference – that parks don't really want a national effort. They don't want an effort on the level of the Vital Signs monitoring program – they simply want to proceed with their individual park efforts. As far as user requirements go, my original scope was to be developing what we call use cases which help elucidate a systems' functionality, but now I'm simply trying to understand what it is park needs, want, require, wish for, in helping them move forward with their data from their blitz type activities.

A: So not so much biodiversity stuff, or ATBI stuff, but just looking at just the bioblitz as a subset of some of these other things, and what databases can do to support that?

Q: Well, no I think it's not more what a national database can do for you – we do have this interim tool that has been developed, and is there for parks to use, and so I'm not really refining that database so much, or trying to figure out how it's going to fit into IRMA – (Ft. Collins is also on the interview) can you weigh in?

Ft. Collins: Everything is so dispersed – in terms of who's doing what, and how they're doing it, and how far along they are, and how their park is set up, and what taxa groups they're getting, that to develop sort of more, use cases, which pertains more to a fairly coherent system – I think it's premature.

A: Yes!

Ft. Collins: I think right now, what we need to do is to figure out, who is doing what, how are they doing it, and then from there, start to figure out ok, where are the commonalities? Where would some sort of common thread, or procedure, or tool, have the most wide-spread use or applicability – or purpose – and kind of start at zero, as opposed to starting at 50, on a scale of 100, in terms of working towards some sort of solution. We can't even figure out a solution, because we don't quite understand where everybody is, and what they need.

Q: So going back to that email I wrote you at the end of November, I was trying to synthesize some things that I talked with you about in previous conversations, so I'll go back to that now. And that was, the premise that you have, that parks are very interested in contributing to biodiversity type activities; and they have been doing these activities all along – definitely prior to Gillian's' Centennial Challenge proposal. And in and of itself, you told me it would be useful to know what these many efforts are – who is doing what, where and on what kind of scale and time frame. And you also mentioned that there were many, many efforts going on that satisfied those park interests and objectives in working on biodiversity projects, and that there are also many different ways and mechanisms out there that are used to collect information – which is definitely what I've been finding. So the bottom line – what I understood from you – is that you wanted a common place, i.e. a database - to pull data from and push data into, and it has to be easy, and that you are under the working impression that that place is NPSpecies.

A: Yes, just because what else would we use?

Q: The interim database was offered up as a potential solution, but from the meeting at the DLIA conference, I got the distinct impression that that is not the route we want to be going. It's certainly there as a tool for parks to use, if they don't have any other means of capturing data, but I agree with Ft. Collins; I think we're kind of premature in holding

this up saying, this would be great if everyone used this – or to even try to round up data to populate that database – I’m not convinced that that is a plausible strategy. So I’ve got some questions, and I guess I’ll start off by asking what I usually end up talking about, and that is – how is it that I can help you? What is it that you want me to do for you?

A: I’m in a different position than a lot of people in a lot of parks in that I can do a lot of things on my own – if I need to get it done, I just call someone up and go from there. In my case it’s less, what can you do for YELL specifically, the best thing, is that you’ve listened to the things that I think we should be doing as the NPS, and really, it’s moving those things forward. I think that just the fact that you’ve – nobody is looking at this, and taking on a role of - what are all these parks doing?, and are there some common threads?, as you guys just mentioned. Because everyone else doing this – we’re attached to a single park. Kirsten is a bit different, but she’s not really getting paid to work full time to pull together a strategy for the whole NPS – she’s doing this on the side. And so nobody is really looking at what everybody is doing, and what does it mean? – I don’t mean that you take charge and that you’re the biodiversity czar for the NPS – but even having someone that has taken the time to interview and track down what people are doing on these efforts in some kind of cohesive manner – and somebody who is aware of what NPSpecies can do, can’t do, should do, shouldn’t do – I’m putting you in that role, and I know you have opinions and biases, but I still think that you can be objective in the usefulness of tools? Whether or not it’s the ideal thing – we should have done this at the beginning – all that kind of stuff, but still, in a practical sense – I think that could be hugely valuable, because obviously, people are playing around on the edges of this. They’re doing specific things in single locations, but it’s really hard to get a handle on, ok, we’re coming at it from a lot of things, we’re chunking away at it in little pieces - do these little pieces taken together mean anything? Could they, if we had a more comprehensive strategy, and an idea of a goal that we are aiming for – could we chunk away a little more strategically?, could we pull information?, could we make this stuff be more valuable, so that it could get some support? Bottom line – we can write all kinds of nice stuff about it, but it’s going to come back to data – what do we know and what don’t we know and what should we know and if we’re going to go after pieces of this, it would be nice to have a better blueprint of how we could do that. I don’t see it happening, unless someone like you is taking the time to do it. From my personal perspective – sure, you could come work for me full time, and I could give you tons of things to do, and it would help me out, but short of that, it does me way more good to have someone pulling together stuff, and some sense of what’s going on across the NPS. And the fact that there is an interim database that I can use for my bioblitz that is thought through, and it will hold the information that you typically put into a bioblitz, and it’s a safe container for data until I decide what I want to do with that data, and how I want to use it? That’s what

I really need for a bioblitz, a safe place to put your data that holds all of the things that people have thought of that they might want to collect during a bioblitz. And it's a huge benefit for me that I don't have to take a week to call people and come up with questions on my own – build it, reinvent the wheel, etc. I think that that's good, but this question of, ok, if we're doing this to understand biodiversity in parks and what does that mean, and you want to be able to access that and get it back – should I not be putting everything I know into NPSpecies? Should there be a greater, bigger strategy that if we have lots of money, and parks are working together – we should be doing it a certain way? You have to be realistic; none of this is ever going to be funded at the multi-billion dollar level across the NPS. It's going to be in pieces; but we could be doing the pieces more strategically and we could be assimilating the information. I'm really interested in – we have from the I&M program, we came up with these habitats, say out in YELL – habitats of interest – ecosystems, etc. – high elevation areas, our northern range area, as an example. And some vague sense that we need to be knowing what's going on there – how they're changing, either from species going in and out of them, or global climate change or all kinds of stuff, and should I be doing something where we're looking at insects? And if so, which ones? And so what I want to do is spend some money on what do we actually know about insects in YELL, any studies that anyone has done, to me, it makes sense that I document that in NatureBib linked to species lists, and maybe something else that has documentation of what these projects really where, like, big, small, weekend, two year – whatever – and that I can start to get some sense of what I know and what I don't know, so that when I go to experts and we bring people in to have a conference or a meeting about it, it's organized in some form that I can hand it out, show people, etc. I need some containers, and ways to interrelate this information.

Q: One thing you brought up in previous discussions is that perhaps, someone approaches your superintendant, or your chief of Resource Management, and wants to know about the diversity of spiders in the park. So you would look for that information to be pulled from NPSpecies?

A: That's a simple, easy, thing that is just like a fun-fact numbers type of thing. What I'm looking at – I'm trying to go a bit deeper than that – that's the first step, but if for some reason, spiders were a really good way of looking at what's happening on our northern range, and maybe they play a critical role – or maybe it's pollinators, maybe it's something else – but to even get a start on this, I need to be able to put things in some form that species lists and studies and references and data can all be interrelated. And it seems like the databases that you guys are working on are a step towards doing that, and they are the containers that we would do that in.

Q: Yes, I think you've just described the system very well, I think that the progress is probably not as fast as parks might need it, but I can assure you that it's a very thoughtful and well planned system, and when it makes its debut, I think it's really going to blow people's socks off.

A: But as far as I know, not everybody is – I mean people are doing these bioblitzes and are doing these things, and a lot of them are focused on insects and things like that, but I don't think it's universal that people are using these (I&M) databases to hold any of that information.

Ft. Collins: I think you're right – I think its catch as catch can in terms of where the data go and what happens to them.

A: And that's exactly the sort of thing that Libby could be finding out – like, we've done 27 bioblitzes in our park - or 15 – these are the subjects, this is what we did with our data.

Ft. Collins: Right – we did 15 bioblitzes and it's stored in 15 different places.

A: Right – okay so then do you have researchers come into your park, and do research projects on some of these, but yeah, the only thing we have is a listing in RPRS – just some sense of – I don't think that anybody could really answer that question – you could individually, if someone took the time to talk to each of these people, but other than that, no one has a clue, no one knows!

Q: Yes, and I guess what you're hearing a little on my part is some frustration because the overall effort is fairly frustrated. There's not a cohesive plan on how to proceed, and as you pointed out, individual parks are doing their individual efforts. So I am not that sure of myself, and what it is I'm producing that is going to help people, and I don't want this to be a waste of time and money.

A: No, of course not! I'm giving you my opinion on what I think would be helpful to the NPS. Individual parks – in truth, some of it might be talking to people and, if it really seems like we should be getting this stuff into these databases – and this information, so it can be accessed from one thing all interrelated; you know enough about these databases to know, like, what is the effort it would take, and are there mechanisms that this could be helpful through this?

Ft. Collins: Or that, a confirmation of the fact that everybody is kind of collecting the same basic things: what it is, where it was, when they got it, what spatial requirements they have, what curatorial requirements they have, and the identification problem. And

all of that can help feed into the requirements that we're doing for IRMA here, but it also kind of represents – I think maybe ATBI is at a kind of a threshold where, ok, these scattershot-type efforts have gone on and we've got some valuable lessons learned, and we better stop and figure out where these things are going, and maybe develop some procedures and tools before this goes to the next level.

A: Well it should go to another level! What I've learned in the last year – it just happened to be because the Centennial Challenge came along, right? – so somebody, Gillian and some other people, actually sat down and tried to make a list of all the things people are doing. Well, it made it look like there was this big, cohesive effort, but it obviously isn't. And then when we got together as a group, and tried to plan it like it was a cohesive effort, it was really clear that we had no idea what's really going on out there. And what does the NPS – I don't see us getting billions of dollars in the current climate to pursue this in some big, from-the-top down program. I see individual groups getting money, and continuing to piece away at it. But I do see that some overall strategy of what we'd like to accomplish through these efforts, and where we'd like to put the information – a lot more value could be added to what we know about this stuff if it was a little bit more organized. But you can't dictate to people that are going after sweat and blood efforts to get \$3500 dollars to do something to find out about spiders in their park. But ok, now you're going to take all your time and put it here and do this and do that, and you have to do it this way – it's just not going to work. So I think the way - we could gather the information about what's out there and *then* sit down and have some sort of a strategy – ok, what would it take to make this stuff a little bit more coherent and easy to get at and easy to look at, as the NPS develops its strategy to go forward – what are we going to do about all these changes?

Ft. Collins: And Libby, that's kind of where you fit in – is maybe, as a result of all of these interviews, you can help us hammer out a strategy of 'this is what we think it would take' – vs. the scattershot approach now – to something that could synthesize or knit together some very good lessons, and information for the NPS.

Q: So one of the first interviews I did – I talked to a woman who told me that simply what she would like to see, is a website – which we have up and running – that had some templates that were developed for individual groups, i.e. – how bird data are collected, or herpetofauna or plants, and then she said she'd like examples for these. She'd also like to see "how-to's" for all the varying efforts, from a quick-and-dirty type bioblitz, up to having focused scientists coming into a park to do inventories. So she thought that any and all tools on an ATBI-type website, stored in one place might help her.

Ft. Collins: Sure.

Q: So is that more of what you are thinking – developing that kind of tool?

A: You know – I was thinking of something bigger and broader. The fact that pieces of information that somebody said – something like this would be useful to me – if you just did that, that's all you would do. I was thinking more, ok, these are the kinds of things that people - - there's two things going on here; there's individual parks trying to do stuff, and trying to find out more stuff about what's in their park, and then there's the – what are we going to do in the NPS? And how do we contribute to the sort of national look at what we preserve, and what does it mean, and how are things changing, and how is that going to change our strategies, and all that kind of stuff. So I guess that I'm mixing those two up, but they're sort of separate – how does the NPS want to move forward strategically on using this information and what does it mean, and then, what help do individual parks need to do, in order to do that. And I know that you're focused on the individual parks and helping them because you know, money came from these places, and so in order to satisfy them back – I'm less concerned about that, actually. And more concerned about what does it all mean, and do we have the tools to assimilate this information into something that means anything, both back to individual parks and up as a service and strategically, each individual park, decisions they're going to make into the future. That's not a good roadmap for you....

Q: How do you see information that you are potentially collecting at YELL, helping the NPS?

A: It's more – us coming up – I see us sort of stopping and thinking, ok, let's come up with a science strategy of how we should be aiming our research, our operations, our everything - over the next five to ten years. And asking people, what are the important issues? What's going to happen? How do all these threats and things coming down – are we set up?, and do we know the things that we need to know to make the decisions that we're going to have to make in five years? And biodiversity, and how things are going to change with biodiversity, and what does biodiversity mean? And how does it affect the fundamental workings of the ecosystem, and how does it fit in – are some of those questions. I'm a low rung on the totem pole here, but it's real clear to me that an awful lot is known about YELL, but I have no way to access it, and no way to even hand it the people who can make those bigger decisions, who have those bigger opinions.

Q: That data you can't access – where/how is your I&M network involved?

A: They are only doing vertebrates and vascular plants and I think a lot about the diversity and the things that are going to be really important aren't going to be vertebrates and vascular plants.

Ft. Collins: Are there others in your park who feel that way too?

A: Yes, I think my boss does. And I think that people have a gut feel that that is the case, but can only throw their hands up in the air and say, yeah, but what are we supposed to do about that? I think it's too big a question, and I'm not even talking about microbes or anything like that. I'm just talking about something that doesn't have a backbone. But, an awful lot is actually – and so, I just need a place to go – I mean I don't know, I'm just waiving my arms here. But I do know that an awful lot of the parks that are out there, that are smaller, that have done these little individual efforts – at least they know a whole lot more than we know!

Q: But can they get at that information easily?

A: And can anyone else?

Q: So towards that end, it does seem to be, that NPSSpecies, being the NPS's biodiversity database, would be the common receptacle for that kind of information – it was certainly built to accommodate invertebrates, etc. – but the distinction between NPSSpecies, and say, the interim database, is that one is a collections-based database – the interim – and one is not. So NPSSpecies is really just a place to pull list data from, with proof attached to each record.

A: Right. And also potentially, you could hook information about the actual studies that collected that stuff - - it could all be linked together.

Q: We do have that ability already – with references, etc. – you can link them to a species list, and that is a very tidy little tool, but getting back towards what your upcoming effort might be – if you think that you're going to be issuing research permits and collecting voucher specimens, then we need to engage the curators and the ANCS+ database, and you need a receptacle to handle all the many different fields that are necessary for a collections-based, blitz effort, vs. let's say, an observational one. What I'm getting from parks is that sometimes, they go into a blitz effort thinking that they're just going to collect observations, and at the 11th hour, they decide that's not going to work, and so there can be a last minute shuffle to get that organized. So if I'm hearing you correctly, you would want to know what all those endeavors consist of up front? What you'd need to do – contact this person in advance, make allowances for NPSSpecies, etc.?

A: We've been doing that stuff for a long time here.

Q: What stuff?

A: You know, collecting things. Putting things in collections, curating them, keeping track of them. And it is done in ANCS+. My point was it isn't like those things aren't going to happen. I'm not sure I understand what....

Q: I'm just trying to understand what your upcoming blitz effort might encompass?

A: Ok, the upcoming blitz effort was primarily designed as an 'engage the public with the idea of biodiversity'. That particular bioblitz - by involving the public - that was more the point of it, than what we're going to find out.

Q: Are you actually planning this blitz, right now?

A: Yes.

Q: Is it going to be a targeted blitz, or a general-type blitz?

A: More general; to the area. And it will be - what gets targeted, will be based on what scientists actually end up being here, as opposed to, we want to find out all the spiders in the area, so we're only talking to spider people, and we're only going to invite people who know how to collect them, and document them, and that kind of thing.

Q: Will it be in a certain section of the park, or park-wide - it's a big park!

A: Up in the north part of the park - between Mammoth and Gardiner, in that area.

Q: Do you feel like you have all the tools you need to pull this off?

A: Who knows?!

Ft. Collins: Tell me again - are you targeting a species group?

A: No, more general. The point of it is - it's more of public engagement. What groups get targeted will be determined by what scientists participate.

Q: Which ones you can engage prior to the event?

A: Yes, that's to be determined. Initially, there wasn't as much of a scientific objective as there was an engagement of both park staff and the public. More towards awareness. I made the assumption that the interim database would be a great tool for all of that. But in the meantime, after I've been to that DLIA conference, I am also interested in pursuing the idea of targeted, more scientifically rigorous collection efforts.

Q: And I guess that would be one of my first suggestions – I was just talking to the folks at Joshua Tree yesterday – they're getting ready to plan their first endeavor. What I learned from that conference and in talks with other parks, is that the general, more sweeping-type blitzes, are the ones that really create the headaches for data management....

A: Yes, but if your goal is to engage the public, and get your staff excited about biodiversity, and not to collect data that you're going to use – then that's not the issue.

Q: Ok so then, there's the crux. You don't look at this as a data collecting exercise, that is going to give you data that can be entered into NPSpecies, or has the ability to produce species lists?

A: That's a secondary goal – it would be opportunistic.

Q: Then why would you even need a database?

A: Because, depending on which groups, there are a lot of groups we don't know anything about – no one has ever bothered to collect anything. And in those cases, it makes sense then – if we've got not only the people who understand how to collect them, but also the taxonomists who have bought in to actually doing the post-work – you certainly want to capture that.

Ft. Collins: It seems like the goal is to do the endeavor as though it *will* result in some kind of valuable information, even if it doesn't – so treat the data that are collected with care, because there *is* the possibility that some good information can come out of it....

A: We're not going to find a new reptile, and probably not a new mammal, or even a bird. But if we get somebody here that was interested in spiders, and wanted to participate, every spider we found would be a new record for us. And how we treated that data would totally depend on what commitment we had past that, to identify and curate the specimens. But I certainly wouldn't want to – and I'll be realistic about the whole thing depending on my resources and the commitment of the people who are

participating in the project. And that's still fuzzy right now – I've gotten a lot of interest, but it's still a ways away and so I don't know how much interest will translate into real work. But, like I said, as a result of that conference at GRSM, I am really interested in going after some money and doing some targeted efforts, in certain habitats, on certain species, where they would be much more in the line of a specific taxonomic group with committed experts and commitment to identify the species down the road, and get that stuff – and do a really good job of that. In that case, I don't know whether the interim database would be the place to stash that stuff, or is there something else, or what are the pluses and minuses of those things?

Ft. Collins: But probably what *would* be helpful, is looking at what other parks have done with, say invertebrate bioblitzes; how they – especially the ones who successfully collected data – how they managed their data. Like BOHO, they're looking at invertebrates as being mini-wildernesses that exist within the islands, and learning from what they've done as a way to help direct what you might do - -

A: Absolutely – and also what they've done up in ACAD, and what they've done down in CONG, and what they've done in GRSM on these focused efforts – and what kind of stuff did they collect with that, and where did they store it, and where did they put it – would be of *huge* use to us.

Ft. Collins: Right, and then in an ideal world – if you *did* collect this information, regardless of the repository – let's say that we could provide you with just a procedure – not a whole lot of data munging – or anything else, but just a procedure to say ok, send this file here, and we'll move it into NPSpecies, or some sort of process that at least lays out a path that says, ok, you want to get it into ANCS+, or you want to get it into NPSpecies, or whatever the system is going to be – here's what you do.

Q: (to Ft. Collins) Are you saying that you guys have the resources, if parks wanted to send you a spreadsheet or a database and say, get this into NPSpecies?

Ft. Collins: I think so, yes, and I think the idea there is to automate it as much as possible, but ideally, what we can do is, if information meets certain criteria, like ok, the stuff is in distinct fields, and there's a certain level of documentation – the way data can be transformed can be endless.

Q: Because that is something ACAD was asking me about – they've got this Access database and it's got reams of data in it from their blitz activities from the last five to six years, and he said what would help him the most, is to be able to send the backend file to Ft. Collins, and have Ft. Collins upload it into NPSpecies.

Ft. Collins: Yes, and I think the process that we could be looking at there is – sure, send it in, we upload it, and then it goes into this sort of workbench area, which means, it hasn't necessarily been certified or approved, or maybe there's certain things that haven't been identified yet, but it's like a holding, and as the information is verified, and it gets the thumbs up from people at the park level, or the POC for NPSpecies, it can then be – quote – published, and can then go live.

A: That's kind of what I was getting at. Sort of that – you're the one Libby, that's going to know – I was thinking about ACAD when I said that, because they have said that in the past, and I knew their stuff wasn't in NPSpecies – he's they're not the only one who has said that. The thing is – I think a lot of people feel like, ok we've put all this effort into getting into this database – we're not going to re-enter the whole thing again in NPSpecies. And if they had some help and guidance as to getting it in – it would be a good place to hold it. And the thing is, you can't always – some I&M programs are open to that, but some aren't because some are feeling more pressure as to where they should put time and efforts, and often, it's not invertebrates. So there isn't anybody else out there – if you don't have an I&M person help you out, you're stuck. Because no one else knows anything about it.

Ft. Collins: So what I'm hearing is, is that what we ought to be doing, for ATBI data, and for NPSpecies, or whatever system replaces it, is to have some pretty distinct extract/transform/load procedures where we can go and look at a variety of different types of source data - transform the data, and load it into NPSpecies.

A: Ideally, as people started using some version of that interim database for these efforts – and I would assume that that one was made so that it could be translated into NPSpecies – I could be wrong on that, but that would have been the smart thing to do – then there'd be a more standard way to - - really, a reason for putting things into NPSpecies, is because it already has a bunch of other stuff in it, but it's really because, one small piece of this – not maybe the science piece of it – of understanding biodiversity and what it means, but one piece of it is being able to make lists! And so the two things I'd like to get is, all my stuff in NPSpecies, so as you guys improve that and make it nicer and easier and better for me to do queries and make lists – I can make lists really fast and easy and I can give them to anybody. The other piece is, that as you are looking at this stuff – if other people are doing these efforts to discover biodiversity, and we really don't have a database, and this interim database isn't it – some recommendation that there is a hole here - - those are the two things. You guys are the ones that can make the best recommendation – it should be something that is a piece, interrelated with these other databases, obviously, so that they all talk to each other.

Q: The interim database is based on the NRDT template, and it works very well for I&M type endeavors, and those that are involved in I&M programs, are comfortable using this type of database – they are fairly complicated to use, but serve a good purpose. On a blitz type activity that you’re talking about, that is going to be more observationally based, I’m not sure I can recommend it. So I’m thinking where I could go with this, is I can round up the other examples – SAMO’s database, ACAD’s database, spreadsheet efforts, etc. – and offer up these as solutions, given the scope of your effort. So if you’re running more of a collections-based bioblitz or ATBI, then by all means, the interim database is the way to go. But if you’re really just interested in a quick and dirty look, and you don’t want data to be lost, I think I would suggest the ones at ACAD or SAMO, so maybe having those tools all pulled together would be a help?

Ft. Collins: I think that would be a good thing to add as part of a deliverable for you Libby – are actual examples of those databases.

A: I agree with you that people didn’t know enough to really tell Libby what to do, and what was going to be the most useful, but I truly think that your efforts of going around and trying different things, and then talking....you could contribute in a huge way to where we go into the future in a thoughtful way. It’s not going to happen unless someone goes through the pain that you’re going through. But you know, all worthwhile things are, and that’s why they don’t get done, because they’re a hassle, or it’s not someone’s job.

Q: I’m willing to do whatever it takes, I just don’t get the clear feedback that this is what I should be focused on – this conversation is helping. I’m struggling with the deliverable – what kind of information do you want? So that I don’t think it’s a waste of time and resources. So that the parks are really going to get some utility out of this.

A: Some of it would be – if some of these people that are doing these things....first of all – we kind of know all the different things people have done in different places – I kind of know in the back of my head, but I really don’t know who all has done spider things – some of that kind of stuff would be really useful and you’re going to find that out because you’re talking to people.

Q: So just which taxonomic categories they are focusing on?

A: Yeah! Just the fact that I would know that, then I could call somebody up and ask them how to do it for spiders.

Q: So, for example, I found out at CONG that they had done a freshwater mussel inventory – so just knowing that?

A: Yes! That's a piece that would be useful for me; another piece would be if there really are some problems with using the existing databases to do the things that we are talking about, someone should be articulate about that. And then, another thing is, I just don't know where – just as a support in the NPS and the bigger idea – people are doing these things, but they are all being kept in isolated databases, and they aren't available to make species lists, or anything else that you might do, or interrelate it with the project report, or anything else. If that could get moved forward in a thoughtful way – you're offering up those – I mean, I don't know where the money comes to do it, or somebody talks to Steve Fancy as says, you know – this is a valuable use of our databases, we should be supporting this.

Q: Towards that end – a bit off subject, but it's a question I've been meaning to ask Ft. Collins – doesn't Steve have access to more funds now for inventories, that he's willing to give to parks?

Ft. Collins: Yes, there's been a draft process for inventories, and I think that what they are looking at is, first priority is to finish up the inventories that are difficult and that are complex and that haven't been finished yet.

Q: Do you mean in the vertebrate and vascular plant realm?

Ft. Collins: Those and then vegetation, soils, geology – things like that. There are still some huge gaps in Alaska that haven't been met, so that's kind of the first priority. The other is to look at recurrent inventories – for example every 20 years or so, there are probably going to be vegetation maps that need to be redone – things like that - and then the third area priority is a certain amount of money is going to go to new types of inventories such as benthic, and submerged resources and things like that. So I don't think anything is specifically targeted towards spiders or invertebrates, but there is the recognition that while we still have these other big areas to still complete, there are others that represent kind of the second wave of inventories – the invertebrates and the non vascular plants.

Q: Do you think Steve has a pretty good understanding about these many and various efforts that are going on in the parks, and that the parks are looking for answers as to what to do with these data?

Ft. Collins: I don't think so – it's something that I can certainly convey. But in terms of ATBI, I think what Steve thinks is, "I've got to focus on what I've got to do here". ATBI is outside of his scope. And where we can probably find the integration and knit some of these efforts together is in the data and how we manage it and how we serve it up in much more of a national perspective. So, I think for him, he feels like he can't dilute his intention with ATBI. It's up in BRMD now. And I don't know from a national perspective where the funding is going – do you have any sense?

A: There is no funding! The only thing there is, is – well I definitely have a sense about the Centennial projects, but that's just for 09. There's 10 million dollars, and they're going to divvy it out among the regions, and every region is going to pick three projects, based on some criteria – probably how many jobs they create. So will that be an ATBI? Maybe, maybe not. But I wouldn't think that 09 is the year to – you know, there could be, that with a new administration, there might be a more articulated strategy for how things will go after 2009.

Q: Do you get the idea that the call will be funded?

A: Yes, that 10 million dollars, they're going to spend on Centennial stuff – that's my impression.

Ft. Collins: But how much of that would go towards ATBI?

A: I have no idea, for the IMR, there are probably 40 or 50 projects that are ready to go that have funding – some of those are ATBI stuff – they're going to only pick 3 out of them, of the whole 40. I know that they looked really favorably on our project – for a variety of reasons –

Q: What project?

A: The MATBI. But, the truth is, that's not the highest priority for my park. My boss is more worried about lake trout eating native cutthroat. So whether or not it will get funded, I have no idea.

Ft. Collins: So pretty much for the foreseeable future, the direction ATBI is going is – individual park efforts based on opportunistic funding?

A: Absolutely, I would say.

Q: Where is your RLC on this?

A: Well, you know, kind of me and a couple other people *are* the RLC, so....We're all in bed together – our RLC, our I&M program – it's all the same people. But RLC's are big drivers of these efforts across the country...they can be – in some cases they are the main driver, in other cases they are not involved. I think that what is going to happen – as a national effort, it's going to be really tough to sustain a huge – there won't be any money to support it – I think its chances in 2009 are very little, but I also don't think it's going to go away.

Q: Yes, individual park efforts are certainly not going to go away.

A: Yes, but the whole idea of us somehow needing to understand this – and how it works together, and what does it mean – I don't think that need is going to go away. It's going to become greater and greater – and then, all of a sudden, it's going to become this big deal, and someone is going to want to put their hands on this stuff, and we're not going to have it.

A: Just between us three, I like the idea of the website – an ATBI website, housing a bunch of templates or tools or example databases that parks could access for future endeavors.

A: I think that's the sort of thing you could partner with the RLC group to do - - because that was one of the things out of our last national meeting, that people decided was an important thing to do – to put together a toolkit for doing these efforts.

Ft. Collins: The ATBI national meeting, you mean?

A: Not the ATBI, the RLC national meeting – more a bioblitz, but not just for the public type thing, but these real focused type things with scientists, to find out things. And because a lot of RLCs are involved in those efforts – and a lot of people have had experience and done them, one of the things that got put forward as something we wanted to accomplish in the next year was, on a website – putting together toolkits, and that. I mean, I don't know where that's gone so far, but I know that there is another group specifically looking at things related to this.

Q: So that would be hosted by a RLC website?

A: Yes, I don't think anybody cares where it's hosted, as long as it's available to everyone who wants to use it.

Q: That's the point I'm making, is that there is one up and running – with the interim database – it's a start – why not make it...

A: There's nothing wrong with that – my point wasn't so much the where is it, and what you should do with it – but, it would make more sense to do it with other people that feel strongly about it and want to contribute to it than to just do it all on your own. I'd really like to see some people get – like ACAD – they've got all this data, and they're open to putting it in NPSpecies – linking it to IRMA efforts – figuring out a way to make that happen, so that ones that get planned in the future, automatically get linked in.

Ft. Collins: Maybe what I can suggest is, Alison is working on a lot of the releases of IRMA, and maybe what I can suggest is, that we use some of ACAD's datasets as sort of pilots, and use those as examples in terms of building some of the features we need within IRMA, to accept and integrate that kind of ATBI data.

A: You should have copies – when they were building the interim database, I contacted a lot of those guys to get those copies sent to Ft. Collins.

Ft. Collins: Yes, there's a bunch on the Sharepoint. So I can provide those to Alison and we can take a look at those in terms of looking at the upload or the transform functions that we might need to get this stuff into a database.

A: Yes, what I don't know is how many of those people did make the effort to send stuff, and how many didn't.

Q: I'm looking at the Sharepoint site – it looks like their spider blitz is there – but their database must be getting quite large by now, and I'm not sure they would have sent the whole thing?

A: Yes, well – I've talked enough. Personally, out of this? I've said a couple of things that would be useful to me, but I also think it would be really good to have a better sense of this information, and this data, and how it can be used in a more cohesive manner, and that kind of advice would be really helpful.

Ft. Collins: Libby is doing all the lifting here – we'll see where this all ends up and I think it's been good for you to reaffirm for Libby, that this is gnarly stuff, and there's not a lot of order and it's chaotic, but there's good stuff there.

A: But the only chance of there being any is if she puts effort into it, because – like - who else is going to do it? Even if it wasn't originally what you guys all thought you should

do with the money – or anything else. And obviously, other people might disagree with me on this. You’re listening to all kinds of people, and I’m just one. I’m just trying to help out the greater good. One other thing – I’m really interested in what you’re finding out, and I think that if they have some more of these phone calls – the quasi-steering committee type calls – you should definitely be a part of that.

Yosemite National Park_1

ATBI/Bioblitz User Requirements Interview Questions

12 December 2008

Q: What are the goals of your blitz activity?

A: To inventory species to find out what we have, and then to reduce the harm to those resources. If we’ve got things that are around that we don’t know about, and they have a very limited distribution, and maybe a limited distribution even more world wide, then we should probably not plop something down on them that would obliterate them. And sure there is a pure intellectual interest, and if we didn’t have that going for us, there is no way we could interest scientists to do all this work. And while I certainly have this intellectual interest, that isn’t what is driving our goals. But the third goal that is probably far more important than an intellectual one is the fact that – rare stuff is cool. Big furry things that are rare are cool to Americans, but something small and creepy looking – if you put it under a large enough scope – that’s pretty cool too! And so getting people – if we can put it as a carrot we can dangle peoples’ interest in – either why environmental stewardship is important, or why protecting our national parks – why our public lands are important – if I use the word education really broadly – really in order for that magic – rare stuff is magic for people. And if I can get them to talk about, for example - we have this really cool pseudoscorpion that is rare in our caves - then I can talk about our cave resources and that will go into a whole lot of other things; water quality, etc. So I think rarity is kind of a hook for me too.

Q: What do you call the effort at your park?

A: Targeted taxonomic studies.

Q: Is your I&M network involved in your park effort?

A: No.

Q: Your RLC?

A: No.

Q: This is strictly a park effort?

A: The RLC – I want to do a RLC with no money eventually – and this is one of the pieces of it. I don't really think we're going to get more money for RLCs unfortunately, nationwide, but I'm not going to get bummed out about that. I think we can do a lot of those goals once we – using this type of work – and using the internet more effectively. I think for the NPS, the fact that the NPS could be doing a lot of things with the internet – the distance learning center for example – we've hired an interpreter just to work on our website.

Q: Is there a vision for future efforts at your park?

A: Here's the thing – this is all going to be done with foundation funding. We're going to keep doing the cool, sexy projects that we can get funded, until the rest of the NPS gets off their collective butts and gets me some money to do some real over arching inventory work. My job, my vision, is to cobble this together until the NPS steps up to the plate. And I think they will some day.

Q: I guess I would come back to the I&M program at YOSE – I worked in the I&M arena for 6 years – all parks received money to conduct inventories for vertebrates and vascular plants – so were those not done in your park?

A: Yes, but I'm not worried about – well first off, the vertebrates were done, and then the vascular plants – but not in – we didn't get very much money for inventory, and we have – I feel very uncomfortable saying this, because some of this is critical of some folks – basically, I'm so tired of hearing what I&M won't let them do (our I&M network). We have staff on our I&M program – our coordinator – who basically – whatever she's been told, she never actually pushes. If you have somebody who is a coordinator who never says – I disagree – I talk to other I&M coordinators, and they all seem to be doing really cool stuff, but we've got one here who read some kind of manual, and she's doing what she's been told and that's it.

Q: What about these funds that the I&M program is going to be making available for additional inventories – have you been able to access that?

A: No, we haven't. Every time I talk to the coordinator about this, she's too busy.

Q: Well they do have a lot on their plates – I know that – but I'm under the impression that what is going on at YOSE – is not an I&M effort, but a park effort, and this national effort (ATBI) is somewhat struggling finding a foothold to land in, and I keep reminding myself that we're talking gray and green people collecting and entering data – using data – this is not an I&M project, it just kind of landed with the BRMD - -

A: It didn't land on the BRMD – they didn't do anything – it had absolutely nothing to do with it. Basically, it was a rogue group of us that put this together.

Q: Yes, I'm understanding the history about Gillian and how she picked this common theme with these parks, and got matching funding, and then wanted to run bioblitzes more for social science type work - -

A: We're such a rogue group that while we all love Gillian, we all said, yeah, that sounds good, but we're not going to do that.....

Q: And so when she accepted the deanship, it landed back on Bert Frosts' desk, and he gave it to the BRMD, and she portioned off a part of this project off to I&M because they have the technical expertise and staff and resources....

A: And that's been a really good thing!

Q: And so that's where I come into the project and what they want me to do is look at the requirements for a system – and I think the disconnect is – I don't think that parks want a system – a database system – yet another one to populate – what I got from the DLIA meeting, is that I think everyone came to consensus that we don't want or need another database to populate, but having said that – there is one available – the interim database.

A: What we asked for, when we had that conference call in the spring – was database assistance for the small parks. I didn't need any help! And that's what we asked for. And it morphed into this database development.

Q: What do you mean by data assistance to the small parks?

A: There's a lot of really small parks that – more than half of them – have very few natural resource people involved, and they just had no capacity to make sure the data got put into some kind of database. They are very tiny parks, and when the big parks – about three or four of us – donated part of our money for a national perspective – we just wanted to make sure the small parks weren't left out in the cold. Because for the life of us, we couldn't figure out how the nine parks got picked! We had no idea how that happened. So we at YOSE and PORE are like – yes, we're on top of it – have a nice day, and the rest of the parks said, we need help! That's why we gave up some of our money, so the small parks could have some help! I felt that was the least we could do.

A: Okay, so this database was created, and I've been tasked with developing these user requirements, and it's kind of an after-the-fact thing in my mind, and I'm kind of struggling a bit with helping Ft. Collins figure out a system, because what I gathered from the meeting last week – I don't think parks want a *system* - yet another database to populate – if they don't have one, they would just like some assistance, but as far as this being a program on the lines of I&M – I don't get the impression that's where the committee wants to go.

Q: No, you're right – I was going out to the meeting they had – some kind of meeting with database development last June, and I was all set to go to that – I thought we were going to talk about what we really needed to *do*. So it was a three day meeting, and I

guess I didn't look at the agenda that closely – I was just thinking I would go to Ft. Collins and chat a bit. As it turned out, my plane had mechanical difficulty, and I was told I couldn't get to Ft. Collins for another 24 hours, so I went back to my office and called in. That's when I realized it was a good thing I didn't go to the meeting because I thought we were going to talk about – just the kinds of things that you and I are talking about right now – this kind of conversation – things like, what do we really need, and what don't we need? But that wasn't the case – it was I&M, talking about this huge architecture of the database, and after about an hour, I backed out of the call and said goodbye. I wasn't going to listen to constructing a database talk for three days on the phone – that surely wasn't going to happen.

Q: And that was the topic of that meeting – what kind of fields do we need? What kind of records do we need to keep track of? But then there was the July meeting with Bert Frost --

A: I was at that – that was a good meeting.

Q: So that was more along the lines of what you were thinking?

A: Yes.

Q: So then really, these data management related questions are the meat of what they're asking me to ask, and they do want to see if there's some common threads as to what is going on at the park level, and if that can be subsumed into this IRMA effort that is being developed, but then I get the impression from you that you are not interested in that kind of endeavor?

A: Not really, no – no offense, but where we can use NatureBib, we're going to use NatureBib, and where we can use anything else, we'll use – I just want to make sure that all of the data are electronic, and then it's fine and then I'm good to go. I want to make sure the data are kept in perpetuity, and that someone can get to it again.

Q: Okay, so let me ask you a few more questions – how do you currently keep track of the data that comes out of these inventories – caves, lichens – who is responsible, and how is that kept track of?

A: The project managers do it.

Q: Those are the three names you gave me?

A: Yes.

Q: So they could answer more questions about the data side of things?

A: Yes.

Q: Let me ask you about NPSpecies – are you interested in putting your blitz data towards that effort?

A: Yes. I think that the NPS has picked NPSpecies, and I think the more we can get on board with that, the better. If it can be useful for these types of efforts, and it's easy to do, I think that makes sense, because we're putting other stuff into NPSpecies, so that makes perfect sense to me.

Q: So that would be one of your objectives then?

A: Sure. We're putting a lot of effort into NPSpecies, so that's a good thing.

Q: What about ANCS+ - are you having problems with collections, as far as getting data from your biodiversity inventory efforts into ANCS+?

A: I have no idea – that is our staff's problem - but I'm not worried about it. Let's be honest here – out of the three projects that were a part of this ATBI effort – the data aren't even back yet. Besides a few cool things I was able to pull out for the DLIA talk. For example, the lichen stuff – it's still being analyzed, and will be during the whole winter. We didn't get the money – keep in mind that while we were told that we were supposed to be done with the projects, we didn't get a *dime* from those folks until the second week of September, and we was floating this entire project on the backs of other projects – because the Centennial Challenge office and the IG decided that every single thing that anybody did related to the Centennial Challenge had to be investigated. Nobody got any money until September, so we couldn't write contracts until September, which means that all of our taxonomic review work is still in somebody's hand in a university somewhere. It's not something we've really had to address yet.

Q: So here is a question I'm getting various responses from, based on whether parks are running a single bioblitz type effort, or a more full-scale inventory or ATBI, but who uses the data, or is planning to use the data from these efforts? Who uses, or is planning to use, the data from your blitz efforts?

A: The data are going to be used by the subject matter experts, so if the data are collected, say for the lichen study, then it will be used in various scenarios – by vegetation folks – they'll be using it when they talk about biodiversity, when we're required to do compliance in a particular area – they'll query their databases to see if there are any rare species or rare lichens we may have identified where there is a proposed project. The way we work here – we do not turn our data over to planning people – they ask us specific questions, and we run the analysis for them. So it will be used for scientific purposes – for example, when we have researchers that come to the park and asks do you have this and this and this? And we'll reply – here's our species lists – here you go! And also, the data will be used in planning processes.

Q: So when you say - from the database - do you mean NPSpecies?, or in-house databases – do you create your own databases?

A: Both, but keep in mind that we have a very old park, and there is like 130 years of data, and stuff has only been organized in a comprehensive fashion in the last ten years, and so when somebody asks about a particular species or area – we have to go look in a lot of places! The best part of I&M – from my perspective, the thing that makes I&M worth all the trouble – is that their job was to go through and figure out all the different types of data for the inventories, and where they are in the park – that was one of their projects, and that was just fabulous!

Q: Yes, the data mining effort?

A: That just *had* to be done, and so that makes it a very important program, from my perspective. Just for that.

Q: So I would go to your project managers to get more on-the-ground data questions asked?

A: Yes, but as I said, the data aren't entered yet, but ask away – but as I said – it's all still being analyzed. Keep in mind that we've just hired the very first data manager for the park – she's coming on board in January – and her job is going to be to provide advice to all of our subject matter experts on how to get their data into better formats. We've never had a data manger in the park before.

Q: Will that data manager be working with the I&M program as well?

A: Maybe peripherally, but they've already got their own data manager. I mean, they will certainly be in communication – there offices will be close by – but we're not going to pay for her to do I&M's work.

Q: No, I wasn't suggesting that – more in light of – say you wanted to put these data into NPSpecies?

A: Absolutely – I expect everyone to work together like happy little campers!

Q: So it looks like I'll need to talk to your PIs for more data type questions – but is there anything else you'd like to add as far as needs or concerns that you might have with data or data management?

A: I appreciate what you are doing, and I guess – I'm not concerned that maybe we can't fit the data into a database format that may or may not be used. The old NPS didn't even think about consistent data format or helping each other, and this new NPS - we may have not gotten it right this year, but we did two good things: number one – we talked about helping each other, and it didn't matter if you had the money or not, and number two – at least no one can claim that they were left without any support or any help – none of those nine parks can say, "I don't know what to do with my data, and no one will help me".. they can't say that! We're trying really hard – we may not have gotten it right this

time, but there's nothing about the Centennial Challenge that was handled well, and I feel that everyone that is involved, should be proud of what we *did* do right.

Q: To help me a little bit – a bit off the record here – sometimes I'm getting a bit of mixed messages from Ft. Collins, and in talking to the Centennial Challenge parks, the conversations don't really lend themselves to these large data systems, it's more help in terms of we need tools on how to deal with crowd control, etc. – what I'm asking – what is your understanding of what it is I'm helping with, and what you'd like to see come out of this effort?

A: What I'd like to see you doing is that – any park that collected data from this Centennial Challenge, is going to be able to get it all into a database that is accessible, and whether that is NPSpecies or whatever else – that by the end of your contract, there's not a single park that said, no one helped me getting my ATBI Centennial Challenge project data into a database.

Q: Is there anything I can help you at YOSE with, other than listening to you and talking further with your PIs?

A: You just calling them up and engaging them on this topic will motivate them to remind them that you talked to me, and I am going to ask them – how is data entry going? Again, I don't care what they use, but it better be accessible to everybody, so maybe just calling them will help me.

Q: So you don't have any problems with me calling them up?

A: Not at all – but I suspect they're going to say, gee, I don't have any data yet – I don't know what you're talking about – we'll get to that when we get to that, but because I think in a way – because the money was available so late, no body had their data back. But that's ok, we're going to get there. Re: the Centennial Challenge – we've got things under control. The people who wrote the proposal knew exactly what we wanted to do, and we went out and did it, and everybody in D.C. seems hell bent that we are under their umbrella. We don't need that kind of help. We donated money so little parks wouldn't be hurt – because they don't have staff – and I believe so much in the concept of inventory, that we were willing to give up some of our money so they could have some help. But from my perspective? There's absolutely that the national office can do for me.

Yosemite National Park_2

ATBI/Biolblitz User Requirements Interview Questions

6 January 2009

Q: What are the goals of your cave inventory?

A: It started with our initial attempt to generate some guidelines for cave management in the park – up until a few years ago – not many people in YOSE were even aware that YOSE had caves. So there was discovery of some marble caves in the remote, backcountry part of the park, and so in mapping those, there was an initial biological inventory of the caves – done by Dr. Jena Krecja, at Zara Environmental. At the same time, Jean was contracted by Sequoia/Kings' Canyon NP to do biological inventories of caves down there. Concurrently, she discovered a new species of spider down there, which was also in one of our backcountry caves, and so that got us initially thinking that we would need to do a more thorough inventory of our caves. In the next year, Jean completed the inventory of the caves at Sequoia/Kings' Canyon, and found about 30 new species to science. Most of them were cave-adapted, and in a couple of cases, those species appeared to be endemic to a particular cave. So they're pretty sensitive. So building on that work, and wrapping up our first assessment of cave resources in YOSE, we contracted with Jean to come out – in 2006? – to do some work in some of the talus caves in YOSE valley. In her initial reconnaissance, she did discover a new species of pseudoscorpion, which we had verified. There were other species of millipedes and mites that were also cave-adapted, and were "candidates" for new species, but she did not do another collection to verify that. So the essence of this ATBI project, are to again, contract with Jean to do visits of these talus caves. In February, we'll do our first sampling effort, and again in June or July – that will capture the end members of what these caves are like. In other words, in February, they're very wet, and come July, they're pretty dry. In addition to doing a more thorough inventory of the biology of the caves, she will also be quantifying the habitat and the food/energy sources, to try and determine whether these animals are cave-adapted to the point where they must absolutely rely on the cave. Or whether they're able to survive in the talus, or other areas of the sub-surface. One other goal, is to actually do a scientific description of the new pseudoscorpion species.

Q: So this is a fairly new project – you in turn, are subcontracting with Zara Environmental, as part of this Centennial Challenge project?

A: Right – and it is continuing work that Jean initially did, but we didn't have the funding beyond a reconnaissance.

Q: What kind of staffing do you have?

A: I will be assisting Jean in the field during the inventories, and probably one of our wildlife biologists here.

Q: What kind of data will you be collecting? (Will send some preliminary reports.)

A: Well, we'll certainly generate some species lists from the caves. We have surveyed the caves, but we may do a more thorough survey of them, rather than just a line/plot of the caves, we might try to quantify volumes and depths, etc. Jean will be quantifying their habitat needs – not sure what those data will look like.

Q: Do you have any idea of how the data you are collecting will be stored? Have you talked about data management at all?

A: Not specifically for this project, no. Our division just hired a data manager, so she will be there to help us. I assume that the data management for our project will comply with our park guidelines, but at the same time, we're all ears if you have ways that you'd like to see these data stored. I can imagine that the data will take the form of Word and .pdf file reports, Excel spreadsheets, and photographs and scans of field sheets.

Discussion about the interim ATBI database.

Q: Is Jean also the taxonomic expert on this project?

A: Not for every species – her expertise is in cave invertebrates. When it comes to actually keying out individual species, she will work with her network of taxonomists who are experts in those groups.

Q: And you'll be doing collections?

A: Yes.

Q: So, you have collecting permits, and will go through ANCS+?

A: Yes. Jean already has her permits.

Q: What about any spatial considerations in this study?

A: We need to be careful about this, because cave locations are protected by the Federal Cave Resources Protection Act, so in essence they're treated like archeological sites. So we want to be careful about points on a map which locate the caves or the cave entrances. What we typically do is have very detailed maps of the caves themselves, but they are not georeferenced in any way. So that you can get all the info you need about the cave, and what's in the cave and where things are in the cave, but you can't take that information and use it to find out where the cave is. Which exists, but we are careful with how that information is disseminated.

Q: Back to the curation, do you have a curator on staff? Where will specimens go?

A: Yes. Our curator worked with Jean in the past, and in some cases, the specimens are housed at a museum in Texas – our curator was okay with that. But we'll have that discussion again with the next round of permitting.

Q: What about NPSpecies? Are you familiar with it?

A: Kind of, being a geologist, it's not my expertise. But I want to make sure that we're putting this information in all the places it should be put.

Q: Your I&M network, or RLC – are they involved?

A: Not specifically. Typically, we'll communicate with them; run our plans by them.

Q: Is there a vision for future work for this project?

A: There will probably be potential for more work – a little bit of effort produces a lot of amazing things. In these next two field efforts, we're not going to be able to get a handle on everything that is there, so the potential for more work is high.

Q: How do you think these data could be used?

A: For starters – the cave that contains the pseudoscorpian – is a fairly often-visited cave. At this point, we don't have enough information to know whether or not that pseudoscorpian is endemic to that cave, or if it exists throughout the talus piles in YOSE – in which case its habit would be quite extensive. But if it's just the cave – then its habit would be quite limited, and that would make us rethink how we are managing that cave. That is part of the motivation for this project – to help us manage the caves better, and ensure that these species are endemic, or at least, not common – and we're protecting them. This is a real concern of mine, with managing that cave – at present, there are no restrictions to access, and every time I go in there, there's trash, and food, etc. – we really don't have any sense as to how that may be impacting these species.

Q: Any other uses you can think of, for data coming out of this project?

A: One of the interesting things would be to start comparing these data with those generated from the southern Sierra, in Sequoia/Kings' Canyon because we're seeing some similarity of species, but some large differences too, and the inventory done down there was much more extensive, and so as we generate more data here, it will be interesting to see what sorts of patterns we see across the length of the Sierra Nevada. How those populations are fragmented; what the controls are on where species go, and where they don't go.

Q: Do you have a wish list for data?

A: One thing Jean has wondered about, is what sort of data is out there on invertebrates in the soil, because that will help us understand how truly cave-dependant these species really are. We're not sure if this kind of information is even out there – if it's not, it's probably something we should get, and if it is, we need to track it down.

Q: Any other questions for me?

A: No, but it's nice to know you are there and interested!

Project goals	Staff Involved	Types of Data Collected	Data Storage Method	How many records?
Primary goal is to conduct species level inventory for groups not covered by the I&M program. Secondary goal is to engage park visitors and citizen scientists. Additionally, biodiversity is spelled out in the park RMP.	RLC organizes the varous blitzes.		The park ecologist collects data on who participated in a blitz; the number of hours of volunteer time, and the overall effort spent on a program. These data are kept in an internal spreadsheet.	
To engage the public and citizen scientists to learn about the bird species present in park, and to contribute the data collected to a larger, national effort via the web.	Park resource management staff assisted by volunteers	Locality (Town, County, State, Park)	Data form uploaded to the web (http://www.birdsource.org/gbbc/); individual copies kept at park.	2008: 14 records, 18 birds, 1 checklist reporting species 2007: 25 records, 205 birds, 2 checklists reporting species.
		Observation date		
		Observation Start Time		
		Total time spent birding		
		Party size		
		Expertise (fair, good, excellent)		
		Weather (poor, fair, good, excellent)		
		Habitat(s)		
		Checklist of species encountered		
		Maximum number of species encountered by		
To engage the public and citizen scientists to learn about the butterfly species present in park, and to contribute the data collected to a larger, national effort via the web.	Park resource management staff assisted by volunteers	Temperature and weather	Data form uploaded to the web (http://www.naba.org/); Excel spreadsheet in Resource Management files	

Project goals	Staff Involved	Types of Data Collected	Data Storage Method	How many records?
		Number and names of volunteers/citizen		
		Time period for observations		
		Total number of species		
		Total number of individuals (Scientific name,		
To document presence/absence and to confirm with taxonomic verification of actual specimens collected, that a particular species is to be found in the park. Secondly, to engage the public and citizen scientists to learn about the spider species present in park to couple this effort with the targeted scientific study to expand the parks' spider list, and to help diffuse the misconception that spiders are potentially	Project investigator external to the park; citizen scientists for the Spiderblitz.	Data collection parameters left up to the PI for the scientific study	It is the responsibility of the PI to do all data management, which will eventually be turned over to RM. Data is bottlenecked because the PI is very behind with taxonomy.	400-1000 species were collected (unsure). Preliminary data shows 100-150new records for the park, making the total count around 400 species; park thinks the list may rise to 700-800 species present in the park.
1) The overarching goal for bioblitz efforts are to gain a complete species list for everything in the park. 2) To close data gaps for species that should have shown up during I&M inventories, but because of drought conditions, those species were never documented.			Attempted to use the NPS Interim database, but found it too complicated for this type of effort. They also attempted to use the field sheets generated from the Interim database, but also found them too detailed for their simple needs.	
		Site identify organisms to species level; a descriptive location on the parks' nature walk (no GPS units involved).	Data resides with the lead scientist conducting the bird blitz - park is doubtful that they will get it back.	

Project goals	Staff Involved	Types of Data Collected	Data Storage Method	How many records?
		Site identify organisms to species level; a descriptive location on the parks' nature walk (no GPS units involved); photographs as necessary. Last minute voucher specimens taken.	Data resides with the lead scientist conducting the fungi blitz - park is doubtful that they will get it back.	The mycoblitz identified 30 new species of fungi for the park.
		Site identify organisms to species level; a descriptive location on the parks' nature walk (no GPS units involved); photographs as necessary.	Data resides with the nrtwork NPSpecies data coordinator; attempted to use the NPS Interim database, but found it too complicated for this type of effort. Currently in Excel format.	

Project goals	Staff Involved	Types of Data Collected	Data Storage Method	How many records?
1) To learn about the animal resources for which we have little knowledge; especially cryptic resources, 2) to develop good partnerships with outside organizations, 3) to provide opportunities for public education.	The COR runs and organizes the blitz events; is a collateral duty for him. There is no dedicated staff for bioblitz projects. For the bioblitzes, the public is not excluded, but also not intentionally invited. Other participants are amateur entomologists, members of the state Entomological Society, and lay people with strong interests.	Lot number, site name with UTM, site description, date, time, family, species, genera, person who did the identification.	All data are kept in an MS-Access database developed at the park for the specific use of bioblitz efforts.	Unknown.
			Once data have been entered into the MS-Access database, lists are exported from it to the state Forest Service.	

Project goals	Staff Involved	Types of Data Collected	Data Storage Method	How many records?
Attempting to inventory, document and discover everything (all taxa) in the park.	A non-profit park association runs it in association with the park.		The I&M Network data manager built the first desktop ATBI database for the park. That database was put on disk, and sent out to researchers to use for entering their data - with the idea that it was to be returned, so that they could incorporate it into a master database for the park. However, none of the researchers liked or used the database (it was modeled after the NRDT database), and the park found that they were not receiving data back from their researchers. A collaboration with a research center was then formed, to build a new, easier to use, web-based version of the ATBI database, which is	A few thousand.
1) A science-based objective of providing vouchered information about the biodiversity of the park in order to understand what remains from the parks' disturbed islands and how that could potentially affect management planning, 2) An education and interpretation component considering PARK is an urban park; giving the public an opportunity to engage in experiencing biodiversity that they otherwise might overlook.	A Harvard Postdoctoral fellow spearheads the ATBI program, assisted by students and interns.	Physical location, date, collector, type of trap, general habitat information. Pictures and sound recordings taken. There is also some opportunistic observational information collected during a site visit; for example, a Monarch butterfly observation would be noted on a field form for a particular site, and entered into Mantis as an observation.	Mantis, a Filemaker Pro database manager of taxonomic information and specimens. This online database (http://insectdatabases.oeb.harvard.edu/boston_islands/index.htm) contains records for park voucher specimens in the Entomology Collections of Harvard's Museum of Comparative Zoology (MCZ). Individual field forms are kept in a binder in the lab.	>10,000 records in the Mantis database; a little over 1000 voucher specimen, and approximately 25k total specimens (6700 collected lots). (Still needing work).

Project goals	Staff Involved	Types of Data Collected	Data Storage Method	How many records?
A minor component of the overall ATBI, but it has contributed some data to the Mantis database. Used as more of an outreach component towards the overall ATBI.	The PI for the ATBI is a beetle expert, which influenced the choice of this group for a bioblitz event.		Used an Access database. Unclear from the interview where these data are.	
A minor component of the overall ATBI. Used as more of an outreach component towards the overall ATBI.	Hired a science coordinator from to 1) ensure science was robust, 2) to follow specific protocols, and 3) to follow up on specimen identifications. Was paid 5k		The data "exist in whatever database was used by the science coordinator at NU." There is currently a rough draft report from the intertidal blitz effort.	
park was the first National Geographic Centennial Challenge bioblitz; as such, the goal was simply to host the event. In general, the goal of the bioblitz was for more of a publicity-type endeavor, than a science-driven endeavor.	The only data management help came from the I&M data manager, otherwise, the bioblitz was organized by the park resource managers.	What survey team were participants on (moths, beetles, etc.)	Each field crew was provided formatted field data sheets after it became apparent that the database was "somewhat intimidating to use"; not all datasheets were returned, but those that were, were compiled into an Excel spreadsheet.	960 records; not all field data sheets returned - specifically those that dealt with collection of specimens.
		Observer		
		Date entered		
		Date observed		
		Location description		
		GPS coordinate		
		Species information: Common name, genus, Nativity (exotic, invasive, native)		
		Abundance (abundant, sparse, rare)		
		Observed/Collected (observation only, voucher)		
		Specimen ID from team leader (if collected)		
		Photographs: this was a "big problem" due to ownership issues with NG photographers.		

Project goals	Staff Involved	Types of Data Collected	Data Storage Method	How many records?
FY08 effort was postponed; planned during the summer of FY09. Is being designed to "engage the public and park staff with the idea of biodiversity". The major goal is to engage the public - looking at the endeavor as a data collecting excerise, or to produce species lists, is a secondary, and even "opportunistic" goal.	To be determined.	To be determined.	Interested in using the NPS Interim ATBI database.	
1) Inventory species to determine what is in the park and then to 2) be able to reduce the harm to those resources. 3) For general intellectual interests 4) to attract scientists to the park to study and 5) to locate and document rare species which can then be used as a "hook" for educational and environmental stewardship purposes .	Have 3 PIs involved in the three Centennial Challenge park efforts, and their associated field crews.	Left up to the Pis to determine.	Left up to the Pis to determine.	All projects are in the works, and data has not been finalized.
1) To do a thorough inventory of the parks' caves with a specific emphasis on a biological inventory. 2) quantifying the habitat and the food/energy sources in the caves to try and whether the biological entities found there are cave-adapted to the point where they must rely on the cave, or whether they are able to survive in the talus outside of the caves. 3) To write up and publish the scientific description of a new species of pseudoscorpion that was found in an intitial cave search.	The PI, a contractor and perhaps a park wildlife biologist.	Hope to generate an invertebrate species list and to quantify the volume and depths of the caves.	Has not tackled data management at all. The RM division recently hired a data manager (not at park yet), and so the PI assumes that this person will be there to help him. The PI thinks that many different formats will be used, i.e., Word docs, .pdf files, Excel spreadsheets, photographs and scans of field sheets.	TBD

Project goals	Staff Involved	Types of Data Collected	Data Storage Method	How many records?
1) use CC money to fill in key data gaps in knowledge of terrestrial organisms, 2) partnering with TNC to do this, 3) to bring in a cross-section of taxonomists to excite them about the potential for additional inventory work in the park and to have them help put together strategies for additional inventory funding.	No dedicated park staff involved; scientists/taxonomists apply to the park through the RPRS system to work on their groups of interest. Not planning on hiring additional staff for the CC project.	Left up to the RPRS researchers - to be determined for CC project.	Individual researchers manage their own data; data is not managed centrally. Reports are usually submitted through the RPRS system, though spreadsheets or databases are usually not received. For the CC project, park is hoping that their TNC partner will 'recommend an appropriate data repository' and park hopes that would be compatible with any	Effort has not started yet.
1) To obtain 'laundry lists of critters', 2) Park wants to understand plant and animal distributions, associations and ecological relationships, and relative abundances. 3) To record organisms, habitats and conditions that will form a baseline to document potential effects from climate change or other landscape-scale dynamics and alterations, and 4) To engage the public, and particularly school kids, not only to obtain help with inventories, but also to foster a connection with younger audiences to light a spark for them about environmental				
To fill out the inadequate information of the park's invertebrate populations, especially, their distribution vegetation, elevation and habitat gradients.	Four groups of volunteers; groups from local colleges, elementary school fourth graders, and park YCC volunteers. (As well as some in-house NPS park staff).	Vial number, species name, where species was collected, elevation, habitat information - " basic collection information".	Interviewee developed an Access database for this project, but views it as only a temporary means of storing data until "a more suitable database is developed or provided". He keeps data in "a couple of Excel and Access databases; just simple tables, that could possibly be	807 individual organisms collected; approximately 1000 data records.

Project goals	Staff Involved	Types of Data Collected	Data Storage Method	How many records?
The initial invertebrate project found numerous scorpion specimens, which sparked an interest to learn more about them. Park learned that they had many endemic and/or rare species, so as part of their CC monies, they entered into an agreement through their CESU to have the University of Nevada (LV) conduct a park-		Species identification, location, habitat information, collecting voucher specimens, and high quality photographs. Not interested in simply a checklist of species - the park wants to have individual species closely associated with paramaters such as habitat, so that at some point in time, they can determine habitat/ecological function relationships.		Unknown
In an effort to stay on top of the various and miscellaneous collections that have come out of the surface/ground dwellling invertebrate blitz project, interviewee formed an agreement with NAU through their CESU for identifiacaton of the non-ant and non-spider groups that have been collected to they are putting together legacy information from multiple specimen repositories				
			The Specify database - an extensible, pluggable platform written in Java, for multidisciplinary biological collections computing and management. This is a free database and licensed under an open source agreement	Unknown
To collect and record information, especially species lists, on the fungi in the park.		GPS coordinates, took photographs in situ, recorded habitat information.	Excel spreadsheet	Collected 279 individual mushroom vouchers. (88 were duplicate vouchers; approx. 200 unique species for the park).

Project goals	Staff Involved	Types of Data Collected	Data Storage Method	How many records?
To capture a snapshot-in-time of water quality from 250 locations within and around park in order to glimpse how spatial differences in climate, pollution, and disturbances like mountain pine beetle are affecting watersheds.	This was a cooperative effort between the park, volunteers, and CU's Cooperative Institute for Research in Environmental Sciences (CIRES). Over 100 individuals took the		Left up to the PI.	
The project was initiated as a marine ATBI in a particular bay, which then grew into a Biodiversity Inventory, largely funded through Friends' Association, and in cooperation with the RLC.	The RLC director and data manager - Pis bring their own staff/students to their individual projects.		Data are stored on a partnership website: w viewers can obtain information on publications, checklists of marine species found in the bay, and summary statistics.	Unknown
The primary goal was to produce vouchered records of all the macro fungi of park Secondarily, to increase the awareness about fungi with the general public.	80-125 volunteers helped with the mycoblitz.		There is an extensive website, hosted by cooperating university, which lists individual species names, a photograph, the date collected, the collection number, and a link to a map of the collection route (trail in the park) where the species was	Over 450 individual records.
Work in progress? Not fully fleshed out yet.				

Project goals	Staff Involved	Types of Data Collected	Data Storage Method	How many records?

Taxonomic Considerations	Available Taxonomic Expertise	Spatial Considerations	Curatorial Considerations	Is there a curator on staff?
				No. A biotech manages the park collection as a collateral duty. There are no appropriate facilities at the park to handle specimens; only a small collections room is available for collections in the RLC, and it cannot accept wet specimens.
Working from species lists that have previously been worked up for the park; developed by a long time volunteer who has informally published bird lists (note: would this be the same list as is in NPSpcies?) Only common names recorded.		GBBC conducted park-wide; data taken by habitat type and time needed to complete the count.	No specimens are collected, only observations.	
Working from species lists that have previously been worked up for the park. Only common names recorded. Resource management staff trained on butterfly identifications.		GBBC conducted park-wide; data taken by habitat type and weather.	No specimens.	

Taxonomic Considerations	Available Taxonomic Expertise	Spatial Considerations	Curatorial Considerations	Is there a curator on staff?
No available lists to begin with; this is the major project goal.		Have maps with GPS coordinates for relocation for future SpiderBlitzs. PI has many individual structured sampling sites. The data elements that contain the site description and the point location are assumed to be in the final report that the PI submits.	There will be a large collection of spiders from the targeted scientific study, together with collections from the SpiderBlitz. There is currently no park curator to do this type of work; only a biotech who manages the collections as a collateral duty.	Spiders will be repositied at university, which is amenable to signing a collection agreement.
				No, interviewee is in charge of the museum at park, which is culturally based, and would like to start a NH collection with invertebrates.
The data coordinator printed out a bird list for the park rom NPSpecies, which was used as the starting point to identify species found during the blitz.			No specimens.	

Taxonomic Considerations	Available Taxonomic Expertise	Spatial Considerations	Curatorial Considerations	Is there a curator on staff?
No available lists.			If fungi are returned to the park, they will need to be entered into ANCS+ and curated.	
The lead botanist thought the field sheets from the Interim database were too detailed for the kind of information he wanted to provide - i.e. - he wanted to simply state what species he observed while walking the nature trail. Therefore, the data coordinator printed out a list of vascular plants for the park from NPSpecies, which was used as the starting point to identify species found during the blitz.		All observations were on one trail, an approximate 1/2 mile loop. As such, observations were linked to that general location, though the data coordinator would have preferred the use of a GPS.	No specimens.	

Taxonomic Considerations	Available Taxonomic Expertise	Spatial Considerations	Curatorial Considerations	Is there a curator on staff?
	Taxonomists with expertise in the target organisms are brought in to conduct the identifications. The lead taxonomist is responsible for getting all the collected material pinned, identified and returned to the park.	When blitz volunteers return with their collections, they are first guided to a computer where a GIS map of the park is displayed. If volunteers didn't have a GPS unit available to them, an effort is made to try and pinpoint the general location. Another map is available that has existing site names where people have collected in the past - if it's one of these sites, they are given that particular information/code to put on their label. Otherwise, UTM coordinates are generated as close as possible to where a volunteer describes the place they were collecting.	Park doesn't want to have all specimens from their blitz efforts cataloged. They take a representative sample of each taxon curated, generally a male, female, juvenile and adult forms. Specimens get cataloged into ANCS+ as they are returned from their respective identifier. In general, there are minimal problems with curation.	There is a curator on staff, and many volunteers helping to catalog specimens.
Species lists from the state Forest Service were prepopulated into the MS-Access database for use during the blitz.				

Taxonomic Considerations	Available Taxonomic Expertise	Spatial Considerations	Curatorial Considerations	Is there a curator on staff?
	Left up to Pis.		1) There are 6-7 agreements in place between institutions and the park to accept specimens, and "some awareness in getting these institutions to agree to NPS curatorial standards." 2) Currently, the park collections are housed in an annex that has been through twohurricanes, so the park is not comfortable with this setup. Plans are being made for other (temporary) solutions.	No park curator on staff. Is a collateral duty for another NPS staff member. There is concern that once their small, initial efforts on invertebrates are completed in terms of collecting, that there will be tens of thousand of specimens added to the (growing) collection, and that the annual cycle of ANCS+ will become larger than they will be able to handle.
Taxonomy work is not done in the field - everything is brought back to the lab for identifications.	Groups are picked to work up based on the taxonomic expertise available, otherwise specimens are housed on shelvesuntil taxonomic experts can be found. i.e. - there is a large backlog of specimens remaining to work up.	Use GPS and harcopy maps to relocate sample sites on the islands.	This park is unique in that the islands that comprise it are not owned by the NPS. As such, there is no need for ANCS+ to be populated.	Yes

Taxonomic Considerations	Available Taxonomic Expertise	Spatial Considerations	Curatorial Considerations	Is there a curator on staff?
	The organisms that will be targeted in the upcoming bioblitz will be based on what local scientists actually end up participating, or want to participate.			
Left up to the Pis to determine.		Left up to the Pis to determine.		
	The contractor attached to this project has expertise in cave invertebrates, though when it comes to actually keying out individual species, the contractor will work with a network of taxonomists who are experts in those particular groups.	The park has to be very careful about this topic since cave locations are protected by the Federal Cave Resources Protection Act.. The park has detailed maps of the caves themselves, but they are not georeferences in any public way - they have to be very careful about placing points on a map which locate the caves or cave entrances. While they do have this information, it is only very carefully disseminated.		Yes.

Taxonomic Considerations	Available Taxonomic Expertise	Spatial Considerations	Curatorial Considerations	Is there a curator on staff?
	Will largely leave this up to TNC to help out with; "park doesn't have time to take the leadership here" - but has the names of a few interested scientists.		The park has a small, portable building for maintaining cultural collections - the majority of collections are housed outside the park, and the park prefers to have them curated at these outside facilities that have appropriate staff and funding.	No park curator; there is a network curator at nearby park who helps out periodically. Park has collections agreements with the other institutions
				Yes
Interviewee sorts the specimens to the Order level before sending them out to experts.	Emphasized spiders and ants because the RM manager had arranged outside scientists to make the identifications.	Have point data where plots are located.	No data has been entered into ANCS+ yet; awaiting identifications before ANCS+ is populated or specimen vouchers curated.	

Taxonomic Considerations	Available Taxonomic Expertise	Spatial Considerations	Curatorial Considerations	Is there a curator on staff?
	Identifications are the responsibility of the University contractors.			
		Used GPS's to record coordinates.	A Botanic Gardens houses the collections (and data) from the mycoblitz to date, while they are still being identified. Once identified, they will provide voucher	Yes.

Taxonomic Considerations	Available Taxonomic Expertise	Spatial Considerations	Curatorial Considerations	Is there a curator on staff?
Left up to individual Pis, though "when things can be linked with ITIS, that is done - when it can't, they rely on the Pis".	No taxonomic expertise in-house.		The park ATBI effort "has not been good getting their data into ANCS+". If a PI is associated with a musuem, then specimens go there. Staff hopes that ANCS+ cataloging will improve in the future.	Have a staff of three.
	Faculty and graduate students at local university		All data, including voucher specimens, maps and photos are stored and maintained by University.	

Taxonomic Considerations	Available Taxonomic Expertise	Spatial Considerations	Curatorial Considerations	Is there a curator on staff?
				Yes.

Permitting Considerations	Year started/frequency	General Work Flow	NPSpecies? (Y/N/Planned)	I&M Network involved?
			Park leaves this up to the I&M network (for major groups).	
No permits needed.	Ongoing: Project began in 2007; conducted annually every February.	Bird counts are generally conducted on one day over a selected four day period. Birds are counted for a minimum of 15 minutes at a single site; can visit many sites per day, though a separate checklist is submitted for each of the four days.	Planned: Park is interested in uploading all data into NPSpecies	No
No permits needed.	Ongoing: Project began in XX; conducted annually every summer.		Planned: Park is interested in uploading all data into NPSpecies	No

Permitting Considerations	Year started/frequency	General Work Flow	NPSpecies? (Y/N/Planned)	I&M Network involved?
The PI for the project applied for and obtained a park collecting permit.	Spiderblitz initiated in fall of 2007; repeated fall 2008. Scientific study from 2005-2008.	For a blitz, the PI conducts a short powerpoint presentation to frame the issue, to talk about various collection techniques, to demonstrate the techniques, and to assure participants that there will be no harm posed by the spiders. The PI sits in the center of a collection site (targeted by habitat type) with collection cups, and participants are sent outwards from that point to hand collect specimens. The PI saves a suite of interesting specimens to talk about with program participants at the end of the program, and to allow	Planned: Park is interested in uploading all data into NPSpecies	No
No permits issued; in hindsight, the park "should have tackled this".	Summer of 2007; one time bioblitz event.			The NPSpecies data coordinator worked before, during and after the bioblitz.
			Unknown to date since data have not been returned.	The NPSpecies data coordinator worked before, during and after the bioblitz.

Permitting Considerations	Year started/frequency	General Work Flow	NPSpecies? (Y/N/Planned)	I&M Network involved?
Initially, only observations were planned since the lead mushroom scientist felt he had the skills to site identify what was in the park. During the blitz, he was surprised to learn that there were many species unknown to him, so that			Unknown to date since data have not been returned. Photographs were taken of individual species, but the data coordinator does not feel that they are up to network standards for evidence.	The NPSpecies data coordinator worked before, during and after the bioblitz.
			Planned: According to the data coordinator, most of the common species that exist in NPSpecies do not have associated evidence records, so data will be entered as observation records in NPSpecies to support the presence of common species in the park.	The NPSpecies data coordinator worked before, during and after the bioblitz.

Permitting Considerations	Year started/frequency	General Work Flow	NPSpecies? (Y/N/Planned)	I&M Network involved?
	One 24 hour collecting event per year, geared towards a specific taxonomic group. The event spans a weekend, with the sorting, identifying and preparation lasting from Friday until Monday. A typical scenario for a blitz event is: Friday evening there is a mini-conference with a number of speakers addressing the topic. Participants are then given an orientation about why these blitzes are being done, and what the weekend will look like in terms of effort. On Saturday morning, there are detailed workshops on how to indentify specimens, touching on the major morphological characteristics,	All data collected are based on the concept of the lot number – a lot number is a unique number that is assigned to a group of specimens that are collected at a certain place, a certain time, in a certain way. As organisms are collected around the park, participants put a data card with the specimens into a ziplock bag. When they come back into the lab, each bag is assigned a lot number for that unique group of organisms. For that lot number, there is a site name that is arbitraliry given to it, with a UTM location. In addition to this, as organisms get checked in with their lot number, a date/time/site description is written which contains the collection method, the collector and any comments - an open ended space for the user to fill in, for example - what host were the taxa found on. The key information is the lot number, and how the specimens were collected. Everything is then put in a general area, where the people who are sorting, take that information – sorting by the taxa they are looking	At present, data entry into NPSpecies is minimal. Park has a once per year contract for a person to update bibliographic information for the park, and if species are mentioned in those reports, they also get linked to NPSpecies. Currently, there is no effort to pull data from their bioblitz database into NPSpecies.	No

Permitting Considerations	Year started/frequency	General Work Flow	NPSpecies? (Y/N/Planned)	I&M Network involved?
Still at the start of this effort and having some problems. To get into the RPRS system, researchers must sign that they will deliver data that is ANCS+ compatible, however, when they receive a grant for their work, they're saying they will provide data in <i>their</i> database, so it's not really clear yet to everyone, what the researchers are really going to have to do with their data.	2006		Unsure. The park is more interested in taking their NPSpecies records and importing them into their ATBI database. Some staff sees the ATBI db as being the official receptacle for species information - things newly discovered as well as historic/legacy information. The park intends to proceed with focusing efforts on their ATBI db, putting aside their frustrations with what NPSpecies has been able to do so far. Park is "not terribly interested in using NPSpecies as is currently exists as a tool for querying their data", but also recognizes the time/money that went into its development. If NPSpecies is to be the NPS-mandated receptacle for biodiversity	Yes - park is working closely with the Gulf Coast data manager.
The PI coordinates research and collecting permits and enters information into RPRS.	??? Year started? Structure sample from spring through fall; no sampling in the winter. Each of the 7 islands are sampled at least one time per year.	For structured sampling: 1) data sheets taken out to the field 2) GPS coordinate taken for all passive sample sites (ex. Pitfall traps, malaise traps, etc.) 3) samples are tracked with an 8-9 digit code, written on paper and deposited into the collection bag. The code determines the island, the trap type, which trap at a particular site, and the date. 4) The various codes containing the sampling event information, get logged into Mantis immediately on return from the field.	Planned. At the outset of the project, the thought was to download all data from Mantis at the end of a 5 year period into an Excel spreadsheet and upload it into NPSpecies. This has not been attempted yet. Also, NPSpecies may not be the appropriate database to capture everything the park wants i.e. - they would like photographs and sound files together with the collections data.	I&M network is "largely uninvolved" with the ATBI effort. The park would like to figure out a way for inventories to be run together with their I&M program, rather than the ATBI project run as a separate inventory with a data management system independent of what is being done in the I&M program.

Permitting Considerations	Year started/frequency	General Work Flow	NPSpecies? (Y/N/Planned)	I&M Network involved?
	Planned for Summer, 2009.		Planned.	I&M network seems to only interested in vertebrates and vascular plants; the diversity is much higher than simply the taxa in those categories.
Left up to the Pis to determine.			Planned. The park feels that the NPS has designated NPSpecies to be the repository for biodiversity data, and so they plan on eventually populating it with the results of their bioblitzes.	No
	2007			
The contractor has the collection permit.			Not in the PI's field of expertise, but he wants to ensure that information is getting to all the appropriate places it should be.	No - only to communicate their effort.

Permitting Considerations	Year started/frequency	General Work Flow	NPSpecies? (Y/N/Planned)	I&M Network involved?
All researchers/scientists go through the RPRS system.	To be determined.	Planning to have a workshop with TNC and identified, interested scientists to talk about an overall park ATBI strategy; specifically to identify information gaps and how the 40k CC funding will be best spent. Hope to identify which participants need travel funds, identify various field projects to be worked on, as well as looking at legacy samples that haven't been identified or published yet. Want to address the question of what makes the park important for biodiversity? This	Park has not put a lot of thought into this - "assumes" that data will eventually go there. Park has a 'vast backlog' of information about invertebrates and non-vascular plants that isn't included in NPSpecies, and they feel it would be a large undertaking to get the data into that application.	Hoping for data management help from their network, at least in an advisory capacity. Would like to be able to hire a data assistant to work in cooperation with the I&M data
				The park touches base with both their I&M network and RLC, but they do any assistance from them.
Interviewee issued a research permit under his name for this project.	29-Sep-07	Effort began in 07, and increased in 08 with CC funds. Have used approximately 4 volunteer groups from local colleges to do their blitzing.	While interviewee has the expectation that data from this effort will eventually go into NPSpecies to "keep it current" - he also does not feel that the NPSpecies program is serving much to help out with their ATBI database needs.	

Permitting Considerations	Year started/frequency	General Work Flow	NPSpecies? (Y/N/Planned)	I&M Network involved?
The University group has a collecting permit.	In the second year of a two year project.			
In the past (approximately 3 years ago), worked on an insect bioblitz, collected insects but did not have a permit. Data will not be entered into ANCS+ because of lack of funding/follow-through. Is still working on the specimens, and will eventually house the data in the university database.				
The Mycological Society obtained the collection permit.	Aug-08	Worked in partnership with the Mycological Society and Botanic Garden. Gave the MSC 1k to organize a website, get members interested in a mycoblitz, register the participants, get them to the park for a weekend, do the training, and be in charge of	Did not plan or consider entering data into NPSpecies; thinks that NPSpecies could be problematic, in terms of taxonomy, for fungi. Thinks it would be desirable, but have not made any plans to enter the data there.	No

Permitting Considerations	Year started/frequency	General Work Flow	NPSpecies? (Y/N/Planned)	I&M Network involved?
There is a permit, which is somehow linked to a larger effort, trying to understand nutrient flow through watersheds and how that affects aquatic organisms. No collection of organisms yet - only water samples to date.	Aug-08		N/A	The I&M network will use the data to identify sentinel sites for long-term water quality monitoring.
Permits are issued for all ATBI projects.	Fieldwork was conducted from 2003-2005		Planned. Part of the CC grant will go to fund about two months of time for their database manager to do this task.	I&M is interested, but there is no real support. Have had discussions with I&M data managers to help get some of their legacy data into NPSpecies, but the thought now is to use CC funding to get their data into the "national ATBI database:".
	Four forays were conducted in Dec-Jan of 2005-2006 and 2006-2007.	The mycoblitz was structured into four "forays" , or mass collecting efforts. Collecting was focused on 47 trail and road based areas. Identifications were done in two steps - sorting into major groups and identification of the easier taxa in the field on the first day, followed by more careful scrutiny in the lab on the		

Permitting Considerations	Year started/frequency	General Work Flow	NPSpecies? (Y/N/Planned)	I&M Network involved?
Interviewee reports that the park curator has vociferously complained that when research permittees hand in their IAR reports, they rarely, if ever, come with data - i.e. spreadsheets, where specimens are located, field notes. They simply receive a report. Even though permittees must sign in their application that they will turn all data over to the park when they have completed their project, there is no enforcement of this policy. There is large backlog of information that needs to be "wrestled" from researchers - this will be a new responsibility for interviewee - to first organize and then to enforce information return. When	TBD			

RLC involved?	Is there a vision for future park efforts?	How are parks using their data?
Yes		
		Used data from inventory to work on proposals to target these taxa for additional ecological research. Want to understand habitat and ecosystem roles with this taxon. Also turned information into a public lecture series to stimulate further
No	The park was very happy with their bioblitz effort, though it was more of an introductory look into what is involved in conducting a blitz. They would like to see a more scientifically focused effort, especially for an insect-based ATBI.	1) Used for Resource Briefs, 2) to populate NPSpecies, 3) Park is currently in the middle of a GMP, so these data will help to identify species/habitats/areas that the park needs to spend more time with on management activities, 4) To generate lists to support wildlife viewing; park is on the State of Virginia wildlife viewing list and the Virginia birding trail.
No		Park wants to know what species are affiliated with a particular trail; they want lists of species for those trails – more from an interpretive or educational angle.

RLC involved?	Is there a vision for future park efforts?	How are parks using their data?
No		Park wants to know what species are affiliated with a particular trail; they want lists of species for those trails – more from an interpretive or educational angle.
No		Park wants to know what species are affiliated with a particular trail; they want lists of species for those trails – more from an interpretive or educational angle.

RLC involved?	Is there a vision for future park efforts?	How are parks using their data?
All blitz activities are run through the RLC	1) Conducting more than one bioblitz effort for a taxonomic category per year, 2) broadening the geographic scope of the blitz to more areas of the park, 3) begin to look at seasonality in their collections efforts - currently, all blitzes are run during the high summer only.	1) The state Forest Service uses the data from the blitz efforts to expand the range of known insects and to determine new state records. 2) Secondly, the education and outreach component are important for the park. 3) The park has not used any data to make management decisions, but if the need arose to do an EA, they would probably look at their ATBI data, though since it's just a snapshot, it would be limited data at best, with no statistics.

RLC involved?	Is there a vision for future park efforts?	How are parks using their data?
		1) Some staff think that the question of "how do you intend to use ATBI data in the course of your work?" to be a tough thing to answer. Thinks that "people say a lot of flowery things about the value of ATBI data", but from where they sits, they are "scratching our heads wondering if you can really tell me how knowing that this insect that was found over there, on this date, is going to influence a resource management decision". Doesn't think this will happen, unless it is a T&E species, or one that has otherwise been given some level of management importance. 2) Still early, but hoping that data from the ATBI will stimulate other research topics, such as climate change or hurricane disturbance. 3) The park hopes that data from the ATBI will help formulate new hypotheses and new research to help answer important questions, though is doubtful that if the park were to discover something related to global climate change in the preserve, that it
No	For management, this is the "question of the year", given that the original funding source for the ATBI partnership with Harvard MCZ ends "soon". Otherwise, the park does not envision moving away from the invertebrate focus to the ATBI.	1) Park would like to be able to develop and monitor "indicator species" to assess active management work, and 2) to have an early detection framework for newly invasive species, particularly pests of concern; 3) also, to be able to manage effectively, park needs an understanding of the plant and animal resources; cataloging them is a priority towards this end.

RLC involved?	Is there a vision for future park efforts?	How are parks using their data?
Interviewee and a few other staff members "are" the RLC - not much going on.		
No	The park will keep doing piecemeal biodiversity projects until the NPS has a formal strategy and funding for overarching inventory work.	The park envisions mostly subject matter experts to use the data from blitz their targeted inventory work. For the lichen study, vegetation staff will likely use it to promote the value of biodiversity, as well as when the park is required to do compliance in a particular area of the park where there is sound biodiversity information. Data will also be used by scientists who come to the park and need lists of taxa discovered, as well as used in the Resource Management planning process.
No - only to communicate their effort.	There is the potential for continued work.	1) Biological data collected, especially on endemic/rare invertebrates, will propel the park to rethink their cave management. There are currently no restrictions to access of caves, even though a rare pseudoscorpion has been collected. 2) The park would like to compare their data with similar data that has already been collected in other areas in the region, to look for patterns, how populations are fragmented; what controls where a species lives and doesn't live.

RLC involved?	Is there a vision for future park efforts?	How are parks using their data?
Not at this point, but possibly in the future.		Park thinks data can be important when looking at major issues such as climate change; also for potential management actions that are taken, and how those actions might affect rare or endemic species that they might not yet be aware of. Data about non-vascular plants and invertebrate animals could potentially highlight the importance of island restoration efforts, and help the park direct what habitats are important for restoration and protection.
The park touches base with both their I&M network and RLC, but they do any assistance from them.	The park intent if for all-taxa to be explored; limited by their isolation, in getting volunteer groups to come to the park to do the work, as well as limited by taxonomic expertise.	
		Park plans to develop a geospatial database that will enable a better understanding of the ant species (in particular), and also their habitat associations. They want to determine how factors such as aspect, habitat, and elevation influence species diversity and abundance, and use these data to contribute to a larger regional or national understanding.

RLC involved?	Is there a vision for future park efforts?	How are parks using their data?
		As part of the goals for the scorpion project, the University will produce a user-friendly, scorpion guide and key, geared towards lay audiences, so that future blitz efforts can depend more on a visual guide, rather than needing to collect voucher speciemens. They also hope to use these guides for educational purposes (park road shows) and are also interested in selling them through their cooperative association.
		The hope is that the results (data) coming from this project will provide the "seed information" from these miscellaneous insect groups, to provide excitement and interest to engage future partners for taxonomic work beyond ants and spiders. Staff at university is working these miscellaneous taxa up.
	Has worked with park on a project to identify that parks' insects, so that the curator can place names on them. Park collection will now be stored at university as part of their NPS collections, instead of at park, where no one ever sees them. 2) Is working with a different park on an invertebrate project, 3) collaborates with the ant group at Harvard	Thinks that biodiversity in and of itself, is a resource that needs to be protected, and therefore, inventories are needed to help ask questions, i.e. - how is climate change going to affect the biodiversity in a park?
	No fleshed out vision.	
	Would like to repeat the effort, especially in a year that isn't as dry as 2008.	To simply get a species list.

RLC involved?	Is there a vision for future park efforts?	How are parks using their data?
		1) To determine where their water quality concerns are in the park, 2) where the parks' pristine water sources are, 3) for use by the I&M network to identify sentinel sites for long-term monitoring.
Bioblitzes were initially run through the RLC. Currently, projects are initiated by finding an interested project coordinator - usually a University scientist, or taxonomist, interested in obtaining species diversity data.	Interviewee sees the ATBI continuing at a steady pace, with the RLC continuing to be the overall umbrella. Blitzes to support inventory work, or to support public outreach will continue as funding becomes available.	1) To identify new species to the park and to science, adding to overall species lists to gain a more complete understanding of what taxa are represented in the park, 2) As rare species are found, management plans will start to be affected - i.e. understanding where hotspots of biodiversity are within the park - where the species are, how sensitive they are - will help the park with their planning. 3) The ATBI information may not always help out with resource management information, and the data that is often most useful, is not simply a list of species, but by doing an inventory, other discoveries are made that generate ancillary research products. Since most of the park researchers tend to be ecologists rather than taxonomists - when they are doing their projects, there is also the ability to glean taxonomy data, so in the name of the ATBI, the park is supporting research that provides some answers to ecological questions, that may lead to research management questions further down the road. Bottom line -

RLC involved?	Is there a vision for future park efforts?	How are parks using their data?
		Visitors to the park often ask what resources are being impacted (by threats), and how the park is going to manage for them. Since they don't even know what species they have in the park, except for the megafauna or those that are easily seen and identified - overall species inventories become very important - to map what is in the park, and to be able to make prudent resource management decisions about them.

Are there issues with how data could be used in the future?/what issues are parks having with data?	Wish List Items for Data
	1) To use the data as a tool to present to the NPS that even though park is culturally-based, it also contains significant natural resources - even on the level of other parks such as GRSM and EVER. To support this claim to the larger NPS, with evidence (data). 2) The park thinks there is a great potential for natural history curatorial efforts, and is hoping that Neil Cobb at NAU will lend his expertise and a graduate student in 2009 to begin work on an ATBI insect collection.

Are there issues with how data could be used in the future?/what issues are parks having with data?	Wish List Items for Data

Are there issues with how data could be used in the future?/what issues are parks having with data?	Wish List Items for Data
Data are not being used internally; are used more outside the park, for example, by the state Entomological Society. The park feels there is a lot of potential with these data, but not a lot of uses for it yet. As for data being used to support management issues, the park doesn't have management issues in the general area that the blitzes are conducted, and because data are collected in a short time span per season, the data would be of questionable use to support management decisions.	1) The park would like to be able to send their existing database to Ft. Collins, and have the NRPC populate NPSpecies for them directly, as staff and funds are very limited to do this. 2) To return to old sampling sites and get more detailed information on habitat. 3) To have photographs of sites/specimens. 4) Used part of their CC monies to create a user-friendly, web-based biodiversity atlas (work in progress: no website available yet; mapping tool is in production at the state university) - so that the public can map the results of the various bioblitzes. Would like to have photographs of sampling sites as part of this mapping tool, so that when a user clicks on a sampling location, they would receive habitat data, a site photo, and a list of the species found there, over all the bioblitzes conducted by the park. 5) Would like the ability to translate the results they are learning to a more lay audience, and even to the participants who come back year after year. Would like to be able to engage these volunteers in the off season, by having a web presence where volunteers could interact, leave messages, photos, share things, as well as having the ability to look at data.
	To return to all sampling sites 40-50 are sampled per year) and collect detailed habitat information, including site photographs.

Are there issues with how data could be used in the future?/what issues are parks having with data?	Wish List Items for Data
There is concern from RM staff that the ability to show evidence that the ATBI is ever going to reach the point where it's a valid management tool to decide whether or not to allow a right-of-way project in some area of the preserve, or a power line, or a bridge - thinks this is going to be very difficult to do. Interviewee is not aware of any example in the NPS, where people are using ATBI information at that scale, for managing a park.	1) Needs the ability for researchers to enter their data once and then be able to satisfy all of the data houses that are also required. For example, the BTA doesn't have the obligation or requirement to populate ANCS+ or NPSpecies. 2) Would like to have NPSpecies data imported into their ATBI database, which would then serve as the single place to get information on all taxa, both legacy/historical data, and records new to the park since the ATBI effort began. 3) Would like the ability to share data, even beyond the NPS; recognizes that this individual park effort is just one of many global 'data palaces' (i.e. GBIF, Ency of Life) that need a broader context to really be able interpret data..
1) There is concern that the database being developed and used for the ATBI effort does not mesh with I&M network databases; for example, the network does not know how to access or use the ATBI database. 2) When looking at the data in NPSpecies, there is confusion as to what is, or has not been, certified - "there should be a way to easily mark that, and to keep data separate". And for ATBI data, there is a possible need to flag those collections that are awaiting identification, or verification - through various and multiple stages of the data cycle.	1) It would be "extremely useful" for park managers, youth services, interpretation staff, etc., to go to <u>one</u> portal to find out about the biodiversity in the park, however, 2) there is some recognition that one database may not serve all needs; each park research study is very specific, with specific data entry fields tailored for that study - what is needed is for all existing databases to have the ability to "talk to each other", and an easy way to maintain the data and keep them up to date. Along these lines, if one database is not possible, then the park would like a clear understanding of which database is NPS-only, vs. which is available to the public, and what the features and reporting capacities for each are. 3) Park would like the ability to list and retrieve data by separate park subunits. 4) The ATBI database is currently hosted by Harvard on their website; this is not a sustainable long-term structure for park based data. 5) Need to look at habitat variables at different scales - not just as large forests or beach habitats on a broad scale, but also an

Are there issues with how data could be used in the future?/what issues are parks having with data?	Wish List Items for Data
1) Has concerns that no one in the NPS is looking at the larger picture of what parks are doing with bioblitzes and ATBIs, and what these efforts mean for the NPS. 2) Wants reassurance that the interim database has been thought through, and is a "safe container" for data, until a future decision is made as to what to do with the data.	1) Would like to be able to use NPSpecies to put data into and pull data from - easily - in one common place. 2) Park is under the general impression that NPSpecies is this common receptacle. 3) Would like a comprehensive strategy for biodiversity studies, and an overall goal that individual park efforts can plan and shoot for. 4) Wants to know what is going on across the NPS in terms of biodiversity studies. 4) For the various inventory efforts at park, need to be able to document what these individual projects are, for ex. - big inventories, small inventories, weekend events, two year events, and be able to organize their results in a way that is easy to hand out information to interested parties - "needs containers and ways to interrelate all this disparate information". 5) Would like to understand how individual parks vs. the entire NPS want to
The park is not interested in pulling together individual NPS biodiversity efforts that fall under the IRMA umbrella - interested in doing their own projects, independently.	1) Park wants to ensure that all data collected are electronic and 2) that data are kept in perpetuity for future access
	The park would like to know about data collected from soil invertebrates, to help them understand how truly cave-dependant the species they are finding, truly are.

Are there issues with how data could be used in the future?/what issues are parks having with data?	Wish List Items for Data
	1) Park is interested in both the I and the M components of the I&M program, but not entirely sure what to do about the I part. There is a lot of inventory information - beyond vertebrates and vascular plants - that the park doesn't know what to do with - they feel it is interesting information, but don't quite know what to do with it. 2) Park is interested in databases like the Encyclopedia of Life, and/or Tree of Life, with popular and easy-to-use interfaces. Park is occasionally asked why they aren't using these more popular data portals, instead of NPSpecies which only has internal access, and not linked to larger efforts where data can be put into a
	1) Needs a database to keep track of, and archive the status of what's been collected - not only where it was collected, but where it is now - i.e. - a tracking mechanism. 2) Would like to have a database that is also a research tool so that specimens can be linked with habitat, elevation, vegetation type; would like a geospatial component; would like to have the capability for model development to be able to make inferences about species outside the areas that they are collecting in.

Are there issues with how data could be used in the future?/what issues are parks having with data?	Wish List Items for Data
1) Scientists (outside the NPS) are caught in the middle of RM-funded programs and I&M projects; lists of insects don't seem to be a priority to anyone, and when scientists obtain permits, and then put their data into ANCS+ - it get's lost in the system because no one has access to those data but the NPS. 2) Doesn't think that Resource Managers know what to do with data collected from an ATBI, or how important it is - and also, that they shouldn't be expected to know about this - more of an I&M role. 3) Thinks that the quality of data that come from bioblitzes is horrible, in terms of scientific value - thinks that most scientists want nothing to do with bioblitzing.	1) Whatever database is developed for ATBI data for the NPS, interviewee would like it to be compatible with their database. 2) Feels that the I&M program is important to the ATBI effort, and wants more than just species lists - wants species distribution modeling and climate change modeling, and thinks that invertebrates make ideal models for these efforts. Thinks it's very important to tap into the data layers that the I&M program is/has developed. 3) Feels that the science-based thrust of the I&M program makes it to be a better fit, when working with university scientists, than to have the scientists working with Resource Management, park staff, and yet the data would also benefit the RM program. 3) Would like to see the NPS take the GRSM model and nationalize it. 4) Need to do biodiversity assessments of parks and
Interviewee did not feel that the park could ever manage for fungi, or that the presense of certain species would change any management strategies.	

Are there issues with how data could be used in the future?/what issues are parks having with data?	Wish List Items for Data
	1) The RLC director suspected that a national effort is having difficulties moving forward, so he would simply like their data to be available - "at least on the same level as NPSpecies" Has concerns that NPSpecies will not be available to the public very soon - when their mycoblitz and other data are already up on a public website, 2) Being able to visualize the biodiversity data that we have within our parks; and to visualize it among parks. 3) Having a national database with a spatial component, so that a specific location could be pinpointed, that also can generate species lists, 4) Also interested in getting their data into a national portal such as GBIF, so that the data can actually be used by the scientific community. Thinks a lot of ATBI efforts are done ad hoc, or 'on the fly', so that it is difficult for I&M to keep data in a format where a regional or national perspective could be obtained.

Are there issues with how data could be used in the future?/what issues are parks having with data?	Wish List Items for Data
1) Discouraged that the Inventory component of the I&M program has been "dropped". 2) Thinks the data associated with voucher specimens in NPSpecies if too little - to say that it just came from the park doesn't help 3) Realizes that the I&M program had to start somewhere - with vertebrates and vascular plants - but this park has determined that invertebrates occupy the highest percentage of organisms in their park, and thinks these are being ignored - i.e. - the Inventory portion ran out of money; said they would tackle this inventory (invertebrates) later - later has never come around. 4) In thinking about the current process of not getting RPRS data back from scientists, will start an Excel spreadsheet to determine who has, and has not completed their park projects, and will then cross-reference that with the archives, through their museum curator, to try and determine what data are outstanding. Once information begins to come in, staff has concerns as to where they want to place it, and how they will organize it so that it will be accessible to other people.	1) From what interviewee has seen of the Inventory program - it is just "lists of stuff". Would like to see the natural history of individual organisms described, or to be able to link to this type of information via a website. 2) Needs data on where the species is located in the park, where you could potentially find it, how many you could find (i.e. abundance data), frequency data, photographs, what time of day/year are you likely to see them?, natural history information, and thinks that this should comprise the meat of the inventory information from the I&M program. In general, would like to see NPSpecies more robust and more useable. 3) On one hand, is happy with the various inventory products like soil maps, veg maps, etc, but on the other, would like to be able to submit these data in layers and then to determine ecological information - i.e. - if you are catching invertebrates, or birds, and you see more sightings at a particular location, for example, along an elevational gradient, - it's not particularly useful to know that 5 loggerhead shrikes were seen there - that is simply an inventory number. But if you can say - "hey, we've documented this species at this particular GPS point, and this is the elevational gradient, and we know that there's this particular type of vegetation there from our veg maps, and this particular type of soil texture from our soils maps - now, you can get layer upon layer of information -

Miscellaneous
1) When the I&M surveys were performed in the early 2000's, the park was under drought conditions - the park feels that some of the species that should have been found, didn't show up, so the park views the ATBI effort as trying to close some of those data gaps. 2) Park viewed their bioblitz as a beginning, to see what effort it took to initiate one. They used the I&M network data (species lists from NPSpecies), but that was as deep as they intended to go with this first, exploratory effort. 3) The I&M data manager spent approximately 6 hours familiarizing herself

Miscellaneous

Miscellaneous
1) Interviewee realizes that one 24 hour bioblitz effort, conducted once a year on a single taxonomic group (as their blitzes are structured), "is not as scientific as it could or should be". 2) The state Forest Service keeps its own invertebrate lists, which the park uses to pre-populate their internal, Access database. Data are exchanged when a blitz effort has been completed. 3) A Spiderblitz was held at years ago; it took 8-9 months to get the identifications back from the PI. A Flyblitz was conducted 2-3 years ago, and no data has been returned as of yet. 4) Samples are sorted to Family in the lab, during the blitz, and then pinned and labeled with their associated lot numbers. Even though the lot numbers (representing all the data) are on the specimens, the park often does not have a good inventory of who has taken which specimens for further identification. It hasn't been a huge problem to date, but it is an area the park thinks it needs to improve on. As insects are identified to Family, the Resource Manager rarely gets a list of who has taken what - and vouchers are often sent off to a third or fourth party without his knowledge. Thinks this is okay, since the lead taxonomist is overall, responsible for this - to send specimens out, get them identified, get the vouchers back to the park, and write up a small report. Sometimes, they get a small honorarium for this, based on the fees that are received from the blitz registration. 5) The park is committed to creating a front end part to their existing web site, focused on their bioblitzes, which

Miscellaneous
1) I&M vegetation inventory data is from all 34 subunits, individually. Park does not know if these data are in NPSpecies yet, but would like to keep them segregated by island. 2) Attempted to talk to (then) I&M data manager re: how to get ATBI data into NPSpecies - unsuccessful in resolving this issue. Has not attempted an upload/transfer yet because they don't want to be constantly updating data - want to do it at the end of their invertebrate project. 3) Having park biodiversity data in numerous databases (instead of a single, central receptacle) will make it difficult to get a region-wide, or service-wide perspective on a taxon - there are too many systems to deal with. 4) A peripheral ATBI project is with another Harvard student who is working on the Mathematica software (and the ATBI data) - he is using it to develop some user-friendly interfaces for them to be able to extract data from the Mantis db, and to map species distributions, sampling locations, etc. Eventually, they will be able to click on a sampling location and generate a species list, images, a photo of the sampling location, be able to create graphs and pie charts, etc., which will be helpful in overall data synthesis. 5) Bioblitzes are not a major (data)

Miscellaneous
1) Has a good understanding of I&M databases and the IRMA effort, but does not feel that the people doing bioblitzes across the NPS have a similar understanding - does not feel that it is universal that park staff are using I&M databases to hold bioblitz information. 2) Thinks that the RPRS system is the only thing parks have which lists the many research projects that are going on at a park, but other than having that system, "no one really has a clue what is going on in the parks". 3) Discussed the possibility of having a workbench type area in an upcoming iteration of NPSpecies, where data could be stored that hasn't necessarily been certified or approved, or maybe even not identified yet - but simply having a holding place to store data-in-the-works. 4) Feels that parks who have developed their own biodiversity databases or spreadsheets, are not as willing to also have to re-enter their data into NPSpecies; and if I&M personnel aren't available to help them, they
1) Park has just hired their very first data manager

Miscellaneous
1) Scientists, taxonomists, etc. regularly apply to the park to do surveys and taxonomy work through the RPRS process, independent of the I&M program, 2) In general, the way in which the park deals with upcoming inventory projects, is that they depend on outside scientists coming to them and asking if they can go out and collect on the islands - park is generally in agreement with this - i.e. no formal planning involved. 3) Re: public outreach/education, they would like to have a 1-2 day public series of presentations and displays highlighting the bd of the park as a way of bringing the science to the public. However, the park does not see much value in a 24 hour effort geared towards "collecting things", so they are downlplaying
1) concerns about the future of the program - he initiated the enthusiasm for the effort; got backing from his Superintendant, but both he and the Superindant are short-timers. As such, he has engaged DLIA to form a potential partnership. Has submitted a proposal to the DLIA board - which was "considered and accepted". 2) A new superintendant is expected in March 2009. Hope to launch this initiative shortly thereafter, including hiring an additional staff of two. 3) Due to staff turnover, and the fragile status of their data (in miscellaneous dbs and spreadsheets) - the hope is that instead of turning their data over the be subsumed into the DLIA database system, rather - to use the interim ATBI database that was developed last summer.

Miscellaneous
1)Interviewee is under the impression that the NPS interim db was created to simply deal with bioblitzes from the 8 Centennial Challenge parks, and that it was not meant to be a long-term database. 2) Thinks that some parks can't get their arms around the very large task of documenting biodiversity - that it's too big to deal with, so therefore, they aren't going to deal with it. Would rather see parks ask the question - "why can't we do this?" instead of to question why. 3) As with GRSM, if parks embrace local schools and faculty at small, local colleges, and pay small honoraria, then ATBI efforts would be more successful - don't leave all the effort up to the NPS.
1) ROMO modelled their mycoblitz efforts after the PORE experience.

Miscellaneous
1) one subset currently the only data in the on-line database. There are plans to bring the fungal data, new terrestrial data, and new lichen data into this same database. Currently, "as projects present themselves, our main goal is with the CC money - to try and get all of our legacy data, into whatever NPS database is being put together". 2) The ATBI effort is independant of the parks' RM efforts. 3) None of the data on the has been uploaded into NPSpecies. 4) Under the ATBI umbrella, the park has some datasets thay typically would have been developed by RM - i.e. - information on sea grass beds, or sea floor bathymetry - that can be used for delineating marine protection areas. This information would not have been available without the Tomales Bay ATBI - it sparked more products.

Miscellaneous
1) The parks' RM component is growing, but they lack the manpower and funding to hire staff to do all the projects they would like to do. Therefore, there has been a push to engage the public - to have people volunteer - to help out with various projects. This would be developing a citizen science program which allows the park to have free labor to address some park goals for management, and at the same time, it is an opportunity to give back to the public , by educating them, and giving them the opportunity to be invovled in park operations. 2) Learned from the DLIA meeting in December that a 24 hour "free for all" bioblitz is not the appropriate manner in which to proceed - there is too much going on, and too much data to be lost. Feels that smaller, targeted groups, done at various times of year, and working with focused groups of volunteers, will be more appropriate for her park and for data gathering.