

**FSML: COLLABORATIVE PLANNING FOR THE
WOODLAKE ENVIRONMENTAL AND BATH
FIELD STATIONS**

FINAL REPORT^{*}

**CLEVELAND STATE UNIVERSITY
UNIVERSITY OF AKRON**

SEPTEMBER 2001

^{*} This material is based on work supported by National Science Foundation Grant Number DBI-9907585. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the authors and do not necessarily reflect the views of the National Science Foundation or Cleveland State University.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
II. SURVEY RESULTS OF POTENTIAL RESEARCHERS & PARTICIPANTS	2
III. FIELD STATION VISIT SUMMARY	3
IV. EDUCATIONAL WORKSHOP	4
A. OVERVIEW	4
B. EDUCATION WORKSHOP PRESENTATIONS	5
C. CAROUSEL BRAINSTORMING SESSION	7
D. FIELD STATION TOURS	8
E. EDUCATION.....	9
F. CONSORTIUM DEVELOPMENT.....	10
G. RESOURCE INVENTORY	10
V. RESEARCH WORKSHOP	10
A. INTRODUCTION	10
B. DAY 1 (APRIL 14, 2000).....	11
C. DAY 2 (APRIL 15, 2000).....	11
D. DAY 3 (APRIL 16, 2000).....	13
VI. PLANNING WORKSHOP	15
A. INTRODUCTION	15
B. OVERVIEW OF WORKSHOP FORMAT	15
C. DISCUSSION SUMMARIES.....	16
D. SUNDAY MORNING SUMMATIONS	20
VII. RESULTS FROM PLANNING ACTIVITIES	21
A. STRATEGIC ASSESSMENT	21
B. TAKE-HOME POINTS	23
VIII. FUTURE PLANS	25
IX. APPENDICES	
APPENDIX A — POTENTIAL USER SURVEY	
APPENDIX B — POTENTIAL USER SURVEY RESULTS	
APPENDIX C — QUESTIONS FOR FIELD STATION VISITS	
APPENDIX D — GENERAL SUMMARY OF FIELD STATION VISITS	
APPENDIX E — PARTICIPANTS IN EDUCATION WORKSHOP	
APPENDIX F — CAROUSEL BRAINSTORMING SESSION	
APPENDIX G — RESEARCH WORKSHOP PRESENTATIONS	
APPENDIX H — PARTICIPANTS IN RESEARCH WORKSHOP	
APPENDIX I — PARTICIPANTS IN PLANNING WORKSHOP	
APPENDIX J — BATH NATURE PRESERVE AND FIELD STATION MASTER PLAN	
APPENDIX K — WOODLAKE ENVIRONMENTAL FIELD STATION 5-YEAR PLAN	

EXECUTIVE SUMMARY

All six tasks outlined in the original proposal to the National Science Foundation were completed and provided planners with a wealth of information and perspectives that will be valuable in implementing the development of both field stations into the future. These tasks included:

- An October 1999 survey of 308 potential researchers was conducted to determine their interest in utilizing the Woodlake and Bath Field Stations for research and education. Sixty responses were received and the results of the survey revealed substantial interest in using both of the field stations for research and for educational purposes. The survey also identified many supply and equipment items that, if available, would facilitate research and teaching activities at both stations.
- Between October 1998 and September 2000, project staff visited eight field stations at various locations in the United States. Field stations were selected according to several criteria: a focus on rural/urban interface; collaborations among institutions, particularly with links to federal agencies; recently established; or located in our geographic region. The results of these visits provided project staff with insights into the uniqueness associated with every field stations operations.
- On December 11 and 12, 1999, an Education Program-Planning Workshop was held to: 1) introduce the Bath and Woodlake facilities and current courses to the regional community of university, college, community college, and K-12 educators; 2) encourage collaborative program development and partnerships within the regional education community; 3) solicit advice concerning program development, facilities and equipment needs from an audience that represented many of the likely station users in the region; and 4) gain information on effective delivery of education at field stations and innovative, national initiatives in environmental and ecological education, through presentations by invited experts. Several recognized experts on educational uses of field stations were invited expressly to share their special expertise and advice at the workshop, and to provide critical assessment of the needs and potential for educational programming at the Woodlake and Bath stations.
- Between April 14 and 16, 2000, a Research Program-Planning Workshop was held to provide an opportunity for local scientists to interact with current leaders in the field of urban ecology, and to introduce our facilities to the larger national community of ecological scientists. The objectives of this workshop were to: 1) provide potential users of the stations with information concerning available facilities, data, and natural resources; 2) establish coherent research priorities for the stations, focused on the general theme of ecological change at the urban fringe; 3) assess equipment, facilities, and infrastructure needs to support those research priorities; and 4) promote collegial interaction and collaborative relationships between our group and other researchers with similar research programs.
- Between September 29 and October 1, 2000, a Field Station Planning Workshop was held to integrate the information gained through the user survey, field station visits, and the previous two workshops into actual planning documents for both field stations.

Draft planning documents were prepared and will continue to be refined. Still under development are specific timeframes for the actions outlined to meet the field stations' goals and objectives.

I. OVERVIEW OF PLANNING ACTIVITIES

As outlined in the original proposal to the National Science Foundation (NSF), field station planning efforts included 6 tasks:

- Conduct a survey of potential researchers and participants
- Visits to other field stations
- Conduct an educational program planning workshop
- Conduct a research planning workshop
- Conduct a field station planning workshop
- Develop planning documents to guide continued development of the stations

All six tasks were completed and provided planners with a wealth of information and perspectives that will be valuable in implementing the development of both field stations in the future.

II. SURVEY RESULTS OF POTENTIAL RESEARCHERS & PARTICIPANTS

To determine research and education priorities, a survey (Appendix A) was sent in October 1999 to 308 potential researchers of the Woodlake and Bath Field Stations in the region (33 CSU faculty, 172 off-campus, 103 from Ohio Biological Survey). The list of recipients was compiled using the Center for Environmental Science, Technology and Policy's newsletter mailing list and selected members of the Ohio Biological Survey. Sixty surveys were returned (19%).

Results of the survey (see Appendix B) revealed substantial interest in using both of the field stations for research and for educational purposes: 78% of respondents expressed interest in using the field stations for research activities, while 83% indicated interest in educational activities. Areas of interest included ecology, water and water quality, habitat fragmentation, conservation, invasive species, and urban-rural gradients and urbanization. Respondents expressed interest in using the stations for undergraduate as well as graduate research, and expected to use the stations repeatedly. Fifty-five percent expressed a need for classroom space at the stations and only 33% expressed interest in overnight facilities. Many respondents (between 52-30%, depending on type of data) expressed interest in datasets. The types of data identified (listed by decreasing level of interest) included: historical environmental data, historic aerial photos, species inventory, and meteorological/climatological data. The survey also identified many supply and equipment items that, if available, would facilitate research and teaching activities at both stations, including a water quality laboratory, computer facilities, internet accessibility, long-term monitoring plots, GIS capabilities, artificial streams/pools, guided tours of habitats, and overnight facilities. In addition, specific types of field sampling equipment were listed as well as laboratory equipment.

III. FIELD STATION VISIT SUMMARY

Between October 1998 and September 2000, project staff visited eight field stations:

- **Bay Springs Field Station**, located near Abbeville, Mississippi and operated by the University of Mississippi;
- **F. T. Stone Laboratory**, located on Gibraltar Island near Put-in-Bay, Ohio and operated by The Ohio State University;
- **H. J. Andrews Experimental Forest** in Blue River, Oregon, which is cooperatively administered by Oregon State University, United States Forest Service's Pacific Northwest Research Station and Willamette National Forest;
- **J. H. Barrow Field Station**, located near Hiram, Ohio and operated by Hiram College;
- **The Louis Calder Center** in Armonk, New York is operated by Fordham University;
- **Mountain Research Station**, located north of Nederland, Colorado and operated by the Institute of Arctic and Alpine Research of the University of Colorado;
- **Pymatuning Laboratory of Ecology**, located near Linesville, Pennsylvania on Pymatuning Lake, which straddles the border of Ohio, and Pennsylvania. The Laboratory is operated by the University of Pittsburgh on land owned by the Commonwealth of Pennsylvania; and
- **Shortgrass Steppe Field Station**, located 13 miles northeast of Nunn, Colorado and operated by Colorado State University in collaboration with the United States Department of Agriculture, Agricultural Research Service and Pawnee National Grasslands.

As indicated in our proposal, we selected field stations according to several criteria: a focus on rural/urban interface; collaborations among institutions, particularly with links to federal agencies; recently established; or located in our geographic region. The Louis Calder Center was selected as an example of field stations with an urban-rural interface. The Pymatuning Laboratory of Ecology, Shortgrass Steppe Field Station and H. J. Andrews Experimental Forest are examples of stations with collaborations among institutions including government agencies. Mountain Research Station was visited because it represents a well-established, on-going field station. The others were examples of regional stations, and they also provided the potential to become future collaborators.

We used a bank of questions (see Appendix C) to structure our visits to the field stations. A general summary of the field station visit reports is presented in Appendix D. A review of both the table and the reports provided insights into what we learned from those visits.

Facilities range from meager to expansive and staffing varies considerably as well. Most of the stations had some dormitory capacity, suggesting that on-site residence is an important consideration. Likewise, most stations appear to have a core of two or three people who are deeply involved with station administration. Often one person acts as director and the other as manager, with the director usually more policy-oriented and the manager more facilities-

oriented. Some directors are faculty members who take on the station's administrative duties on a part-time basis, sometimes supported by release time from the affiliated university.

Almost all field stations were supported financially at the college/university level. One would conclude that securing some form of institutional (beyond departmental) support is essential for long-term viability.

We were surprised to learn that most stations do not have an extensive set of rules for use of the stations. It appears when rules (policies) are promulgated, a very low-key approach is followed. The approach is reactive rather than proactive, vis-à-vis, making rules only when a problem persists. Such rules as do exist are generally developed by some sort of faculty or advisory committee and the director is charged with enforcement.

Some student scholarships were available at most stations with funding generally coming from gift or grant funds.

Data management was another issue with a broad range of responses. It appears the more established stations have had more time and opportunity to develop information systems. Also, research collaborations can also foster development of data management protocols.

IV. EDUCATIONAL WORKSHOP

A. Overview

A workshop to explore educational issues at the Bath and Woodlake field stations was held on Saturday and Sunday, December 11 and 12, 1999. At the Saturday session, we recorded 47 attendees (see Appendix E for listing) representing a broad cross-section of educational interests, including university and college educators, K-12 teachers, managers of other field stations in the region, and education specialists from regional environmental education centers, museums, and local, regional, and national parks. Also in attendance were several recognized experts on educational uses of field stations who were invited expressly to share their special expertise and advice at the workshop, and to provide critical assessment of the needs and potential for educational programming at the Woodlake and Bath stations. They included:

- *Dr. Bruce Grant*, Widener University, who was invited to provide insight into ecological education initiatives of the Ecological Society of America, and to provide advice for instituting inquiry-based ecological education at the stations;
- *Ms. Sedra Shapiro*, San Diego State University, who joined us to describe her experiences in the development of educational programming within the field station system of San Diego State University, and to present information on innovative educational programs emerging from the National Science Foundation's efforts to improve ecological education at field stations, the FIRST Project ([Faculty Institutes for Reforming Science Teaching](#));

- *Ms. Kathleen Gibson*, who joined us to describe the organization and administration of educational programming at the University of Pittsburgh's Pymatuning Laboratory of Ecology;
- *Ms. Janice Matteucci*, who discussed innovative programming and educational outreach through the Cuyahoga Valley Environmental Education Center (CVEEC), and the potential for partnership of the CVEEC with the Bath and Woodlake stations.

The objectives of the Saturday session were four-fold:

1. To introduce the Bath and Woodlake facilities and current courses to the regional community of university, college, community college, and K-12 educators;
2. To encourage collaborative program development and partnerships within the regional education community;
3. To solicit advice concerning program development, facilities and equipment needs from an audience that represented many of the likely station users in the region; and
4. Through presentations by invited experts, gain information on effective delivery of education at field stations and innovative, national initiatives in environmental and ecological education.

The Saturday session was held at the Boston Store conference facility in the Cuyahoga Valley National Recreation Area (CVNRA, now the Cuyahoga Valley National Park). The session began with welcoming remarks from Tom Bradley, Assistant Superintendent of the CVNRA, and Dr. Mark Tumeo, Director of Cleveland State University's Center for Environmental Science, Technology, and Policy. Two of the workshop organizers (Dr. Michael Walton, CSU, and Dr. Randy Mitchell, University of Akron) then described the format and goals of the workshop and the current visions and programming at the Bath and Woodlake stations. The remainder of the day was devoted to presentations by invited expert speakers (see synopses in section to follow), presentation of the results of a mail survey to assess the likely use of the stations and the sorts of facilities and programming desired, tours of the field stations, and open discussions.

B. Education Workshop Presentations

1. Opening Remarks by Workshop Organizers

Workshop organizers Drs. Michael Walton and Randy Mitchell began formal presentations by briefly describing the history of the Bath and Woodlake stations, their current status with regard to facilities, equipment, and programming, visions for future development of the stations, and the strategic planning process of which the education workshop was a part.

During their presentations, Drs. Walton and Mitchell emphasized that the two stations differ in a number of important respects, which include different arrays of habitats, differences in protection status, potential for field manipulation, current availability of facilities, proximity to home institutions, and different administrative structures. Thus, some of the day's discussion would be pertinent to one station or the other, but perhaps not always both. However, they also stressed

that both stations occur within the same watershed, represent important points along an rural-urban gradient, and share a common goal of becoming centers of research and education regarding the ecological dynamics of urban and urbanizing habitats, especially habitats at the fringes of urban encroachment. Indeed, they view the differences between the two sites as complementary to future program development and collaboration, rather than impediments. Hence, they viewed discussions of the potential for common, collaborative, and complementary development to be highly valued. Further, both speakers expressed the hope that the two stations could serve as central nodes in a larger network of field stations and other institutions that would join together for research and environmental monitoring for the region of northeast Ohio and, perhaps, the Lake Erie basin.

Finally, the organizers charged the attendees with the task of considering and commenting on eleven issues/questions that would serve as starting points for the day's discussions, as follows:

1. What physical facilities are required for effective educational programs? How might facility requirements vary with levels of potential involvement? (e.g., university-only, university + high school, university + K-12)
 2. How can we coordinate courses among participating universities?
 3. What types of personnel are required for effective educational programming? What assets do these people bring to the program? How do we convince the administration of the need for these personnel?
 4. How do we integrate the National Park Service resource management personnel into educational programs?
 5. How do we coordinate and communicate with other field stations and the Organization of Biological Field Stations?
 6. How are user fees implemented, and what rates are reasonable?
 7. Discussions of funding for specific educational projects and the facilities required for supporting such efforts, e.g., REU programs, and teacher professional development.
 8. How do we advertise and market the educational resources of the two stations?
 9. How do we involve high school and K-12 students? How do we coordinate with existing environmental education programs in the region, in particular the Cuyahoga Valley Environmental Education Center?
 10. How do we involve programs and departments other than biology at the field stations? Which programs are commonly interested?
 11. What other questions should we be asking?
2. Presentations by Invited Experts (listed in order of presentation)
- Dr. Bruce Grant* of Widener University talked on national efforts to reform university science curricula, especially ecology education. In particular, Dr. Grant spoke on instituting inquiry-based curricula in ecology courses and various resources available in support of inquiry-based science learning. Among the resources mentioned were the Experiments to Teach Ecology available through the Ecological Society of America website.

Ms. Sedra Shapiro (San Diego State University) continued the theme of instituting inquiry-based learning in ecology education with a presentation emphasizing the educational programming developed for the San Diego State University field station systems. In particular, Ms. Shapiro outlined NSF's effort to reform ecological science education at field stations (i.e., the FIRST Project) and presented specific examples of activities and scoring rubrics. Finally, Ms. Shapiro described the planning process at SDSU and made some suggestions for techniques that could prove useful for soliciting ideas and setting priorities during the current workshop. Indeed, Ms. Shapiro modeled one of the techniques, carousel brainstorming, following the lunch break (see below).

Ms. Janice Matteucci joined us as a representative of the Cuyahoga Valley Environmental Education Center (CVEEC), which is a nearby facility that runs environmental education programming focused at K-12 students. Ms. Matteucci described the cornerstone of CVEEC programming, a residential program (4 days, 3 nights) that involves approximately 3500 children annually from the Cleveland-Akron region. The program provides a combination of experiences and hands-on activities that cover environmental science, citizenship, history, culture, and art. Currently, interns from the University of Akron serve as field teachers in exchange for a stipend, housing, professional development, and 10 graduate credits. Ms. Matteucci emphasized significant opportunities for collaboration and cooperation with the field stations in several areas: 1) researchers serving as consultants to CVEEC programs; 2) integration of CVEEC projects with on-going research at the stations; 3) field trips to the stations to see researchers at work; and 4) contacts to link station activities with regional school districts and K-12 teachers.

Ms. Kathleen Gibson from the University of Pittsburgh's Pymatuning Laboratory of Ecology joined us to speak on the facilities, personnel, planning, and administration required to run a successful education program at a field station. The educational program at Pymatuning is 50 years old and has evolved into a collaborative effort involving 3 other institutions in addition to Pittsburgh. Her presentation touched on the practical details of programs involving the participation of several universities, as well as issues such as scheduling, marketing, course/station fees, and staffing.

Dr. Jeffrey Johansen spoke as a representative from John Carroll University, one of the institutional partners in the Woodlake Environmental Field Station. Dr. Johansen outlined the John Carroll courses planned for Woodlake in spring/summer 2000, which included a course in diatom taxonomy and ecology. Dr. Walton also spoke briefly on courses planned for Woodlake from Cleveland State University, which were Natural History of the Cuyahoga Valley, a course designed for K-12 science teachers, and Field Experience in Ecology and Conservation Biology, a course for advanced undergraduates and graduate students in which students receive training in field methods and then apply those methods to a research project.

C. Carousel Brainstorming Session

Ms. Shapiro ran a "carousel brainstorming" session after the lunch break. In consultation with workshop organizers, Ms. Shapiro selected five questions/issues from the eleven listed above that served as headings for five presentation tablets distributed around the meeting room. She

then asked the attendees to organize themselves into groups of four or five individuals. These teams then went to each chart for 2 minutes and wrote down thoughts/suggestions/ideas relevant to the issue heading. These idea lists are presented in Appendix F.

D. Field Station Tours

The following section is a summary of ideas and suggestions compiled by Bruce Grant in response to the tours of the Woodlake and Bath sites and discussions with other workshop participants on the tours.

1. Woodlake Tour

a. Suggestions for Student Lab/Field Activities

- Gypsy moth invasion has been a recent and important environmental change at the Woodlake site. Develop a teaching unit on gypsy moths, including a spatially explicit simulation model that allows for “virtual management.”
- The National Park Service has established over 80 long-term monitoring sites within the Park. Sample plant species composition near these sites and assess slope effects and other variables as explanations for diversity, presence/absence, etc.
- Develop a teaching unit on what happened to native fisheries of the Cuyahoga River; include simulation model and field aquatic sampling components.

b. Suggestions for Site/Program Administration

- Place procedures for permitting projects and courses on a website along with rules for site use and a “close-out plan” that would specify deposition of final reports, samples, and data to a central location.
- Locate local experts in regional natural history. Devise some way of engaging, drawing upon, and recording their expertise.

2. Bath Tour

a. Suggestions for Student Lab/Field Activities

- The fields at the Bath site are characterized by tree/shrub “islands” that differ in size and separation distance. Develop a curriculum module on island biogeography in which students investigate invertebrate or understory plant diversity as a function of island size and distance from forest or other large islands. Evaluate dispersal abilities of invertebrates.
- There are several oil drilling stations within the Bath site (a common occurrence in the Cuyahoga Valley and a central feature of the region’s economic history). What are the environmental effects of these sites? Develop a teaching unit assessing diversity and toxic gradients.
- The Bath site is part of a private reserve once owned by the Firestone family, and the caretaker of the site is still living. Have students interview the caretaker to learn about the natural and management history of the site.

E. Education

Participants in the educational workshop expressed general support for the following principles:

- Educational program goals should be tied to and complement research at the stations.
- The educational program should emphasize basic knowledge and application of ecological concepts, and the understanding and management of ecological systems at the urban fringe.
- Because ecological changes in suburban-urban areas require an appreciation of the role of humans and their institutions in the environment, interdisciplinary curricula should be developed to integrate such fields as sociology, economics, politics, urban planning, engineering, geology, history, law, ethics, and resource management with ecology.
- Education at the field stations should emphasize inquiry-based learning experiences, and these facilities should serve as models for innovative teaching methods for their respective institutions.
- The partnership of the Bath and Woodlake facilities should provide opportunities for students to compare ecological differences among areas differing in current and past land use, degree of urbanization, and methods of resource management.
- The current participants in the Bath-Woodlake collaboration should build upon current partnerships to develop a broader regional consortium of institutions and faculty to participate jointly in research and innovative environmental education in northeastern Ohio.
- Opportunities should be provided for the general public to learn about research at the stations, and the benefits that accrue from that research.
- The stations should provide information, mentoring, and facilities in support of the excellent K-12 environmental education programs provided by the Cuyahoga Valley Environmental Education Center.
- The stations should seek to develop innovative programs for the training of in-service teachers.

The workshop participants were in strong agreement that early emphasis should be placed on at least three foci, which are:

- Formal development and strategic expansion of the consortium of participating faculty and institutions;
- Inventory of resources (including natural resources, information, regional expertise, equipment, and facilities) found at or available to the stations, and a needs assessment based upon that inventory;

- Planning of the educational program that (1) is strongly tied to research goals, (2) articulates clear goals and objectives, (3) emphasizes inquiry-based learning experiences, and (4) incorporates the strengths of the consortium partners.

F. Consortium Development

The workshop participants, and reviewers of the NSF planning proposal, considered the partnerships represented by the Bath and Woodlake stations to be a strength, which will increase the potential for success and the importance of the stations.

G. Resource Inventory

Workshop participants, especially the field station "experts" from other institutions, were enthusiastic about the available and potential facilities at and around the two sites. In particular, participants were impressed by the following resources:

- an attractive mix of habitat types and the extent of possible sites for research and education at the two field stations, especially in combination with the surrounding National Park lands;
- numerous well-equipped classrooms, conference spaces, and living quarters available either through the Woodlake site or at nearby facilities associated with the NPS or the Cuyahoga Valley Environmental Education Center;
- a broad array of expertise present in the faculties of the collaborating institutions, and among resource management personnel of the NPS;
- an apparent wealth of data from previous and on-going research; and
- availability of these areas within a short drive of home institutions.

However, workshop participants expressed a strong desire for a single (i.e., web-accessible), location to gain access to inventories of facilities, equipment, data, site descriptions, faculty expertise, etc.

V. RESEARCH WORKSHOP

A. Introduction

In the Spring of 2000 (April 14 – 16), we held the Research Planning Workshop. We intended this workshop to be an opportunity for local scientists to interact with current leaders in the field of urban ecology, and to introduce our facilities to the larger national community of ecological scientists. Specifically, the objectives of this workshop were the following:

- Provide potential users of the stations with information concerning available facilities, data, and natural resources;
- Establish coherent research priorities for the stations, focused on the general theme of ecological change at the urban fringe;

- Assess equipment, facilities, and infrastructure needs to support those research priorities; and
- Promote collegial interaction and collaborative relationships between our group and other researchers with similar research programs.

B. Day 1 (April 14, 2000)

The first day of the workshop consisted of a research symposium highlighting local “Ecological Research at the Urban Fringe,” as part of the 2nd annual Woodlake Environmental Field Station research conference. Abstracts of the presentations are attached (Appendix G). The afternoon consisted of tours of both the Woodlake and Bath field stations, and open discussion. The discussion ranged widely, touching on water quality and monitoring, how managers could utilize the sorts of data our researchers generate, the importance of listing the many long-term monitoring projects in the area in a “one-stop shopping” format (with the consortium as the clearing house), and the importance of communication among researchers (a newsletter? annual meeting or report? website and listserv?). There was a strong emphasis on monitoring and observation rather than experiments and hypothesis testing in the discussion.

C. Day 2 (April 15, 2000)

At the second day of the workshop, 35 participants (see Appendix H for listing) heard presentations from the four keynote speakers (Dr. William Burch, Yale University School of Forestry and Environmental Studies; Dr. Morgan Grove, USDA Forest Service; Dr. Charles Nilon, Fisheries and Wildlife, University of Missouri-Columbia; and Dr. Lisa Petit, Smithsonian Migratory Bird Center). All speakers had experience working on sociological/biological questions in urban settings.

1. Presentations by Invited Experts (listed in order of presentation)

Dr. William Burch gave an overview of the Baltimore LTER project's approach to Urban Ecology. The major focus there is on using multiple approaches (sociological, biological, biophysical), and "patch dynamics" (rates of colonization and extinction in a patchy environment) to understand an urban ecosystem. GIS is used as a common language to foster communication across disciplines. As an example, he described their approach to the question of "what role does a park play?" in the Gwynn's Falls Watershed. Such projects allow meaningful discussions across disciplines and between scientists and residents. Among their discoveries is that scientists and residents may have very different perceptions of the value of different aspects of parks. For example, residents considered secluded spots to be of little value because of the danger of crime, while biologists felt that the lack of disturbance made such areas especially valuable. The Baltimore LTER is exploring ways to maximize benefits to all concerned, and to educate all parties about such contrasting value systems. Furthermore, scientists studying the area appeared to become catalysts for positive change. The Baltimore LTER has consciously decided that they cannot and should not act as dispassionate observers, but should actively participate in community dialogs. Additionally, they have decided to use their expertise and results to help ensure that community changes are mutually beneficial and well planned.

Dr. Morgan Grove spoke of his work, centered at Baltimore's LTER site, attempting not only to study human interactions in low-income neighborhoods, but also to actively involve the residents

in the process, possibly influencing their community and individual decisions. He spoke of the challenges of working in an urban setting, especially when being immersed in neighborhoods with high levels of crime (e.g., drug-dealing). He outlined the importance of involving the community both for the research questions being addressed as well as for maximizing the likelihood that the proposed changes in the community actually come to fruition. He stressed that a deeper involvement with communities allows scientists to change the community's perception of scientists and the work they are attempting to conduct. Such community interaction has also led to important insights into the dynamics of the urban ecosystem, which changed the direction of research to a more realistic model.

A lively discussion session followed where Dr. Grove fielded questions from several of the participants. Dr. Grove closed by suggesting that a well-thought out planning and collaborative development stage of any new field stations is crucial to the success of a station, and that this stage should not be rushed.

Dr. Charles Nilon described his research projects in Baltimore: how does a patchy, urban environment affect the population dynamics of birds? Dr. Nilon reemphasized the need to consider the communities in which one works, and the importance of involving the community in one's research. He has attempted to study a question that is relevant to the residents of the Baltimore community in which he works: "If you create a park, and if we leave it alone, what animals will come in?" Dr. Nilon's work therefore considers both basic ecology theory (patch dynamics) and social ecology approaches (consideration of the effects of the changes in neighborhood structure on the patch dynamics). This type of study is imperative in an urban setting (such as the Baltimore and Akron/Cleveland areas) because it specifically addresses the dynamics of natural communities (birds) in the ever-increasingly human-modified habitats that are spreading throughout the globe.

When attempting to use the information gathered from this study, Dr. Nilon emphasized the importance of identifying the influential decision makers (e.g., real-estate developers, homeowners, etc.), and the importance of developing a good relationship with these people so that scientists can help modify the directions that development takes.

Dr. Lisa Petit of the Smithsonian Migratory Bird Center discussed her work on how the nesting birds in the Cuyahoga Valley are affected by forest fragmentation. She used 12 sites that differed in terms of fragment size (patch size) and the type of fragmentation (urban vs. agricultural). Each of her three species (Acadian Flycatcher, Woodthrush, and Hooded warbler) showed different trends, which serves to emphasize the complexity of the issue. Nest parasitism by Brown-headed cowbirds was an important factor for two of the species, and parasitism tended to vary with patch size. Deer overpopulation is also a problem for these birds, since browsing destroys the understory cover in which they nest. She emphasized that a multidisciplinary approach with attention to individual species as well as to human behavior is necessary to work on these issues. Furthermore, her presence and research in a park in Medina resulted in the park district asking her to help design the trail system to maximize bird-nesting habitat.

D. Day 3 (April 16, 2000)

The third and final day of the workshop was the “brainstorming day,” in which the workshop organizers asked an array of questions of the invited experts. By this last day, the experts had seen both field stations, interacted with many of the assumed “end-users” of these facilities, and been introduced to many of the questions being posed by the Bath/Woodlake organizers.

On this last day, we posed several questions to the experts, centered on research at urban field stations. A summary of the suggestions forwarded by the invited experts follows:

- 1) There was general consensus that the primary focus of these field stations is to facilitate research on the Cuyahoga River Watershed.
- 2) Organize a summary of available data and on-going projects for the Cuyahoga River Watershed.
 - a) Map current and past projects (GIS?)
 - b) Consider constructing a standardized sampling grid
- 3) Hire a data manager to pull it all together (graduate student stipend?)
 - a) Data
 - b) Education
 - c) Research
 - d) Community interaction
- 4) Consider using the Ohio/Erie canal as an example of how technology affects the sociology and biology of the region over the last 150 years. *“I’m looking through this geography map, and you are sitting on the first Internet. This canal used to connect everything. You’ve got the glacial boundary. You’ve got incredible stuff here.”* Burch
- 5) The stations should make a concerted effort to contact and collaborate with the many stakeholders in the region.
- 6) Write up a 1-page description of activities and goals that anyone can understand.
- 7) Send out a map to potential users and have them put their points on for their data sets.
- 8) Get people who regulate land use to cooperate.
- 9) Identify important land controllers because they will have a major influence on the watersheds.
- 10) Explore joint research projects to begin collaboration and solidify ties between the field stations.
- 11) Consider writing a paper on the response to land-use changes of all your organisms.
- 12) Have a Fall reception for field station for getting grad students interested in working at either station.
- 13) Grove suggested that the kinds of large-scale collaborative research discussed involve the following two dimensions: the type of collaboration and the process used to implement the collaboration. A partially filled-in table is below:

	Scoping	Prototype	Implement
Research	Patch definition Key data Mock up survey sheet	Student test	Do it
Data	Outline of web site	Mock up and test	Put it up
Education	...		
Community			
Information management			
Facilities			

where, *scoping* means to figure out what to do, *prototype* is beginning trial projects, and *implement* means develop full-blown projects that worked well as prototypes.

- 14) In the long run, user fees in the form of overhead (e.g., 2%) on funded grants should be sought.
- 15) Facilities needs:
 - a) Identify user (faculty & students) needs
 - b) Classrooms and research labs
 - c) Computer and Internet access
 - d) Our location is an advantage
 - e) Storage space & on site equipment
 - f) Web site that outlines facilities, locations, database
 - g) Overnight facilities are important to attract researchers
 - i) Kitchen with refrigerator, etc. to keep costs down
 - ii) Comfortable areas for informal discussions
- 16) Potential sources of collaboration
 - a) Collaborative course among urban field stations (e.g., Baltimore & Bath/Woodlake)
 - b) Ohio EPA 1-week course
 - c) Train future researchers/users for sites
- 17) Get legislators involved (school kids presentations)
- 18) Cuyahoga River Valley Science Day with awards
- 19) Integrated research among disciplines
- 20) Our expertise covers a different scale than existing urban LTER's
- 21) Support Personnel
 - a) Site manager (forest service) (Assistant Site Manager?)
 - i) Safety manual
 - ii) Team needs
 - iii) Who's using vehicles?
 - iv) Interact with education
 - v) Interact with community outreach
 - vi) Keeps equipment running
 - b) Research assistants (students)
 - c) High school assistants for data collection
 - d) Data Manager (Not a P.I.)
 - e) No secretarial staff needed
 - f) A joint steering committee
- 22) Education Funding Sources

- a) Graduate level internships for summers
 - i) Gund or Huntington
 - ii) IGERT
 - iii) USDA
 - b) Education
 - i) Biodiversity (forest component)
- 23) Research Funding Sources
- a) US Fish and Wildlife
 - b) EPA STAR grant
 - c) Parks Service (up to \$50K/yr)
 - d) Collaborative grants meetings
 - i) Come up with a list of major areas of research
 - ii) Each piece is headed up by one or more PI's and grants are developed
 - e) Individual grants should include \$ for overhead for field stations
 - i) 2% for data management
 - ii) 2% for site management
 - iii) Provide section for budget justification
 - f) Create a consortium endowment with 2% \$ (or some \$)
 - i) Put into interest bearing accounts
 - ii) Draw on interest

VI. PLANNING WORKSHOP

A. Introduction

In Fall 2000, a three-day Planning Workshop was held. This workshop was the third and last in a series of workshops held to assist in field station planning efforts. For this workshop, six participants with expertise in field station administration and development were brought in from across the country. All six experts were sent the synopses of the user survey, field station visits, and Education and Research Workshops. The specific objective of this Workshop was to integrate the information gained through the user survey, field station visits, and previous workshops into actual planning documents for both field stations. The number of participants was purposely kept low to facilitate frank, specific discussions. The envisioned documents were an administrative management plan and 5-year and longer plans for Woodlake. The Bath documents included 2, 5, and 20-year plans in addition to plans for administrative management, facilities development and land use.

B. Overview of Workshop Format

The Workshop began on Friday, September 29th with morning and afternoon sessions held at the Woodlake Environmental Field Station. The day began with a brief introduction to the overall plan for the two stations, including the core idea that together these stations can provide an ideal platform from which to study urban ecology and urbanization across the Cuyahoga River watershed. There was a brief introduction to the history and geography of the region and the collaboration. Discussion touched on many issues, including the opportunities for partnering with universities and institutions in the upper reaches of the watershed. Tours of the Bath and Woodlake sites occurred before and after lunch. The remainder of the afternoon involved a group

discussion of research and collaboration opportunities. Fifteen participants (see Appendix I for listing) attended the workshop.

The location of the Workshop moved to Boston Store on Saturday, September 30th. There were breakout sessions addressing specific issues in both the morning and afternoon. Breakout sessions were followed by each group presenting summaries of their deliberations, which was followed by a discussion by all.

The Workshop returned to Woodlake on Sunday, October 1st for the final session. The objective of this session was to pull together specific recommendations for each field station that surfaced during the preceding two days.

C. Discussion Summaries

1. Friday Afternoon Session

The group discussed the importance of having a mission statement or theme for each field station. The concept of developing a mission statement was thought to constrain the types of activities that could be conducted. Therefore, a field station theme, such as urban ecology, would be broad enough to include a wide range of research.

The National Park Service (NPS) relationship at Woodlake was discussed at length. The NPS continues to be supportive, but their priority is resource management, not basic research. The relationship would strengthen with more applied research on NPS topics. Also discussed was the importance of increasing research activities and field station usage and how to attract researchers from inside and outside of our departments and schools. The group explored a variety of legal, financial, and administrative issues that could affect collaboration between the two field stations. The need for a third coordinating body was explored.

The necessity of hiring a station manager for each station was another major topic of discussion. Hiring someone, even on a part-time basis, surfaced as a priority for both stations to move forward with their program development.

2. Saturday Morning Breakout Sessions

The breakout sessions were designed to digest the recommendations forwarded during the first two workshops (Education and Research) and to pull out the most important of these recommendations for use in the final planning documents for both stations. There were six breakout sessions, which are individually described below.

a. Field Station Administration

Participants: Klug, Pickett, Johansen, Walton, and Mitchell

After an open discussion of general issues related to individual field station management, the group focused on recommendations for an organizational structure for the collaboration (and secondarily, for the individual stations). This was summarized in a chart reproduced in Figure 1 (see page 23). The basic idea is that an external advisory board consisting of scientists, community members, interested parties, and local “friends” groups would provide input on

important issues. The collaboration would form a consortium that would be guided by a steering committee consisting of representatives from each of the participating institutions (CSU, JCU, UA, NPS, and Bath Township). Each field station would have its own governing body (a board of directors for Woodlake, and an as yet undetermined structure for Bath), which would make plans and control expenditures. The original suggestion from the committee was that the consortium should also have a joint board of directors. During the discussion, there was general agreement that strong channels of communication are important to keep the collaboration working. Also discussed was the possibility of sharing personnel among stations (e.g., shared manager as a first step). Several potential improvements on the basic structure were also proposed, including the idea of changing the external advisory board from a “membership” group to more of a rotating board of experts and/or stakeholders that are relevant to particular issues under discussion. Something of a visiting committee structure was envisioned.

b. Educational Programs at Field Stations

Participants: Fraser, Weeks, Cohen, Tonsor, and Gibson

The initial focus of discussion was how to best use a field station in education and the associated logistical issues. Field stations not only provide opportunities for science education and research but can also provide venues for other disciplines such as law, history, literature, and the fine arts. Expanding the number of field station users is an important issue. Proactive recruitment efforts should be one responsibility of the field station manager along with coordinating educational uses of the facilities. Cohen and Tonsor suggested that each institution develop a core field-based class for first-year biology majors. Their idea is that the sooner you get students out into nature, the more likely they will "get hooked." This class could be part of the lab component of Principles of Biology. Small groups of students (20-30) would be taken out for intensive fieldwork for a week or taken out once a week for four weeks.

The place of field stations in distance learning programs was also discussed. The consensus was that field stations provide hands-on activities and that distance-learning technologies only be used as a tool to draw students to the field station.

Field stations can also provide an example of sustainable living with “green” buildings and other sustainability programming. The National Science Foundation's Education Directorate has funding to support sustainability programs. Partnering with science education faculty will facilitate access to this support.

Also considered was how to integrate field station research into educational programs. Researchers could conduct tours of their research sites for classes visiting the field station. Also, data collection activities associated with research underway at the station could be integrated into class field trips. Both approaches have value in increasing involvement of students in field-based research.

Field station staffing was discussed. The importance of a field station manager was underscored many times. In addition, the role of science and education program coordinators was discussed. The difficulties of coordinating class usage by more than one university were considered. Pymatuning has offered classes by different institutions and requires the institution to provide an instructor and teaching assistant for each 12 students.

c. *Data & Information Management*

Participants: Holland, Porter, Cline, and Niewiarowski

This breakout session focused on identifying the appropriate methods to manage field station data and information as well as how to structure and control collaborative databases. The group considered identifying potential users as a first step in developing an information management model. Since there are many models for how information can be managed with each having different hardware, software and staffing requirements, the model adopted by each field station will be shaped by its administrative structure. In any case, it is important to develop data and information policies early, paying particular attention to who has access.

3. Saturday Afternoon Breakout Sessions

a. *Field Station Funding*

Participants: Fraser, Cline, Cohen, and Pickett

This breakout session focused on the level of funding each university should commit to support each field station and the collaborative activities between them. Currently at Woodlake, CSU and JCU share the cost of operation and interior maintenance. The NPS provides upkeep of the grounds and exterior maintenance. At Bath, the University of Akron pays Bath Township \$1,500 per month for upkeep of the property (mowing, etc.).

Possible sources of support were considered in addition to university support. Foundations and individual benefactors could be tapped for start-up funding or establishing an operating endowment. The need for ongoing donor cultivation underscored again the need for a field station manager. Foundation funding could help support this position. Foundation funding could also support summer internships for graduate students. The specific foundations mentioned were The George Gund Foundation, Huntington National Bank, The Kresge Foundation and the William & Flora Hewlett Foundation.

Federal funds could be used to support research and educational activities. In addition to NSF programs, USDA, US Fish and Wildlife Service, EPA and NPS were mentioned as possible sources of support. Collaborative research could be supported in this way and developing and sharing a list of major research interests could stimulate future grant activity.

User fees and grant overhead were also considered as potential funding sources. Small proportional user fee structure was discussed, vis-à-vis 2-4 % of grant overhead to cover data and site management costs. Considering the stage of development at both stations, collecting user fees may create more hassle than revenue.

b. *Facilities and Equipment Needs*

Participants: Holland, Tonsor, Walton, and Weeks

This breakout session focused on identifying equipment and permanent facilities needed to carry out both research and teaching. The importance of designing facilities to be flexible, functional, and practical was underscored as well as the need for adequate storage facilities particularly at the end of the season. All equipment and facilities should be “owned” by the field station even though individual investigators may be assigned seasonal use.

The mission and objectives of each station will dictate the need for additional buildings. A building plan for the next 5 years should be developed. However, planning to a 10-year horizon seems too long term. The specific needs of both field stations were discussed.

The Bath Field Station currently lacks any facilities and the following facilities were considered essential: one to three classroom/teaching labs, an outdoor lecture facility for at least 75 people, a large, flexible research space that can be subdivided into at least 3 areas in order to segment incompatible activities, computers and Internet access, and adequate secure storage space for computers and field equipment. Access to overnight accommodations including kitchen and dining facilities would facilitate research requiring repeated night sampling. If construction of these facilities is deferred, a shower facility is still essential.

The Woodlake Field Station already houses a small research/teaching lab, classroom area, library, kitchen, and overnight facilities. However, facilities need to be expanded to those outlined for the Bath Field Station. Additional housing at WEFS is a higher priority since it is located further away from the main campus. Nearby NPS properties should be explored to identify expansion space. Any facility renovations should include a sustainable living component.

Since Woodlake is an established facility, the importance of developing and funding a maintenance plan was emphasized. In addition, safety issues were discussed including the need for chemical and waste storage, fire emergency and evacuation plans.

c. Land Management

Participants: Klug, Porter, Mitchell, and Rorar

This breakout session focused on how to manage land to preserve biodiversity while maintaining access to non-station personnel. Mike Klug began the discussion with a quick run through of how land management issues are addressed at the Kellogg Field Station. Kellogg has a three-tiered system of land-use classification that vary in the ease of use (permitting requirements) and the scope of use (manipulation and destructive sampling). Different parts of the Kellogg preserve are managed for different goals — different successional states, land use types, etc. — across their 4000 acres. Garree Williamson and Mike Rorar then briefly outlined management patterns and issues for the CVNRA and Bath, respectively.

It was suggested that to manage land you must first identify what you have, what your long term goals are, and then decide how to manage to meet those goals, recognizing that those priorities may change over time. Communication between landowners, managers, and users is critical to the success of these collaborations.

Deer, dogs, horses, and invasive species management came up as common problems in management, and the group discussed various ways to deal with them. More important than those specific issues was the general theme that communication with the public about what “those scientists over there” are doing is crucial. In the absence of information, myths are created (e.g., that NPS is stocking coyotes in the CVNRA), and those myths can hamper all facets of field station operations.

The group discussed the importance of minimizing the impact of many large classes on the habitats they study. One example of how to deal with this was discussed. It was proposed that a series of 5 or so successional study plots be established at the old Coliseum site, following the example Porter mentioned in Virginia. A different plot could be mowed each year, and classes (K-graduate) and researchers would be encouraged to sample them all in an ongoing study of how this reclamation site works and how succession proceeds in our area. The idea of teaching teachers (e.g., with regard to the CVEEC) sampling techniques that they could use with their classes back in their own schoolyards, rather than on site, to minimize overuse was put forward. There was a reminder that it is important to ensure that researchers and classes clean up after themselves (flags, tags, etc.).

Security and signage (rather than fences) were discussed briefly. It is important to control public use of research areas (how to have informative and attractive signs, how many, how to encourage responsible trail and land use, and the special concerns about equestrians, and so forth), and of how to nicely say “no” to the public when they own the land.

D. Sunday Morning Summations

1. For the Bath Field Station

Because Bath is in the early stages of its development, there was a lot of discussion about how to move its development along. Hiring a manager was considered key, however without programming in place, University support will be hard to come by. Also considered was the idea of utilizing one of the existing structures on the site as a temporary field station. The upside was that having access to a building could accelerate program development. The downside was that using one of the existing structures could stall efforts to build a new field station structure.

In the end, developing a vision statement and “marketing” strategy to university and community officials were considered essential tools to move Bath’s development along. Grant funding could help develop research and teaching programs as well as a station manager. After activities at the station are underway, it is important to show-case the station to university officials and community members. Efforts directed at developing stakeholders beyond the department and university can pay big dividends.

2. For the Woodlake Environmental Field Station

Woodlake is further along in its development but the complexities of the relationship among the partners (JCU, CSU, NPS) create a tangled web of different ways to step on each other’s toes. Because of the complexities of the partnership, continuing communication among partners is very important. Interestingly, the same key priorities surfaced for Woodlake as for Bath, namely hiring a station manager and stimulating program development. Increasing research activities will require success in writing grant proposals for field-based research. Integrating NPS study sites into Woodlake research and Master’s projects focusing on NPS issues will strengthen partnership. Increasing educational activities could result from greater integration of CSU/JCU curriculum and “marketing” the station as a site for teacher workshops, K-12 visits, and non-science classes, such as photography and drawing. Engaging NPS in educational programming can foster their appreciation of this component.

Development of a mission statement surfaced as a first step in developing planning documents. Involving many stakeholders in the mission statement development process will strengthen relationships. The mission statement can also serve as a tool to garner more resources from University, foundations, etc.

3. For Collaborations

The discussion turned to how to build a consortium. The key here is for both universities to focus on cultivating their own field station programs and facilities at this time. Development of common research protocols could pave the way for future collaborations. Work on developing programmatic links among collaborators, such as joint graduate programs, to strengthen relationships.

4. For the Field Station Manager

The need for a field station manager at both locations surfaced as a major need several times over the preceding two days. This position, even if only part-time at first, would serve to focus the energy necessary to take the stations to the next level. The individual would provide the essential liaison between partners and build relationships with other stakeholders. These development activities are essential to increase field station resources. Moreover, a manager would do the “marketing” to increase the levels of use and then be available to coordinate these activities. A manager would develop use policies as needed and provide the needed administrative functions that come with any university activity, vis-à-vis, budgeting, monitoring expenses, annual reports, etc.

VII. RESULTS FROM PLANNING ACTIVITIES

Based on an analysis of the planning activities described above, the Field Station Planning Committee performed a strategic assessment of both stations’ assets, challenges and opportunities. The input from our invited participants was especially useful in seeing the assets and opportunities available to both stations, as well as recognizing the enormous opportunities available for future collaboration. Equally important, the Committee came away with a number of “Take-Home” points that could be used in developing their individual station planning documents.

A. Strategic Assessment

1. Assets:

- The involvement of faculties from The University of Akron, John Carroll University, and Cleveland State University in the planning activities supported by this NSF grant.
- The lines of communication that this involvement has created.
- Some institutional financial support has been provided to develop and maintain these field stations.

- An attractive mix of habitat types and the number of possible sites for research and education at the two field stations, in conjunction with the surrounding Cuyahoga Valley National Park (CVNP) and the Cuyahoga River watershed.
- Numerous well-equipped classroom and conference spaces, and living quarters available either through the Woodlake site or at nearby CVNP and Cuyahoga Valley Environmental Education Center facilities.
- A broad array of expertise present in the faculties of the collaborating institutions, and among National Park Service resource management personnel at CVNP.
- A wealth of data from previous and on-going research.
- The proximity of the field stations to their home institutions — twenty minutes to Bath and forty-five minutes to Woodlake.
- The University of Akron has access to vans as a means for transporting students to the Bath field station .
- National Park Service support, interest and enthusiasm.

2. Challenges

- Few faculty have utilized the Woodlake station for educational and research activities.
- Development of Bath's physical facilities has been delayed until the lease agreement between Bath Township and The University of Akron is finalized.
- Changing leadership at Cleveland State University may impact Woodlake development.
- Although both institutions provide some financial support, neither provides sufficient funding for dedicated field station personnel.
- Lack of staffing inhibits developing educational programming and increasing research activities.
- Integrating educational and research activities with NPS interest in resource management issues sometimes creates tensions.
- NPS administrative procedures for collecting permits sometimes inhibits educational and research activities.
- Woodlake does not have easy access to bus or van transportation.
- Extant data have not been inventoried and organized into readily accessible databases.
- Since both field stations are early in their development, little time is available to cultivate collaborative projects.

3. Opportunities

- Faculty at The University of Akron have successfully secured \$1.2 million in grant funds to use the Bath property as a resource to teach K-12 teachers how to include field experiences into their biology curriculum.

- The annual Woodlake conference provides a forum to guide research activities at both stations.
- Existing research funding (\$300,000) focusing on ecological health indicators in the Cuyahoga Watershed at CSU, in association with regional government (Northeast Ohio Regional Sewer District).
- The environmental focus on education and research at both field stations positions them well to take advantage of many gift and grant opportunities from individuals, foundations and government agencies.
- Our survey revealed over 60 individuals interested in utilizing facilities at both field stations.
- The desire of faculties from The University of Akron, John Carroll University, and Cleveland State University to collaborate when and where possible on research and educational endeavors.

B. Take-Home Points

1. Organization:

The following organizational structure surfaced as a framework upon which future collaboration can be fostered (Figure 1):

2. Facilities

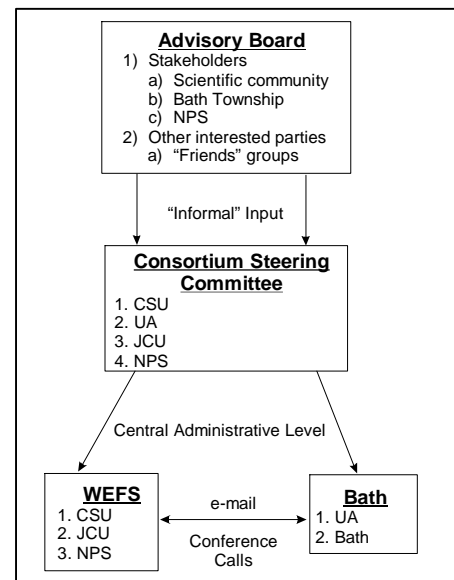
Facilities will follow actual usage. Bath needs basic classroom, lab and storage facilities as soon as possible. Woodlake should focus energy on increasing usage of current facilities before trying to expand. The user survey showed more interest in day use than overnight use.

3. Usage

Concentrate on developing educational usage first. This will expose more people to the field station and research will follow. Transportation for CSU is a major issue to be dealt with. CSU and JCU might register the field station with conference services as a meeting site to increase visibility (a manager would be essential for this). Host events, such as cookouts, cross-country ski outings, or day hikes, targeting faculty and students from area institutions. Use park naturalists to provide programming for these events. Conduct focus groups at the Cleveland State campus to find out why there has been so little activity at the field station. Is it transportation, lack of familiarity with resources, etc.?

4. Rules

Don't waste a lot of time on this now. However, some basic do's and don't should be set forth.



5. Staffing

Need to clarify who are essential personnel, what they will do and how they will relate to the governance structure. Both stations are strongly urged to develop a director-manager model. The director's chief responsibilities should be fund-raising and community-university relations, not developing a research agenda. The director must sell the vision to the university first, then other stakeholders, and then donors. Currently, the educational thrust should be easier to sell. The manager's chief responsibilities are facilities oversight, data organization and management, and field station "hosting." The manager should be able to give tours of the station and the area, something like a park naturalist would do, with a blend of human and natural history. The manager must know what is available in the way of equipment, facilities and sites in order to guide and coordinate field station users. One person can't do both jobs because it takes different skills and credentials, and each person needs to be in a different place at the same time. A two-person team would very effective.

6. Public Outreach

Public outreach is important – both stations should work to make their value visible to their stakeholders.

7. Consortium & Collaborative Activities

The field station consortium will only be as strong as its member institutions. For now, the primary focus should be on getting the two individual stations up and running, but with open lines of communication. Building the collaboration from the ground up will probably be the most effective route. Eventually, a formal collaborative interaction will be modeled on the organizational structure shown in Figure 1.

8. Funding

It is essential to secure ongoing institutional support for basic field station operations. Fund-raising activities for growing field station facilities and student scholarships will more than likely come from appropriations, donations, and foundation support. Some support may come from Federal grants if the director is an aggressive grant writer. Obviously, the director is the key player in this aspect of the station's development.

9. Information and Data Management

The number one priority in information management is to inventory the available existing information resources and databases for the area. Then, starting with research currently underway, start to develop data management protocols that will allow efficient access to data generated at both field stations. Eventually, a data manager should be sought to oversee data archiving and availability, although this position is a lower priority than the field station director or manager.

10. Vision Statements

Bath should work to identify its main vision and goals, and to acquire facilities that will allow them to reach those goals. Woodlake should continue to work to foster collaboration with the NPS, and should codify its main goals in a mission/vision statement.

11. Planning Horizons

A reasonable planning horizon is 5-10 years.

VIII. FUTURE PLANS

Because of the planning activities funded by NSF, both CSU and UA developed formal plans to guide the future development of their field stations. The UA developed a Master Plan, which is included herein as Appendix J and CSU developed a Five-Year Plan included as Appendix K.

The Bath Nature Preserve and Field Station Master Plan is almost finalized, however several issues are not complete. The Lease Agreement between Bath Township and The University of Akron requires that the University develop a Master Plan for their use of the Preserve. The Master Plan outlines the specific aims of the Preserve and Field Station and addresses land usage as well as the plans for education, community outreach, and research usage. A management plan, including permitting requirements, is described.

The Five-Year Plan for the Woodlake Environmental Field Station articulates the vision statement, guiding principles for field station usage, and administrative structure. In addition, the Plan describes the Station's specific goals, objectives and action steps to develop research, education and outreach programs as well as facilities development and finances. A timeline for the action steps is still under development.