

# ANNUAL PROGRESS REPORT

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LONG TERM ECOLOGICAL RESEARCH  
NETWORK OFFICE

## 1998 ANNUAL PROGRESS REPORT

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SUMMARIZING ACCOMPLISHMENTS OF  
THE LTER NETWORK OFFICE DURING  
THE SECOND YEAR  
OF COOPERATIVE AGREEMENT  
DEB-9634135



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## INTRODUCTION

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The second year of the Cooperative Agreement establishing the Long Term Ecological Research (LTER) Network Office (NET) at the University of New Mexico began on March 15, 1998. During this period, the transfer of NET activities from the University of Washington was finalized. The recruitment of NET staff was completed with the addition of a programmer/analyst, a systems administrator, and an accountant to the office. All activities proposed for the second year of the Cooperative Agreement are on schedule. A list of noteworthy accomplishments during the past year is shown below followed by descriptions of progress made in the major areas of responsibility of the Network Office.

- The International LTER program grew rapidly to a total of 15 national networks. The Network Office facilitated the initiation and development of many of these networks.
- The first meeting of the National Advisory Board of the LTER Network, chaired by Dr. Paul Risser, was held in December at the Sevilleta LTER site. Dr. Mary Clutter and Dr. Scott Collins attended this meeting as representatives of NSF.
- The web page describing activities of the LTER Network was re-designed and enhanced.
- Cross-site research activities in socioeconomics and geological weathering were initiated with support from NET. Ongoing activities in biodiversity, regionalization, and climatic variability were continued.
- NET staff organized the updating of data bases describing LTER personnel and publications. Statistics on LTER activities were also updated on the web site.
- The NET publications specialist produced two newsletters, a new network brochure, brochures for four individual sites, and a revision of the book describing ILTER activities.
- The Network Office continued to develop the collaborative relationship with the San Diego Supercomputer Center (SDSC) and the National Partnership for Advanced Computational Infrastructure.
- A proposal to the Knowledge and Distributed Intelligence Competition was developed with SDSC, the National Center for Ecological Analysis and Synthesis, the Ecological Society of America, and Oregon State University
- Activities have been initiated with the Global Terrestrial Observing System (GTOS) including a demonstration project to link data sharing/validation between ILTER sites and NASA programs.

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## FACILITATING ELECTRONIC COMMUNICATION

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One of the principal responsibilities of the Network Office is the development and maintenance of effective electronic communication among the 21 LTER sites, among ILTER sites and networks, and between the Network Office and LTER, ILTER, and other networks. The tasks associated with this activity include the maintenance of a personnel directory and e-mail aliases for scientists working at U.S. LTER sites, development and maintenance of LTER and ILTER home pages, and support of the hardware and software required for data bases and electronic communication.

- All these services have now been migrated to the new servers purchased this year and all movements of the domain name "lternet.edu" have been completed.
- A user-support analyst and a programmer were hired in May of 1998. Colin Johnson and Richard Dahringer now fill these roles.
- The personnel database has been updated with the addition of new demographic parameters and the inclusion of a user-updateable interface. Most graduate students in the network have now been included. We anticipate the production of a new hardcopy of the personnel database in February of 1999.
- The LTER web site has been completely redesigned including the addition of many interactive pages that access the personnel and other databases directly.

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## FACILITATING SCIENTIFIC EXCHANGE

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The ultimate goal of all activities of the Network Office is to help increase the quantity and quality of scientific studies performed by the U.S. LTER Network and its associated national and international partners. The principal mechanism by which the NET achieves this goal is the facilitation of scientific exchange at all levels of LTER activity. To this end, the NET is charged with the development of activities that enhance the capabilities of LTER Networks and their opportunities to interact. During their recent meeting in December, the LTER National Advisory Board suggested that the LTER Network develop a strategic plan addressing mechanisms to facilitate scientific exchange. The existence of such a plan would permit NET staff to prioritize the expenditure of resources among many possible projects. The development of such a strategic plan will be a high priority during the coming year.

Some of the activities carried out during the second year of the Cooperative Agreement are described below.

Facilitating exchange within the U.S. LTER Network:

- The Network Office helped organize a workshop at the San Diego Supercomputer Center on regionalization of LTER models. Twelve LTER scientists participated.
- The Network Office provided support for to plan a cross-site study of weathering being organized by Berry Lyons of MCM. The short-term product of this activity will be a proposal to the Coordinating Committee (CC) for a workshop;

- NET staff facilitated a discussion on the topic of Socioeconomic Research at LTER sites organized by Tom Heberlein (NTL) at the Madison Coordinating Committee meeting. We will continue to participate in the development of a report from this meeting;
- Personnel from the NET helped organize and fund CC meetings at the Short-Grass Steppe and North Temperate Lakes LTER sites;
- The Network Office provided specific web-based information for sites/programs interested in the recent expansion of the LTER program to include urban and land-margin sites.
- NET staff organized Executive Committee meetings in Ft. Collins, Madison, and Washington, D.C.;
- Chris French and Louise Williams helped the Graduate Student Committee organize a meeting of LTER graduate students held during the ESA meeting in Baltimore. The highlight of the meeting was a series of presentations about student research at LTER sites;

Facilitating exchange between the U.S. LTER Network and the national scientific community:

- NET staff designed a series of Vision Statements whose purpose is to encapsulate efforts in 15 areas key to the development of future LTER science. These key areas are: Disturbance and Recovery, Regionalization, Biodiversity/Productivity, Climate Variability, Socioeconomic Elements of LTER Research, Development of Technology, Climate Monitoring, Education, Integration of Graduate Students, Data Management, Publications, Microbial Ecology, Monitoring of Biodiversity, and Planning Environmental Observatories. LTER scientists are preparing summary statements of goals in each of these key areas to be incorporated into the LTER web page. As additional key areas and scientific themes are identified, NET staff will work with the Coordinating Committee to produce suitable Vision Statements.
- Bob Waide and James Brunt are involved in the revision of a proposal to the Knowledge and Distributed Intelligence competition of NSF. The goal of this proposal is to develop mechanisms for the rapid exchange of information between sites of ecological research worldwide. Partners in the proposal include the National Center for Ecological Analysis and Synthesis (NCEAS), the Organization of Biological Field Stations (OBFS), and the San Diego Supercomputer Center (SDSC);
- James Brunt represented NET at a meeting of the Organization of Biological Field Stations at NCEAS, where he discussed methods of developing information management systems at field stations;
- Ray Smith represented the Executive Committee and Network Office at a workshop sponsored by the Office of Polar Programs to discuss the development of an environmental observatory at Point Barrow, Alaska;
- Bob Waide participated in planning meetings for the Biodiversity Observatory Network at Blandy Farm, VA, and NCEAS;

- Patricia Sprott prepared brochures describing research and other activities for three of LTER sites. Additional brochures are in the planning stage;
- Jim Gosz, Patricia Sprott, and Bob Waide are participating with the Publications Committee in the development of the Oxford Press book series;
- Patricia Sprott, John Vande Castle, and James Brunt organized an LTER information booth at ESA and distributed information on LTER activities to many meeting attendees; and
- NET facilitated the development of two videos by John Dennis Productions. The first is an informational video directed towards research at LTER sites. The second video will describe the formation of international LTER networks..

Facilitating exchange between the U.S. LTER Network and the international scientific community:

- The Network Office facilitated the IV Latin American LTER workshop in Puerto Ordaz, Venezuela. Bob Waide, Chris French, Eda Melendez, and John Porter participated in the meeting;
- The Network Office facilitated the annual ILTER business meeting held in Italy in conjunction with the INTECOL Congress. Approximately 12 ILTER member countries participated. INTECOL provided an excellent venue to promote LTER to a wide audience, principally through a special symposium on LTER organized by NET and LTER scientists but also through collateral meetings described above under Western Europe. NET disseminated information about the business meeting and the symposium to foreign scientists who had requested information about establishing LTER networks in their countries. Scientists from the non-member countries of France, Ireland, Italy, Japan, Mexico, Namibia, South Africa and Croatia came to the business meeting;
- With the foreign hosts, NET co-organized a visit in June by 12 LTER graduate students and 2 LTER scientists/mentors to ILTER sites in Taiwan and China. This reciprocated a visit by a group of students from Asia to several US LTER sites in the summer of 1997. Students were required to submit reports about their experience and the impact it had on them professionally and personally. They were also required to give seminars at their home universities and/or LTER sites about what they learned. Several participants contributed to an article in the Network newsletter about their experience. By all accounts this activity was very successful in meeting the objectives of exposing US students to international research and encouraging them to consider future collaborative work abroad, as well as facilitating contacts between US and Asian LTER sites. Several US participants reported serious interest in pursuing postdoctoral arrangements in those countries. NSF/INT and its Japanese funding agency partner have approved NET's proposal for a similar visit to Japan in 1999. A larger number of senior US scientists will participate in at least part of this itinerary, because the Japanese organizers are arranging a workshop on LTER that will involve a group of senior Japanese academic and other ecologists (as well as students.) A second visit to Taiwan is also being arranged, but responsibility for this activity has been shifted to an LTER scientist at the HJ Andrews site;

- NET staff and nine LTER scientists participated in the North American Symposium "Toward A Unified Framework For Inventorying And Monitoring Forest Ecosystem Resources" held in Guadalajara.
- Patricia Sprott prepared a new edition of the LTER book on International LTER networks for the INTECOL meeting in July;
- John Vande Castle will represent NET and the LTER Network at the EMAN meeting in Vancouver, Canada, in January 1999;
- NET staff will facilitate a symposium/workshop on the North American Regional LTER Network at the 1999 ESA meeting in Spokane. Scientists from Canadian, Mexican, and US networks will make presentations.

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#### ACTIVITIES ASSOCIATED WITH DEVELOPMENT OF ILTER

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This has been another very active and successful year in pursuing the international objectives laid out in the Network Office (NET) grant and in implementing the mission of the ILTER network. NET also had increased success in bringing in other US Network scientists to participate in these network development and research planning activities. We will continue our efforts to develop a cadre of interested US scientists to act as advisors to the growing list of countries with active or interested in LTER style research.

During the past year, national networks were formally established in Uruguay, Costa Rica, Switzerland, Poland, Mongolia, and Korea. Substantial progress was made in network planning by scientists and sponsoring organizations in Mexico and South Africa; their networks should be formally established within a few months. Australia has revived its national LTER commitment. Promising discussions have begun with key scientists in France, Austria, Italy, Scandinavia, Romania and Morocco, and inquiries have been received from scientists and government officials in several other countries.

In addition, national networks in two areas of the world have taken the important step of establishing regional coordinating and consultative mechanisms. The inaugural meeting of a "regional network" for Central Europe was held in Poland in September 1998, with representatives from the three formal networks of the region and three other countries interested in developing national networks (Ukraine, Romania and Slovakia.) In November, a similar meeting took place in Mexico, where a commitment was made by Canada, Mexico and the US to establish a North American network. This is a significant development, as clearly demonstrated by existing regional networks in Latin America and East Asia. The countries that have formal networks take on a specific responsibility to assist their neighbors in developing their own networks; furthermore, regions have environmental and cultural affinities that facilitate the development of meaningful scientific collaborations.

NET has contributed to these developments in a number of ways: communication by e-mail, information made available through publications and the increasingly enhanced web site it maintains, but most importantly through consultative visits and attendance at meetings. In the past year, these meetings have ranged from international ecological meetings such as ESA, INTECOL, a North American forest management symposium, a Scandinavian regional scientific meeting and an Antarctic Science meeting (SCAR), through a number of specific LTER-oriented national and

regional meetings, to the annual ILTER business meeting and a special symposium on LTER (both held in conjunction with the quadrennial INTECOL Congress.) Travel by NET staff and other LTER scientists was funded by the core grant to NET as well as supplements received from NSF/INT and NSF/OPP. These meetings are described below, together with indications of NET and other US LTER participation.

**North America:** Gosz visited Mexico City to present information on LTER to the Latin American Botanical Congress and meet with key Mexican scientists and officials. In November, Gosz, Waide, Brunt and three LTER scientists (two of them data managers) participated in a North American symposium on Forest Management, during which serious discussion of a North American regional network took place. A subsequent regional meeting is being planned for the summer of 1999.

**South America:** In February 1998, Waide accompanied an LTER scientist to discuss LTER with scientists and officials involved in an international research center located there. In late May, Waide, French and two LTER scientists participated in the fourth regional Latin American Network meeting, hosted by Venezuela. Data management was a significant feature of this meeting, and most of the participating countries sent data managers in addition to scientific coordinators. This group has made good progress in surveying capabilities and needs among the members, and has established an e-mail consultative group and web site.

**Eastern Europe:** In September, Gosz, French and five LTER scientists participated in a session on LTER in a Landscape Ecology conference in the Czech Republic and field trips to Czech LTER sites. Gosz and French also met with officials of the Czech Grant Agency and national MAB program. Gosz, French and ten US scientists participated in the first regional Eastern European LTER meeting (hosted by Poland), where a major part of the agenda focused on opportunities and interests for collaborative research between the US and member countries.

**Western Europe:** In February, Gosz made a presentation on LTER in Rome to the Life and Environmental Sciences Committee of the European Science Foundation. This invited presentation led to a decision by that organization to explore sponsorship of a regional working group on LTER. In March, Waide participated in a GTOS/GT-NET meeting to cement links between that group and the International LTER network. In Italy, during the INTECOL Congress, meetings were held with a group of Italian scientists interested in LTER and with a group from countries bordering the Adriatic who are planning a long term regional research program on the Adriatic Sea and coastal region. NOAA is fostering this initiative. A planning meeting is scheduled in late spring, which will be attended by an LTER scientist from VCR. In September, Gosz made a side trip from Eastern Europe to a Scandinavian regional forestry meeting at the invitation of the Swedish hosts to promote LTER interest in that region of the world.

**East Asia/Pacific:** In early July, Gosz and Clyde Goulden visited Mongolia to participate in a planning workshop and meet with the officials and scientists who have made a commitment to an LTER network in that country. On the way, Gosz stopped in Korea to meet with government officials and scientists involved in that country's nascent LTER effort. In October, Goulden represented the US LTER network at a preparatory meeting in Korea for the 1999 East Asia Regional LTER meeting.

**Africa/Middle East:** In March, Gosz participated in a regional conference on Arid Land research hosted by Israel with strong involvement of its LTER network. Representatives from Sandia National Laboratory also participated because of its programmatic interest in encouraging peaceful scientific cooperation in the region. Sandia officials have approached NET to seek participation by

LTER scientists in follow-up efforts to promote establishment of an LTER site in the West Bank that would involve Israeli and Palestinian scientists. NET has facilitated contacts with several interested LTER scientists. In March, Waide visited South Africa to participate in a national meeting on LTER development at the invitation of the government sponsor, the Foundation for Research Development. South Africa is in the process of designing its national network, and the ILTER network has accepted its offer to host the ILTER annual business meeting in August 1999.

**Antarctica:** In September, Waide and Brunt promoted LTER activities at a meeting of the Scientific Committee for Antarctic Research in New Zealand. NET administered the NSF funding for 36 US scientists who participated (some of whom are associated with LTER activities, given that the two US stations in Antarctica are both LTER sites)

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### PROMOTING INFORMATION MANAGEMENT PROTOCOLS

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The LTER Network Office (NET) has contributed to several major advances toward the development and use of standards and standard protocols for managing and accessing LTER Network data.

- The network office published a compendium of works from a 1997 co-sponsored workshop on data and information management. The volume entitled "Data and Information Management in the Ecological Sciences" is a collection of papers from the workshop held in conjunction with the 1997 ESA meeting in Albuquerque. OBFS, ESA and the LTER information managers co-sponsored the event. The volume features articles by many of the LTER information managers and is available on-line at: <http://www.lternet.edu/ecoinformatics/guide/frame.htm> and in limited numbers of hard copy. Demand for the volume has been high so far.
- The migration of "CLIMDB", an interactive, web-based access system to integrated climate data from all sites, to the network office is being accomplished through support of Robin Stubbs, a database programmer at NTL, where it was developed. Completion is expected by mid-spring 1999.
- The Data Table of Contents (D'TOC) which is the first in a series of efforts aimed at developing a framework for the LTER Network Information System (LTERNIS), has been fully migrated to the network office. Plans are in place for the support of John Porter, D'TOC developer, to spend time in the network office on furthering the D'TOC metadata.
- The LTER Network Office has a collaboration with the National Center for Ecological Analysis and Synthesis (NCEAS), the Organization of Biological Field Stations (OBFS), NPACI, and others, to further development and dissemination of integrated data and metadata standards outside the LTER Network of sites. The major accomplishment of this collaboration in 1998 was the development of a proposal to the NSF Knowledge and Distributed Intelligence (KDI) program. This first effort was not funded but the proposal will be revised and resubmitted in the 1999 competition. As part of the ongoing collaboration, Assoc. Dir. James Brunt is participating in a working group at NCEAS on metadata interoperability.
- Associate Director, James Brunt will participate in an NRC workshop on "Promoting Access to Scientific and Technical Data for the Public Interest: An Assessment of Policy Options" in January of 1999. This workshop will get at public-sector intellectual property rights and the impact of recent proposed legislation in that area. The study will ultimately make

recommendations for amendments to any future legislation regarding scientific data. James will be the only natural scientist to participate on the panel that is dominated almost entirely by molecular and geophysical administrators.

- Internationally, the LTER Network Office provided assistance in the development of a prototype web-based database for a Nature Conservancy (TNC) effort in Latin America to implement standard methods for monitoring amphibian populations.
- James Brunt is the co-editor/author of a new book, expected out in late 1999 in the Blackwell "Methods in Ecology" series, entitled "Ecological Data". The book deals broadly with standard protocols and practices related to the collection, management, and archival of ecological data, and draws heavily on experiences in the LTER Network.

### **Information Management Committee**

The network data management committee made further advances this year at its annual meeting in Baltimore. Twenty of the 21 sites were represented with Cedar Creek not represented. Additional guests included Rick Clutter, National Estuarine Research Reserve System (NERRS), Baruch Institute; Cheryl Solomon, NASA Global Change Master Directory (GCMD) project; Dick Olson, Oak Ridge National Laboratory, DAAC project; and Miguel Acevedo, IM Committee for the Latin America Network.

The committee focused attention on:

1. future development of the NIS,
2. developing an explicit statement on the ethical use of online data, and
3. reviewing LTER Information Management (IM) outreach, Minimum Standard Installation (MSI), LTER 2000 meeting activities, and the Y2K problem.

A final working session discussed the IM Committee's collaboration with the Northwest Alliance of Computational Science and Engineering (NACSE), and the writing of four pilot proposals to NACSE.

The IM Committee also unanimously adopted the creation of a chairperson position to bring the LTER IM Committee structure in line with the structure of other LTER committees. Susan Stafford was unanimously elected as chair.

### **ILTER Network Information Management**

The LTER Network Office sponsored participation of LTER Network and Network office personnel in a number of international efforts that are helping to lay the groundwork for developing international standards for data exchange and interoperability and provided exchange of information valuable to the developing ILTER networks.

- **Latin American ILTER:** A data management workshop was held as part of the Latin American ILTER meeting in June 1998 in Venezuela. This workshop was a result of a planning meeting in early December 1997 in Albuquerque hosted by the LTER Network Office to prepare Latin American Information Management experts for the workshop effort. The June meeting brought together data managers from LTER sites all over Latin America.

- **INTECOL:** LTER personnel participated in the International Ecology meetings in Florence Italy. In addition to individual presentations, a workshop was hosted by John Porter (VCR LTER) and John Vande Castle that demonstrated the developing LTER network information system. This participation was done in conjunction with the ILTER committee meeting.
- **North American Symposium:** Aimed at developing a "Unified Framework for Inventorying and Monitoring Forest Ecosystem Resources", this symposium featured a large contingent of agency representatives from the three North American countries. Presentations covered site information systems and the developing network information system with an emphasis on the research-driven nature of LTER information management activities.

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### ENCOURAGING NEW TECHNOLOGIES

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The LTER Network Office (NET) completed the transition of computer network services from the University of Washington to the University of New Mexico. Attention has been paid to ensure that the NET has state-of-the-art equipment for efficient operation. The University of New Mexico, including NET has completed connection to the NSF "vBNS" backbone to enhance its capabilities for computer data transmission for the NET servers as well as access to the individual LTER site servers and collaborators such as the San Diego Super Computer Center. The design of the hardware configuration of NET has proceeded to enhance the productivity of NET staff, as well as open opportunities by visiting scientists and interns. Besides the quad processor Sun SPARC and MS-NT servers, CDROM recorders, a slide scanner and recorder, flatbed scanners, large format plotter, color laserjet, and digital video projection systems have been set up to support these collaborative efforts.

Association with programs such as NASA Earth Science Enterprise have continued at both the site and Network level. Collaboration with teams from both the NASA/MODIS and Landsat-7 validation teams have proceeded in conjunction with the NASA associated "AERONET" (<http://aeronet.gsfc.nasa.gov:8080/>), sunphotometer program. The purpose of these interactions has been to maintain research links between LTER site programs and research efforts within NASA programs. Efforts are also ongoing for collaborations with groups such as the "Fluxnet" network. John Vande Castle attended this year's Fluxnet workshop in Montana. Interaction with the European Space Agency (ESA) has also been initiated to link with planned hyperspectral satellite systems planned for launch in 2003 and 2005. This is part of a developing Land Surface Processes and Interactions Mission (LSPIM) as part of the Earth Observation Preparatory Programme (EOPP).

Interaction with the NASA Oak Ridge Distributed Active Archive Center (Oak Ridge DAAC) has continued to enhance other LTER/NASA collaborations, including the LTER Information Management group, and in linkages with associated NASA efforts such as Fluxnet and other validation efforts.

Coordination and design of a data exchange effort between sites of the Global Terrestrial Observing system (GTOS) and the NASA/MODIS validation team was also initiated over the past year. This has included configuration of a web-based access to site metadata and coordination with sites of GTOS. Further information regarding this collaboration can be found at <http://www.fao.org/gtos/>.

The LTER world wide web pages (“<http://www.lternet.edu/network/technology>”) have been completely revised as part of the overall revision of the main LTER web page. A web page and supporting documents were also coordinated for Observing System efforts of LTER ([http://www.lternet.edu/research/technology/microbial\\_ecology/](http://www.lternet.edu/research/technology/microbial_ecology/)) which include information on microbial ecology efforts by all sites of the LTER Program. The LTER Technology Committee was reformed by recruiting a representative from each LTER site to lead the LTER Network Program in its technology efforts. A first meeting of this revised committee is planned for February of 1999.

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**DEVELOPING LINKAGES WITH OTHER LONG-TERM RESEARCH PROGRAMS, SITE NETWORKS, AND SCIENCE AND TECHNOLOGY CENTERS**

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The Network Office has continued discussions about the possibility of future collaborations with NCEAS, an exercise that led to the development of a joint KDI proposal with NCEAS, the Ecological Society of America, and the San Diego Supercomputer Center.

NET represents the LTER Network in interactions with the National Partnership for Advanced Computational Infrastructure based at the University of California at San Diego. The Network Office has a sub-contract from UCSD to promote the use of the facilities of the San Diego Supercomputer Center (SDSC) by LTER scientists.

The Network Office is involved in the development of a joint project between LTER modelers, SDSC, and the Kansas University KDI program. The purpose of this initiative is to use meso-scale climate models to examine the indirect effect of land use change on biodiversity. Predictions on the effects of land use change on regional climate at several LTER sites will be correlated with changes in biodiversity obtained through the KDI program’s interface with museum collections.

Staff of the Network Office has a formal arrangement to handle arrangements for e-mail connectivity within the GTOS network. In addition, the Network Office has facilitated the applications of the LTER Network and the East Asia-Pacific and Latin American Regional ILTER Networks for membership in GTOS.

Scientists from the Network Office and the two Antarctic LTER sites participated in planning meetings to develop an Antarctic LTER network at the Scientific Conference on Antarctic Research in Christchurch, New Zealand.

NET staff participated in a meeting at the Cooperative Monitoring Center at Sandia National Laboratory to establish a Middle Eastern LTER Network. The goal of this initiative is to develop joint Israeli-Palestinian trust and cooperation through a common environmental research program. NET identified several LTER scientists to represent the LTER Network in future interactions.

NET staff helped coordinate and participated in a meeting with representatives of USDA-Forest Service and the Department of the Interior to develop joint projects between the LTER Network and sites administered by these agencies.

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**PROMOTING THE RELEVANCE OF LONG-TERM RESEARCH**

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Nearly all of the activities of the Network Office could be viewed as promoting the relevance of long-term research. However, some accomplishments in particular have been directed towards

promoting a greater awareness in the scientific community and the public regarding the importance of our mission. These include the following research and educational activities:

- Interactions with OBFS have been oriented towards developing an appreciation of long-term research and the need for data management at ecological field stations;
- Discussions with GTOS have been directed towards coordinating the goals of our two networks;
- Development of a symposium on “Planning for Urban Systems” at the Baltimore ESA meeting demonstrated that the LTER Network is on the cutting edge of this important area of study;
- Organization of a symposium at the INTECOL meeting in Florence provided an international forum to stress the importance of long-term research;
- Facilitation of the development of videos on research at LTER and ILTER sites will provide access to a large segment of the public;
- The re-organization of the Website has created important new avenues for reaching the research community and the public through electronic publishing;
- The biannual Network Newsletter is now available on the LTER Website in its entirety long before the hard copy arrives in the mail. In addition, the Web allows unlimited access to the LTER slide presentation, a combination of information and images explaining the LTER program. Through the Internet, LTER sites can easily access to slides for their own presentations;
- While electronic publishing adds a new dimension to communications, the LTER Network Office continues to recognize the importance of print publishing. The LTER Site Brochure series expanded to include Coweeta (March 1998), Central Arizona-Phoenix and Baltimore (July 1998), and Shortgrass Steppe (December 1998). Other publications produced this year include the revised all-LTER brochure and the International LTER book. Together with large-format posters (available on demand to specification), and the Website, these publications create a complete picture of LTER for the greater ecological research community;
- LTER exhibited an informational kiosk at a reception for members of Congress featuring NSF-funded science. This cross-site, inter-agency exercise involved PIs from several LTER sites gathering for meetings with congressional staff and an exhibit for members of congress. Patricia Sprott and LTER PIs spoke one-on-one with members of congress, while distributing literature and displaying the electronic slide presentation;
- LTER also participated with a booth in the exhibition hall at the ESA annual meeting in Baltimore. Patricia Sprott and LTER PIs interacted with the greater ecological research community and disseminated information and publications from the LTER booth, which also featured a live connection to the LTER website and the LTER slide presentation. The success of these outreach activities has spurred planning for several more, including the AAAS annual meeting in January 1999.

**Projected budget – FY-1999**

**FY-1998 Financial report**

**UNM Cost-sharing report**

**UCSD sub-award budget and justification**