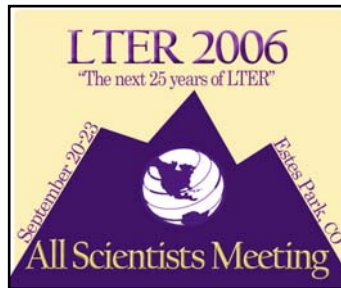


Welcome to the Long-Term Ecological Research (LTER) Network  
2006 All Scientists Meeting  
September 20-23 ♦ Estes Park, CO



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# Message from the Chair

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## **WELCOME!**

Welcome to the 6th All Scientists Meeting of the LTER Network of research programs. I welcome LTER researchers and students, participants from other research agencies and programs, our international colleagues, and those from the National Science Foundation.

We are 25 years old; the first sites funded by the National Science Foundation in 1981. We are here to think creatively and practically about the meeting's theme: "The next 25 years of LTER: Contributions to understanding ecological change." Twenty-five years ago we were founded with the recognition that most ecological processes and phenomena occur over the long term and cannot be understood nor even perceived with short-term studies. We have learned that spatial pattern and scale are important if we are to obtain a realistic view of change. And we have learned that we must consider the human components of the system in which we live to understand ecological change. The human component is an element that must be integrated into the science if we are to succeed in understanding ecological change.

We are in the middle of a wonderfully creative and significant planning activity that can change the very nature of our discoveries, relevance, and future. In addition to the many workshops during this meeting planned by individuals, we will also be advancing the ongoing group planning process. On Thursday morning, Scott Collins will brief you on the accomplishments and future activities of the planning process and you will have opportunities to participate. Most of you should have knowledge of these activities through earlier participation or from reports from your lead principal investigators.

My appreciation and thanks are extended to the co-chairs for this meeting, Bob Waide (LTER Network Office) and Tim Seastedt (NIWOT Ridge LTER site), the other members of the program committee, the staff of the LTER Network Office, the National Science Foundation, and the YMCA of the Rockies for working in our behalf so that we can creatively and practically think about and plan integrated natural and social science on ecological change into the 21st century.

*John J. Magnuson*

*Interim Chair of the LTER Science Council and Executive Board*

# The LTER All Scientists Meeting, Past and Present

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## **Objectives of the All Scientists Meeting**

Triennial All Scientist Meetings represent one of the LTER Network's most effective mechanisms to promote team-building for cross-site research and synthesis. These 3-4 day meetings focus the LTER scientific community on new challenges, result in the formation of new research collaborations, help to integrate new sites and scientists into the LTER community, and provide the only opportunity for community-wide discussions of the future of the LTER program. In contrast to a typical professional conference, an All Scientists Meeting focuses less on the presentation of individual research results and more on brainstorming, discussion, and synthesis of results across different ecosystems. Moreover, All Scientists Meetings present excellent opportunities to share expertise, to transfer technology among sites, and to generate new scientific concepts, approaches, and experiments. They are, in short, the "town hall meeting" for the LTER research community.

## **History of the LTER All Scientists Meeting**

The initial gathering of LTER scientists took place in the mid 1980's at the Cedar Creek site. This informal reunion was the precursor to All Scientists Meetings in 1990 and 1993 at Estes Park, Colorado. Seventeen sites were represented at the 1990 meeting, 19 at the 1993 meeting, and 24 at the 2000 and 2003 meetings in Snowbird, Utah and Seattle, Washington, respectively. All 26 U.S. sites and most of the International LTER networks will participate in the 2006 meeting.

The 1990 meeting, "**LTER in the '90s**", lasted five days and was attended by over 350 researchers. Each of the first four days was devoted to a separate topic: The Network of Sites, Global Change, Biological Diversity, and Regional Analysis. Closing discussions occupied the final day. This meeting consisted of a combination of research presentations, workshops, poster sessions, and ad hoc discussions and workshops generated from the intellectual interactions that took place during the meeting. Each LTER site had opportunity to present their most exciting research results.

The 1993 meeting, whose theme was "**LTER 2000 -- Past and Future**", likewise addressed research topics including: Inter-site and Synthetic Research, New Directions, and Expanding Perspectives. Once again, the meeting consisted of plenary sessions, research presentations, programmed and ad hoc workshops, site presentations, posters, and demonstrations. The National Science Foundation was represented by Mary Clutter, Assistant Director for the BIO Directorate, and program officers Tom Callahan and Penny Firth. An International Summit was held following the All Scientists Meeting, and it was at this summit that the International LTER program was created.

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# The LTER All Scientists Meeting Past and Present (con't.)

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After a hiatus of seven years, the fourth ASM was held in Snowbird, Utah, from August 2-4, 2000. The theme of the 2000 meeting was "**Long-term Ecological Research in the New Millennium - Unifying Concepts and Global Applications.**" This meeting, in conjunction with the annual Ecological Society of America meeting, initiated and continued numerous scientific interactions and collaborations. Almost 800 members of the LTER and associated research communities attended, including approximately 150 graduate students and almost 100 foreign scientists. The meeting included 73 formal workshops in addition to a large number of ad-hoc workshops and meetings. The efforts of the workshops did not end at the close of the meeting, but in fact continue as follow-on activities to the present day.

The theme of the 2003 meeting was "**Embarking on a Decade of Synthesis.**" In addition to a keynote address, the meeting included two plenary lectures by invited speakers, over sixty workshops, poster sessions, student luncheons, and a "Town Hall" meeting. Representatives from the National Science Foundation included Dr. Mary Clutter, Dr. Margaret Leinen, and Dr. Kerri-Ann Jones. In addition, the meeting provided time for ad hoc meetings of investigators to follow up on ideas arising from the workshops and invited presentations. Over 20 new research working groups were formed as a result of interactions among LTER scientists at the 2003 ASM. Products of these working groups included a proposal to conduct the first LTER Graduate Student Collaborative Research Symposium, journal publications, and reports that provided input into the planning process.

## **The 2006 LTER All Scientists Meeting**

The 25th anniversary of the establishment of the Long Term Ecological Research Network will be celebrated in the sixth LTER All Scientists Meeting in Estes Park, CO. The theme of the 2006 meeting is "**The next 25 years of LTER: Contributions to understanding ecological change.**" The program includes presentations from Drs. James Collins and David Lightfoot of the National Science Foundation, three plenary speakers (Pamela Matson, Steve Carpenter, Ed Barbier), presentations on the history of LTER (John Magnuson) and the LTER Trends project (Debra Peters), a full day devoted to the new LTER Research Plan, 50 formal working groups, 440 posters, an evening mixer focused on site research, and meetings of the LTER Executive Board and Science Council as well as the Information Management, Graduate Student, Education, and Social Science Committees.

Traditionally, All Scientists Meetings provide an important opportunity for researchers within and beyond the LTER Network to convey current research findings and discuss, plan and implement collaborative research projects. The 2006 meeting has special importance because it provides a

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# The LTER All Scientists Meeting Past and Present (con't.)

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platform for the presentation of the results of the ongoing two-year LTER planning process. The LTER Research Plan is being developed through a process of collaborative consultation between LTER and non-LTER scientists. The Science Task Force, a group of LTER scientists guiding the planning effort, has established a scientific framework that will direct the future development of cross-site and synthetic LTER research in the future. The 2006 ASM will provide an opportunity for LTER, ILTER, and non-LTER scientists to define and solidify the partnerships that will lead to the implementation of the Research Plan.

## The LTER 2006 ASM Program Committee

<u>Member</u>	<u>LTER Site</u>	<u>Representing</u>
<b>Bob Waide – Co-chair</b>	<b>LNO</b>	<b>Researchers</b>
<b>Tim Seastedt – Co-chair</b>	<b>NWT</b>	<b>Researchers</b>
<b>Chelsea Crenshaw</b>	<b>SEV</b>	<b>Graduate students</b>
<b>Hugh Ducklow</b>	<b>PAL</b>	<b>Researchers</b>
<b>Tiffany Troxler Gann</b>	<b>FCE</b>	<b>Graduate students</b>
<b>Sarah Hobbie</b>	<b>CDR</b>	<b>Researchers</b>
<b>Tim Hollibaugh</b>	<b>GCE</b>	<b>Researchers</b>
<b>Gene Kelly</b>	<b>SGS</b>	<b>Researchers</b>
<b>Brian Kloeppel</b>	<b>CWT</b>	<b>International researchers</b>
<b>Bill Michener</b>	<b>LNO</b>	<b>Information managers</b>
<b>Jill Thompson</b>	<b>LUQ</b>	<b>Researchers</b>
<b>John Vande Castle</b>	<b>LNO</b>	<b>Researchers</b>
<b>Kristin Vanderbilt</b>	<b>SEV</b>	<b>IM/International</b>
<b>Matthew Wilson</b>	<b>BES</b>	<b>Social science</b>
<b>Ali Whitmer</b>	<b>MCR</b>	<b>Education</b>

# Agenda for 2006 All Scientists Meeting

## Day 1 (Sunday, September 17, 2006)

- TRAVEL DAY for LNO staff.

## Day 2 (Monday, September 18, 2006)

- TRAVEL DAY for the Information Management Committee and guests.
- LNO staff prepare meeting venue.
- 7:00-9:00 pm: Information Managers mixer: Session 1 – Working groups

## Day 3 (Tuesday, September 19, 2006)

- TRAVEL DAY for people attending ancillary meetings.
- 8:00 am-5:30 pm: Session 2 – Working groups
- 8:00 am-5:30 pm: Information Management Committee
- 8:00 am-5:30 pm: Environmental Literacy Group

## Day 4 (Wednesday, September 20, 2006)

- TRAVEL and registration day for other participants.

### Morning:

- 7:00-9:00 am: Breakfast
- 8:00 am-12 pm: Session 3 – Working groups
- 8:00 am-5:00 pm: LTER Graduate Student Symposium and Business Meeting
- 8:00 am -5:00 pm: Executive Board meeting
- 8:00 am-6:00 pm: Information Management Committee
- 8:00 am-5:00 pm: Education Committee
- 8:00 am-5:00 pm: LINX II workshop
- 11:30 am-1:00 pm: Lunch

### Afternoon:

- 1:00-5:00 pm: Session 4 – Working groups
- 1:00 -5:00 pm: Social Science Committee
- 4:30-5:30 pm: Poster set up; removal 9:00 pm

### Evening:

- 5:00-6:30 pm: Graduate Student Mixer
- 5:00-7:00 pm: Dinner
- 7:00-9:00 pm: Evening mixer with site poster session

## Day 5 (Thursday, September 21, 2006)

Posters will be available all day in Willome.

### Morning:

- 7:00-9:00 am; Breakfast
- 7:00-8:00 am: Poster set up
- 8:00-8:20 am: Welcome – Chair of the Science Council and Program Co-Chairs (W.G. Ruesch Auditorium)
- 8:20-9:00 am: Presentation by NSF representatives
- 9:00-10:00 am: Presentation of the LTER Research Plan – Science Task Force of the LTER Planning Grant
- 10:00-10:30 am: Break
- 10:30-11:30 am: Discussion of the Research Plan
- 11:30-1:00 pm: Lunch and free meeting time

*(continued)*

# Agenda for 2006 All Scientists Meeting

## Day 5 (Thursday, September 21, 2006)

Posters will be available all day in Willome.

### Afternoon:

- 1:00-2:00 pm: Plenary 1 – Dr. Pamela Matson, "Integrative approaches to the study and management of human-environment systems" (W.G. Ruesch Auditorium)
- 2:00-3:30 pm: Session 5 – Working groups
- 3:30-5:30 pm: SPECIAL Working group session

### Evening:

- 5:00-7:00 pm: Dinner
- 7:00-8:30 pm: Origin, Development and Future of the LTER Network– John Magnuson (including presentations by D. Marzolf, J. Gosz, C. Bledsoe, P. Risser, and J. Collins) (W.G. Ruesch Auditorium)
- 8:30-11:00 pm: Mixer and poster session
- 11:00 pm: Poster removal

## Day 6 (Friday, September 22, 2006)

Posters will be available all day in Willome.

### Morning:

- 7:00-9:00 am; Breakfast
- 7:00-8:00 am: Poster set up
- 8:00-9:00 am: Plenary 2 – Dr. Steve Carpenter, "Ecology for transformation" (W.G. Ruesch Auditorium)
- 9:30-10:30 am: Session 6 – Working groups
- 10:30-11:00 am: Break
- 11:00-12:00 pm: Session 7– Working groups
- 11:30 am-1:00 pm; Lunch

### Afternoon:

- 12:00-12:30 pm: Group picture; front of Administration Building
- 12:30-2:00 pm Free time
- 2:00-3:00 pm: Opportunities for network-scale analyses emerging from the TRENDS project – Debra Peters (W.G. Ruesch Auditorium)
- 3:00-3:30 pm: Tea break
- 3:30-5:30 pm: Session 8 – Planning grant working groups

### Evening:

- 5:00-7:00 pm: Dinner
- 7:00-8:30 pm: Mixer and poster session
- 8:30-11:00 pm: Music and dancing in the Longhouse – Loretta Thompson
- 11:00 pm: Poster removal

*(continued)*

# Agenda for 2006 All Scientists Meeting

## Day 7 (Saturday, September 23, 2006)

Posters will be available all day in Willome.

### Morning:

- 7:00-9:00 am; Breakfast
- 7:00-8:00 am: Poster set up
- 8:00-9:00 am: Plenary 3 – Dr. Ed Barbier, "In the long run we are all dead: economics, history and long-term ecological change" (W.G. Ruesch Auditorium)
- 9:30-10:30 am: Session 9 – Working groups
- 10:30-11:00 am: Break
- 11:00-12:00 pm: Session 10– Working groups
- 11:30 am-1:00 pm; Lunch

### Afternoon:

- 1:00-2:00 pm: Free meeting time
- 2:00-3:30 pm: Session 11 – Working groups
- 3:00-4:00 pm: Tea break
- 3:30-7:00 pm: Science Council meeting and working dinner (Pine Room)
- 4:00-5:30 pm: Session 12 – Working groups

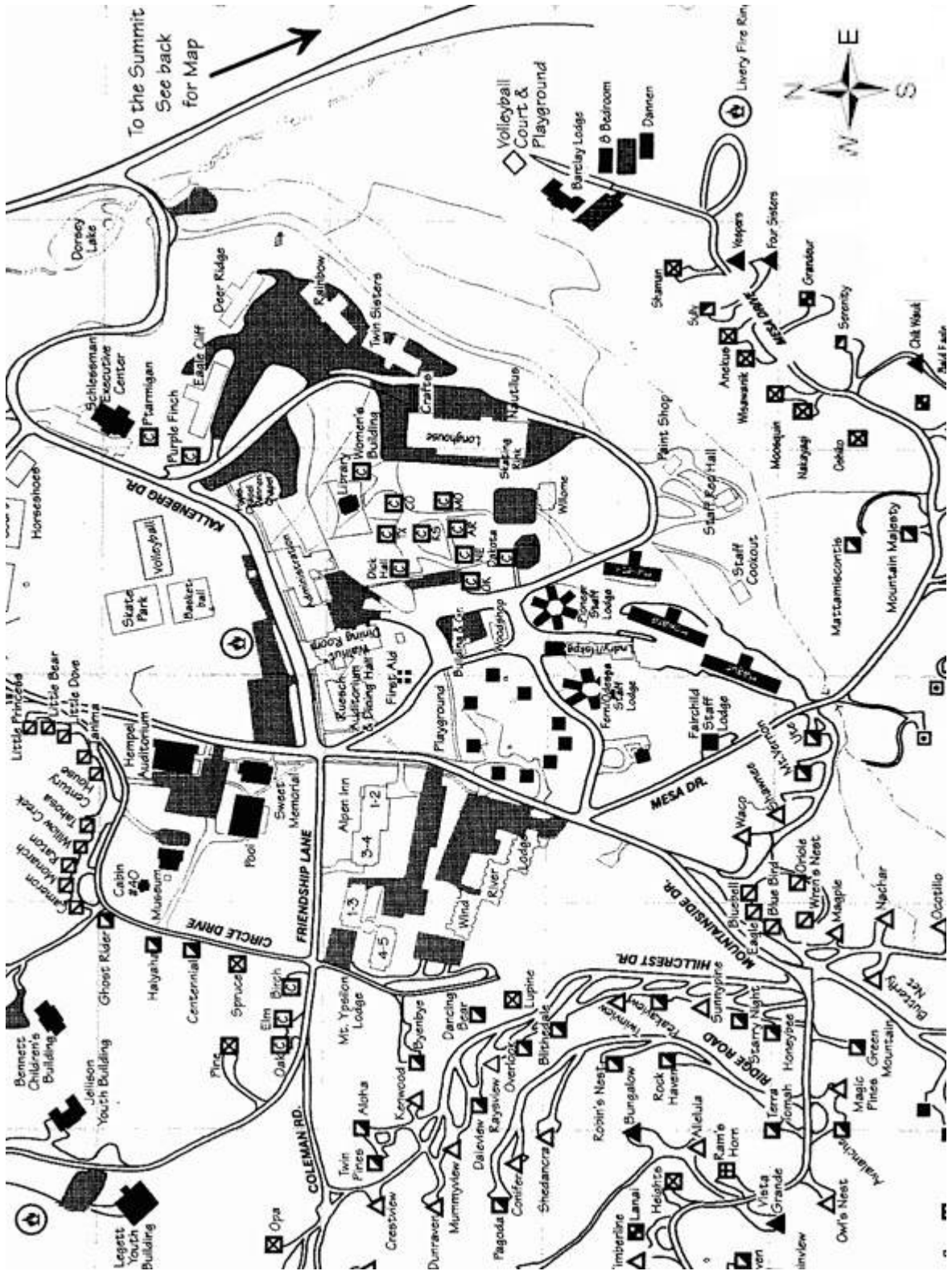
### Evening:

- 5:00-7:00 pm: Dinner
- 7:00-11:00 pm: Goodbye mixer and poster session
- 11:00 pm: Poster removal

## Day 8 (Sunday, September 24, 2006)

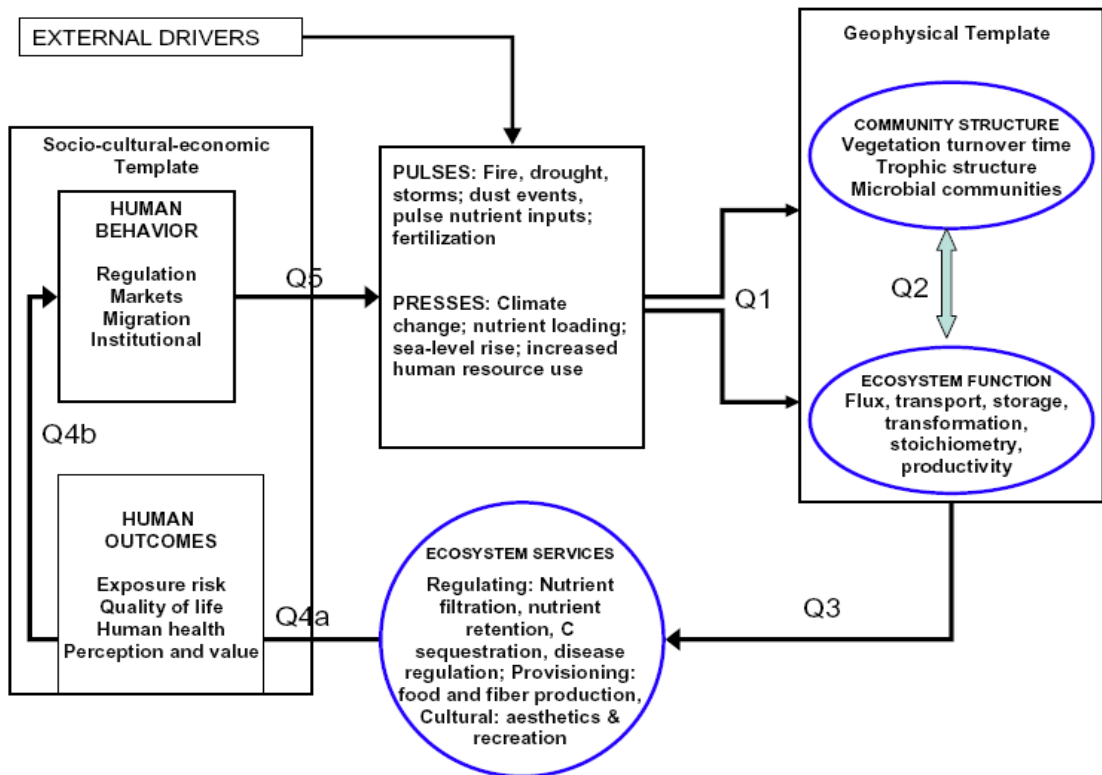
- 7:00-9:00 am; Breakfast
- Departures
- Optional Field Trips to NWT LTER or SGS LTER.

# Map of Meeting Area at YMCA



# Planning Grant Questions

The figure below represents the general conceptual framework that was developed during the LTER Planning Process. The framework incorporates press and pulse interactions, biotic structure-ecosystem function interactions, ecosystem services, and a socio-cultural-economic template. The five general questions (Q1-Q5) integrate the components of the framework. These questions were refined at the recent Program Reps meeting in Albuquerque. The refined question sets include four research sub-themes: (1) altered biotic structure, (2) climate change and climate variability, (3) altered water and biogeochemical cycles, and (4) socio-cultural-economic template. During ASM workshops we will continue to refine the questions and design specific multi-site research activities within these sub-themes. Future LTER planning activities will use the products of the ASM workshops to generate a new synthetic research program that is fully integrated across sites, over time, and across disciplines.



- **Q1: How do long-term press disturbances and short-term pulse disturbances interact to alter ecosystem structure and function?**
- **Q2: How can biotic structure be both a cause and consequence of ecological fluxes of energy & matter?**
- **Q3: How do altered ecosystem dynamics affect ecosystem services?**
- **Q4: How do changes in vital ecosystem services feed back to alter human behavior?**
- **Q5: Which human actions influence the frequency, magnitude, or form of press and pulse disturbance regimes across ecosystems, and how do these change across ecosystem types?**

## Working Group Schedule

### Monday, September 18, 2006, Ancillary: Working Group Session 1: 7:00 PM - 9:00 PM

- 1 - LTER Information Managers Meeting: Mixer and ILTER IM Presentations - Organizer: Barbara Benson; Room: Wind River: A

### Tuesday, September 19, 2006, Ancillary: Working Group Session 2: 8:00 AM - 5:30 PM

- 1 - LTER Information Managers Meeting - Organizer: Barbara Benson; Room: Rainbow: Fireside; Breakout Rooms: Rainbow: Fireside, A, B, C, D; Twin Sisters: A

- 2 - Environmental Literacy Working Group - Organizer: Charles Anderson; Room: Twin Sisters: B

### Wednesday, September 20, 2006, Ancillary: Working Group Session 3: 8:00 AM - 12:00 PM

- 1 - LTER Information Managers Meeting: Plenary on working group topics for September 20 - Organizer: Barbara Benson; Room: Rainbow: Fireside (Note: This working group will meet from 8 am to 9 am)

- 2 - LTER Information Managers Meeting: Information management issues and the LTER Trends project: A drawing board for making cross-site comparisons feasible - Organizer: Christine Laney; Room: Rainbow: Fireside; Breakout Rooms: Rainbow: Fireside, A, B, C D (Note: This working group will meet from 9:00 am - 11:00 am)

- 3 - LTER Information Managers Meeting: Planning Cyberinfrastructure for LTER Network Synthetic Science - Organizer: Barbara Benson; Room: Rainbow: Fireside; Breakout Rooms: Rainbow: Fireside, A, B, C, D (Note: This working group will meet in the morning from 11 am - noon and in the afternoon from 1-2:15 pm)

- 4 - LTER Education Committee: Professional Development and Curriculum Development in LTER Education - Organizer: Monica Elser; Room: Bilheimer Dodge

- 5 - LTER Executive Board Meeting - Organizer: John Magnuson; Room: Hobbs

- 6 - LTER Graduate Student Symposium - Organizer: Chelsea Crenshaw; Room: Wind River: A, B (Note: This symposium lasts all day)

- 7 - LINX II Workshop - Organizer: Patrick Mulholland; Room: Twin Sisters: Fireside

### Wednesday, September 20, 2006, Ancillary: Working Group Session 4: 1:00 PM - 5:00 PM

- 1 - LTER Information Managers Meeting: Planning Cyberinfrastructure for LTER Network Synthetic Science (11am-noon and 1-2:15pm) - Organizer: Barbara Benson; Room: Rainbow: Fireside; Breakout Rooms: Rainbow: Fireside, A, B, C D (Note: This working group will meet in the morning from 11 am - noon and in the afternoon from 1-2:15 pm)

- 2 - LTER Information Managers Meeting: Design of Query Interface to LTER Data Catalog: Controlled Vocabularies Working Group (2:30 - 5 pm) - Organizer: Nicole Kaplan; Room: Rainbow: Fireside; Breakout Rooms: Rainbow: Fireside, A, B, C D (Note: This working group will meet from 2:30 - 5 pm)

- 3 - LTER Executive Board Meeting - Organizer: John Magnuson; Room: Hobbs

- 4 - LTER Education Committee Meeting: Re-Inventing the Schoolyard LTER Web Pages - Organizer: Monica Elser; Room: Bilheimer Dodge

- 5 - LTER Graduate Student Symposium - Organizer: Chelsea Crenshaw; Room: Wind River: A, B; Breakout Rooms: Wind River: A, B, C; Mt. Ypsilon: Lobby Tower I, II; Oak, Elm, Birch (Note: This symposium lasts all day)

- 6 - LTER Social Science Committee Meeting: LTER Social and Interdisciplinary Research and Applications - Organizer: Morgan Grove; Room: Sweet

- 7 - LINX II Workshop - Organizer: Patrick Mulholland; Room: Twin Sisters: Fireside

### Wednesday, September 20, 2006, LTER Graduate Student Mixer 5:00 PM - 6:30 PM

- 1 - LTER Graduate Student Mixer - Organizer: Chelsea Crenshaw; Room: Willome

### Thursday, September 21, 2006, Working Group Session 5: 2:00 PM - 3:30 PM

- 1 - Terrestrial and aquatic N cycling: changing views - Organizer: Walter Dodds; Room: Hobbs

- 2 - Network Level Science Planning Workshop for Integrating Human Behavior into - Organizer: Stephen Swallow; Room: Bilheimer Dodge

- 3 - Ecosystem Response to changes in climate in cold regimes - Organizer: William Lyons; Room: Sweet

- 4 - Community age and assembly in a phylogenetic context: Forging links between ecology and evolution in the LTER framework - Organizer: Jeannine Cavender-Bares; Room: Mt. Ypsilon: Tower I

- 5 - LTER's "Schoolyard Series" of children's books: an overview of the publication plan and process - **Organizer:** Diane McKnight; **Room:** Wind River: A
- 6 - High performance geographical information systems for synthesis across ecological research sites - **Organizer:** Theresa Valentine; **Room:** Wind River: B
- 7 - Chlorophyll fluorescence monitoring at selected LTER Network sites - **Organizer:** Richard Boyce; **Room:** Rainbow: D
- 8 - Disproportionality, Scale and Human Behaviors in Ecosystems - **Organizer:** Pete Nowak; **Room:** Rainbow: A
- 9 - Phenology: data, research, synthesis - **Organizer:** Geoffrey Henebry; **Room:** Rainbow: B
- 10 - The effect of nitrogen-fixing plants on diversity and species interactions - **Organizer:** Jennifer Shah; **Room:** Wind River: C
- 11 - Ad Hoc - **Organizer:** TBD; **Room:** Mt. Ypsilon: Tower II
- 12 - Ad Hoc - **Organizer:** TBD; **Room:** Twin Sisters: Fireside
- 13 - Ad Hoc - **Organizer:** TBD; **Room:** Twin Sisters: B
- 14 - Ad Hoc - **Organizer:** TBD; **Room:** Twin Sisters: C
- 15 - Ad Hoc - **Organizer:** TBD; **Room:** Twin Sisters: D
- 16 - Ad Hoc: Opportunities for Network Scale Analysis Emerging from the TRENDS Project - **Organizer:** Debra Peters; **Room:** Rainbow: C
- 17 - Ad Hoc - **Organizer:** TBD; **Room:** Elm
- 18 - Ad Hoc - **Organizer:** TBD; **Room:** Oak

**Thursday, September 21, 2006, SPECIAL Working Group Session:  
3:30 PM - 5:30 PM**

- 1 - Private Work Group for Palmer LTER - **Organizer:** Hugh Ducklow; **Room:** Rainbow: B
- 2 - LTER Information Managers IM discussion - **Organizer:** Susan Stafford; **Room:** Rainbow: Fireside
- 3 - Planning Grant - Site Reps - **Organizer:** Scott Collins; **Room:** Twin Sisters: Fireside
- 4 - US International Committee - **Organizer:** Steven Hamburg; **Room:** Twin Sisters: A

**Friday, September 22, 2006, Working Group Session 6:  
9:30 AM - 10:30 AM**

- 1 - Metabolic Theory of Ecology and Stream Ecosystems - **Organizer:** Jennifer Shah; **Room:** Wind River: C
- 2 - Biogeochemical complexity across LTER sites: the what, where and how - **Organizer:** Tiffany Troxler-Gann; **Room:** Wind River: B
- 3 - The Sensitivity of Ecosystems to Climate Change: Bringing LTER Observations and Experiments to Bear on Predictive Capabilities - **Organizer:** A. McGuire; **Room:** Sweet
- 4 - Changing Ecosystem Services: Responses to climate and disturbance and implications for policy change - **Organizer:** F. Chapin; **Room:** Wind River: A
- 5 - Engagement of LTER with Schools and the General Public - **Organizer:** John Moore; **Room:** Mt. Ypsilon: Tower II
- 6 - Environmental Justice across the LTER Network: long-term and multi-scale understandings of past, present, and future. - **Organizer:** Christopher Boone; **Room:** Rainbow: B
- 7 - Ecosystem Informatics Education and Research - **Organizer:** Julia Jones; **Room:** Mt. Ypsilon: Tower III
- 8 - Synthetic Retrospective and Paleo Ecology: Network-level investigations of broad-scale and long-term phenomena - **Organizer:** James Rusak; **Room:** Rainbow: C
- 9 - Hydrologic Information Systems: LTER and Observatory Information System Collaborations - **Organizer:** David Maidment; **Room:** Bilheimer Dodge
- 10 - Powerful new molecular tools in soil microbial ecology: insights and utility for long-term studies - **Organizer:** Richard Boone; **Room:** Rainbow: D
- 11 - Exploring the Effect of Scale-dependent Processes on Ecological Systems using Networked Sensors - **Organizer:** John Porter; **Room:** Hobbs
- 12 - Biogeochemical cross-site intercomparison using the DayCent-Chem model - **Organizer:** Jill Baron; **Room:** Twin Sisters: B
- 13 - Planning Grant - Altered biogeochemical and water cycles - Q1 - **Organizer:** TBD; **Room:** Rainbow: Fireside
- 14 - Planning Grant - Altered biogeochemical and water cycles - Q2 - **Organizer:** TBD; **Room:** Twin Sisters: Fireside
- 15 - Planning Grant - Altered biogeochemical and water cycles - Q3 - **Organizer:** TBD; **Room:** Rainbow: A
- 16 - Planning Grant - Altered biogeochemical and water cycles - Q4 - **Organizer:** TBD; **Room:** Twin Sisters: A
- 17 - Planning Grant - Altered biogeochemical and water cycles - Q5 - **Organizer:** TBD; **Room:** Twin Sisters: C
- 18 - Infectious diseases across the LTER Network II - **Organizer:** Michael Antolin; **Room:** Twin Sisters: D

19 - Ad Hoc - Organizer: TBD; Room: Elm

20 - Ad Hoc - Organizer: TBD; Room: Oak

**Friday, September 22, 2006, Working Group Session 7:  
11:00 AM - 12:00 PM**

- 1 - **Metabolic Theory of Ecology and Stream Ecosystems - Organizer:** Jennifer Shah; **Room:** Wind River: C
- 2 - **Biogeochemical complexity across LTER sites: the what, where and how - Organizer:** Tiffany Troxler-Gann; **Room:** Wind River: B
- 3 - **The Sensitivity of Ecosystems to Climate Change: Bringing LTER Observations and Experiments to Bear on Predictive Capabilities - Organizer:** A. McGuire; **Room:** Sweet
- 4 - **Changing Ecosystem Services: Responses to climate and disturbance and implications for policy change - Organizer:** F. Chapin; **Room:** Wind River: A
- 5 - **Engagement of LTER with Schools and the General Public - Organizer:** John Moore; **Room:** Mt. Ypsilon: Tower II
- 6 - **Environmental Justice across the LTER Network: long-term and multi-scale understandings of past, present, and future. - Organizer:** Christopher Boone; **Room:** Rainbow: B
- 7 - **Ecosystem Informatics Education and Research - Organizer:** Julia Jones; **Room:** Mt. Ypsilon: Tower III
- 8 - **Synthetic Retrospective and Paleo Ecology: Network-level investigations of broad-scale and long-term phenomena - Organizer:** James Rusak; **Room:** Rainbow: C
- 9 - **Hydrologic Information Systems: LTER and Observatory Information System Collaborations - Organizer:** David Maidment; **Room:** Bilheimer Dodge
- 10 - **Powerful new molecular tools in soil microbial ecology: insights and utility for long-term studies - Organizer:** Richard Boone; **Room:** Rainbow: D
- 11 - **Exploring the Effect of Scale-dependent Processes on Ecological Systems using Networked Sensors - Organizer:** John Porter; **Room:** Hobbs
- 12 - **Biogeochemical cross-site intercomparison using the DayCent-Chem model - Organizer:** Jill Baron; **Room:** Twin Sisters: B
- 13 - **Planning Grant - Altered biogeochemical and water cycles - Q1 - Organizer:** TBD; **Room:** Rainbow: Fireside
- 14 - **Planning Grant - Altered biogeochemical and water cycles - Q2 - Organizer:** TBD; **Room:** Twin Sisters: Fireside
- 15 - **Planning Grant - Altered biogeochemical and water cycles - Q3 - Organizer:** TBD; **Room:** Rainbow: A
- 16 - **Planning Grant - Altered biogeochemical and water cycles - Q4 - Organizer:** TBD; **Room:** Twin Sisters: A
- 17 - **Planning Grant - Altered biogeochemical and water cycles - Q5 - Organizer:** TBD; **Room:** Twin Sisters: C
- 18 - **Infectious diseases across the LTER Network II - Organizer:** Michael Antolin; **Room:** Twin Sisters: D
- 19 - Ad Hoc - Organizer: TBD; Room: Elm
- 20 - Ad Hoc - Organizer: TBD; Room: Oak

**Friday, September 22, 2006, Planning Grant: Working Group Session 8:  
3:30 PM - 5:30 PM**

- 1 - **Planning Grant - Climate variability - Q1 - Organizer:** TBD; **Room:** Rainbow: Fireside
- 2 - **Planning Grant - Climate variability - Q2 - Organizer:** TBD; **Room:** Twin Sisters: Fireside
- 3 - **Planning Grant - Climate variability - Q3 - Organizer:** TBD; **Room:** Rainbow: A
- 4 - **Planning Grant - Climate variability - Q4 - Organizer:** TBD; **Room:** Twin Sisters: A
- 5 - **Planning Grant - Climate variability - Q5 - Organizer:** TBD; **Room:** Twin Sisters: C
- 6 - **Planning Grant: Altered biogeochemical and water cycles - Synthesis - Organizer:** TBD; **Room:** Twin Sisters: D

**Saturday, September 23, 2006, Working Group Session 9:  
9:30 AM - 10:30 AM**

- 1 - **Bacterial diversity and dynamics: cross-site contrasts, comparisons and synthesis - Organizer:** Hugh Ducklow; **Room:** Sweet
- 2 - **ILTER: the challenges, contributions, principles of integration, and added value of international collaboration in conducting global multi-scale integrated environmental management and research - Organizer:** Patrick Bourgeron; **Room:** Bilheimer Dodge
- 3 - **Urbanization in context: how problems and their solutions vary among biophysical and societal settings - Organizer:** Nancy Grimm; **Room:** Wind River: A
- 4 - **Shrub Expansion and Dynamics Across the LTER Network: A Cross-Site Synthesis of Patterns, Mechanisms and Consequences - Organizer:** John Briggs; **Room:** Wind River: B
- 5 - **Toward a synthesis of LTER studies of small mammal populations and communities in arid and semiarid ecosystems - Organizer:** Paul Stapp; **Room:** Rainbow: B
- 6 - **Next Generation Tools for Sensor Network Information Systems - Organizer:** Kenneth Chiu; **Room:** Wind River: C

- 7 - Coastal LTER sites in observing systems - Organizer: Robert Christian; Room: Mt. Ypsilon: Tower III
- 8 - Cross-Site Synthesis of ANPP Grasslands Research - Challenges in Data Integration - Organizer: Judy Cushing; Room: Hobbs
- 9 - A multi-scale comparison of hydrologic and biogeochemical impacts of insect and disease outbreaks with forest harvesting - Organizer: Brian Kloeppel; Room: Mt. Ypsilon: Tower II
- 10 - Stable Isotopes: new technologies, novel elements and approaches - Organizer: Stephen Macko; Room: Rainbow: C
- 11 - Planning New Cross-Site Research on Dynamics of Coupled Human-Natural Ecosystems - Organizer: William Freudenburg; Room: Rainbow: D
- 12 - Planning Grant - Biotic structure - Q1 - Organizer: TBD; Room: Rainbow: Fireside
- 13 - Planning Grant - Biotic structure - Q2 - Organizer: TBD; Room: Twin Sisters: Fireside
- 14 - Planning Grant - Biotic structure - Q3 - Organizer: TBD; Room: Rainbow: A
- 15 - Planning Grant - Biotic structure - Q4 - Organizer: TBD; Room: Twin Sisters: A
- 16 - Planning Grant - Biotic structure - Q5 - Organizer: TBD; Room: Twin Sisters: B
- 17 - Planning Grant - Climate variability - Synthesis - Organizer: TBD; Room: Twin Sisters: C
- 18 - Ad Hoc - Organizer: TBD; Room: Twin Sisters: D
- 19 - Ad Hoc - Organizer: TBD; Room: Elm
- 20 - Ad Hoc - Organizer: TBD; Room: Oak

**Saturday, September 23, 2006, Working Group Session 10:  
11:00 AM - 12:00 PM**

- 1 - Bacterial diversity and dynamics: cross-site contrasts, comparisons and synthesis - Organizer: Hugh Ducklow; Room: Sweet
- 2 - ILTER: the challenges, contributions, principles of integration, and added value of international collaboration in conducting global multi-scale integrated environmental management and research - Organizer: Patrick Bourgeron; Room: Bilheimer Dodge
- 3 - Urbanization in context: how problems and their solutions vary among biophysical and societal settings - Organizer: Nancy Grimm; Room: Wind River: A
- 4 - Shrub Expansion and Dynamics Across the LTER Network: A Cross-Site Synthesis of Patterns, Mechanisms and Consequences - Organizer: John Briggs; Room: Wind River: B
- 5 - Toward a synthesis of LTER studies of small mammal populations and communities in arid and semiarid ecosystems - Organizer: Paul Stapp; Room: Rainbow: B
- 6 - Next Generation Tools for Sensor Network Information Systems - Organizer: Kenneth Chiu; Room: Wind River: C
- 7 - Coastal LTER sites in observing systems - Organizer: Robert Christian; Room: Mt. Ypsilon: Tower III
- 8 - Cross-Site Synthesis of ANPP Grasslands Research - Challenges in Data Integration - Organizer: Judy Cushing; Room: Hobbs
- 9 - A multi-scale comparison of hydrologic and biogeochemical impacts of insect and disease outbreaks with forest harvesting - Organizer: Brian Kloeppel; Room: Mt. Ypsilon: Tower II
- 10 - Stable Isotopes: new technologies, novel elements and approaches - Organizer: Stephen Macko; Room: Rainbow: C
- 11 - Planning New Cross-Site Research on Dynamics of Coupled Human-Natural Ecosystems - Organizer: William Freudenburg; Room: Rainbow: D
- 12 - Planning Grant - Biotic structure - Q1 - Organizer: TBD; Room: Rainbow: Fireside
- 13 - Planning Grant - Biotic structure - Q2 - Organizer: TBD; Room: Twin Sisters: Fireside
- 14 - Planning Grant - Biotic structure - Q3 - Organizer: TBD; Room: Rainbow: A
- 15 - Planning Grant - Biotic structure - Q4 - Organizer: TBD; Room: Twin Sisters: A
- 16 - Planning Grant - Biotic structure - Q5 - Organizer: TBD; Room: Twin Sisters: B
- 17 - Planning Grant - Climate variability - Synthesis - Organizer: TBD; Room: Twin Sisters: C
- 18 - Ad Hoc - Organizer: TBD; Room: Twin Sisters: D
- 19 - Ad Hoc - Organizer: TBD; Room: Elm
- 20 - Ad Hoc - Organizer: TBD; Room: Oak

**Saturday, September 23, 2006, Working Group Session 11:  
2:00 PM - 3:30 PM**

- 1 - Losses of foundation species and the consequences for ecosystem structure and function - Organizer: Brian Kloeppel; Room: Mt. Ypsilon: Tower II
- 2 - Ecosystem Modifications of Terrestrial Carbon Sequestration Across LTER Sites - Organizer: Alvin Smucker; Room: Hobbs

- 3 - Bacterial diversity and dynamics: cross-site contrasts, comparisons and synthesis - Organizer:** Hugh Ducklow; **Room:** Sweet
- 4 - International Information exchange, sharing, and cooperation activities - Organizer:** Hen-biau King; **Room:** Bilheimer Dodge
- 5 - Status of Emerging Environmental Observatories and Opportunities for LTER Collaboration - Organizer:** William Michener; **Room:** Wind River: C
- 6 - Urbanization in context: how problems and their solutions vary among biophysical and societal settings - Organizer:** Nancy Grimm; **Room:** Wind River: A
- 7 - Shrub Expansion and Dynamics Across the LTER Network: A Cross-Site Synthesis of Patterns, Mechanisms and Consequences - Organizer:** John Briggs; **Room:** Wind River: B
- 8 - Toward a synthesis of LTER studies of small mammal populations and communities in arid and semiarid ecosystems - Organizer:** Paul Stapp; **Room:** Rainbow: B
- 9 - Using GIS in Education - Organizer:** Allison Whitmer; **Room:** Rainbow: C
- 10 - Linking science with humanities and arts at LTER sites - Organizer:** Frederick Swanson; **Room:** Mt. Ypsilon: Tower III
- 11 - Trends & Legacies in the Social Realm - Organizer:** Ted Gragson; **Room:** Rainbow: D
- 12 - Plant community responses to nitrogen enrichment: Results from a cross-site synthesis - Organizer:** Elsa Cleland; **Room:** Twin Sisters: B
- 13 - Planning Grant - Biotic structure - Synthesis - Organizer:** TBD; **Room:** Rainbow: Fireside
- 14 - Ad Hoc - Organizer:** TBD; **Room:** Twin Sisters: Fireside
- 15 - Ad Hoc - Organizer:** TBD; **Room:** Rainbow: A
- 16 - Ad Hoc - Organizer:** TBD; **Room:** Twin Sisters: A
- 17 - Ad Hoc - Organizer:** TBD; **Room:** Twin Sisters: C
- 18 - Ad Hoc - Organizer:** TBD; **Room:** Twin Sisters: D
- 19 - Ad Hoc - Organizer:** TBD; **Room:** Elm
- 20 - Ad Hoc - Organizer:** TBD; **Room:** Oak

**Saturday, September 23, 2006, Working Group Session 12:  
4:00 PM - 5:30 PM**

- 1 - Losses of foundation species and the consequences for ecosystem structure and function - Organizer:** Brian Kloeppel; **Room:** Mt. Ypsilon: Tower II
- 2 - Ecosystem Modifications of Terrestrial Carbon Sequestration Across LTER Sites - Organizer:** Alvin Smucker; **Room:** Hobbs
- 3 - Bacterial diversity and dynamics: cross-site contrasts, comparisons and synthesis - Organizer:** Hugh Ducklow; **Room:** Sweet
- 4 - International Information exchange, sharing, and cooperation activities - Organizer:** Hen-biau King; **Room:** Bilheimer Dodge
- 5 - Status of Emerging Environmental Observatories and Opportunities for LTER Collaboration - Organizer:** William Michener; **Room:** Wind River: C
- 6 - Urbanization in context: how problems and their solutions vary among biophysical and societal settings - Organizer:** Nancy Grimm; **Room:** Wind River: A
- 7 - Shrub Expansion and Dynamics Across the LTER Network: A Cross-Site Synthesis of Patterns, Mechanisms and Consequences - Organizer:** John Briggs; **Room:** Wind River: B
- 8 - Toward a synthesis of LTER studies of small mammal populations and communities in arid and semiarid ecosystems - Organizer:** Paul Stapp; **Room:** Rainbow: B
- 9 - Using GIS in Education - Organizer:** Allison Whitmer; **Room:** Rainbow: C
- 10 - Linking science with humanities and arts at LTER sites - Organizer:** Frederick Swanson; **Room:** Mt. Ypsilon: Tower III
- 11 - Trends & Legacies in the Social Realm - Organizer:** Ted Gragson; **Room:** Rainbow: D
- 12 - Plant community responses to nitrogen enrichment: Results from a cross-site synthesis - Organizer:** Elsa Cleland; **Room:** Twin Sisters: B
- 13 - Ad Hoc - Organizer:** TBD; **Room:** Rainbow: Fireside
- 14 - Ad Hoc - Organizer:** TBD; **Room:** Twin Sisters: Fireside
- 15 - Ad Hoc - Organizer:** TBD; **Room:** Rainbow: A
- 16 - Ad Hoc - Organizer:** TBD; **Room:** Twin Sisters: B
- 17 - Ad Hoc - Organizer:** TBD; **Room:** Twin Sisters: C
- 18 - Ad Hoc - Organizer:** TBD; **Room:** Twin Sisters: D

## Working Group Abstracts

### Monday, September 18, 2006, Ancillary: Working Group Session 1: 7:00 PM - 9:00 PM

**1 - LTER Information Managers Meeting: Mixer and ILTER IM Presentations - Organizer: Barbara Benson; Room: Wind River: A**  
The mixer is the opening event for the Annual Meeting of the LTER Information Managers. ILTER guests will be giving short presentations on their organizations and information management challenges.

### Tuesday, September 19, 2006, Ancillary: Working Group Session 2: 8:00 AM - 5:30 PM

**1 - LTER Information Managers Meeting - Organizer: Barbara Benson; Room: Rainbow: Fireside; Breakout Rooms: Rainbow: Fireside, A, B, C, D; Twin Sisters: A**  
Annual Meeting of the LTER Information Managers

**2 - Environmental Literacy Working Group - Organizer: Charles Anderson; Room: Twin Sisters: B**  
The Environmental Literacy Working Group

### Wednesday, September 20, 2006, Ancillary: Working Group Session 3: 8:00 AM - 12:00 PM

**1 - LTER Information Managers Meeting: Plenary on working group topics for September 20 - Organizer: Barbara Benson; Room: Rainbow: Fireside**

**Note:** This working group will meet from 8 am to 9 am

Leaders of the September 20 working groups for the LTER Information Managers Meeting will present background material for the working groups and discuss the charges for the working groups. These working groups include: - Information management issues and the LTER Trends project: A drawing board for making cross-site comparisons feasible (9 - 11 am) - Planning Cyberinfrastructure for LTER Network Synthetic Science (11am - noon and 1 - 2:15pm) - Design of Query Interface to LTER Data Catalog: Controlled Vocabularies Working Group (2:30 - 5 pm) More detailed information about these working groups is available in the working group descriptions linked from the ASM schedule.

**2 - LTER Information Managers Meeting: Information management issues and the LTER Trends project: A drawing board for making cross-site comparisons feasible - Organizer: Christine Laney; Room: Rainbow: Fireside; Breakout Rooms: Rainbow: Fireside, A, B, C D**

**Note:** This working group will meet from 9:00 am - 11:00 am

The Trends project is looking at long-term trends in ecological data across the LTER Network, USDA-Agricultural Research Service and USDA Forest Service sites. Products of the Trends project include a book and a website that will be maintained and updated into the future. The Trends project website is an LTER Network Information System (NIS) module that will be maintained by the LTER Network Office. This NIS module will also be a model for developing future NIS modules that address cross-site, synthetic, network level research projects in the future. The LTER Trends project is currently compiling long-term datasets from all 26 LTER sites, as well as several USDA-ARS and USDA-FS rangeland sites. We have found that while many long-term ecological datasets are easily accessed and manipulated online, many others are not. In addition, datasets differ widely in their accessibility, their formats, and their levels of available metadata. This workshop will be organized in two sessions. First, we will briefly introduce the Trends project, demonstrate a prototype of the Trends website and present the challenges encountered while creating and populating the prototype website. Second, we will break out into smaller working groups to allow participants to discuss and propose solutions and approaches to problems being faced. The results of this workshop will positively impact the future development and long-term usefulness of the Trends website and future NIS modules.

**3 - LTER Information Managers Meeting: Planning Cyberinfrastructure for LTER Network Synthetic Science (11am-noon and 1-2:15pm) - Organizer: Barbara Benson; Room: Rainbow: Fireside; Breakout Rooms: Rainbow: Fireside, A, B, C, D**

**Note:** This working group will meet in the morning from 11 am - noon and in the afternoon from 1-2:15 pm

The LTER Network is completing a two year planning process to develop a research program for integrative, synthetic network science and the cyberinfrastructure (CI) necessary to support this endeavor. This working group will provide information gathered through a series of "CI Focus Group" meetings and an opportunity for the LTER community to offer feedback on the current LTER CI Strategic Plan and implementation initiatives. Components of the strategic plan cover the CI needs and requirements for cross-site/network experiments, Network-level data integration, and modeling. Presentations by the LTER Core CI team will provide an overview of the strategic plan. A panel discussion will focus key issues for discussion, and open discussion will be facilitated. The product of the working group will be a document providing feedback on the CI strategic plan.

**4 - LTER Education Committee: Professional Development and Curriculum Development in LTER Education - Organizer: Monica Elser; Room: Bilheimer Dodge**

Working with formal and informal education providers is a keystone to many of the LTER education programs. Many sites also engage in curriculum and/or lesson development. Through this working group, LTER Education Representatives will share the strategies and resources that make their programs successful. Each LTER Education Representative will be asked to contribute to these three sessions through a design framework. This will allow the sessions to be formatted in a manner that will provide for rich dialogue and exchange of ideas. Topics may include, but are not limited to: sharing of strategies, actual activities/lessons, alignment with education standards, curriculum integration, evaluation methods, cross-site activities/proposals.

**5 - LTER Executive Board Meeting - Organizer: John Magnuson; Room: Hobbs**  
Bi-annual meeting of the LTER Executive Committee

**6 - LTER Graduate Student Symposium - Organizer: Chelsea Crenshaw; Room: Wind River: A, B**

**Note:** This symposium lasts all day.

LTER students- We are pleased to announce that the LTER Network Office has agreed to help organize a second graduate student symposium for the students that will attend the All-Scientists Meeting (ASM). The symposium will be held just before the ASM in Estes Park Colorado on the 20th of Sept. Travel day for symposium attendees will be 19 Sept. Below is a preliminary time line for the events of the day. The symposium will be a mix of seminars on how to do cross-site work and tips on collaboration, time for idea generation, and social time to get to know each other. As part of the structure of this meeting, we have proposed that senior graduate students come with workshop topics to lead discussion and engage students earlier in their careers in thinking about cross-site work. Therefore, we are soliciting ideas for workshops from graduate students. We will accept ideas for workshops from students at any stage, but particularly encourage students who have attended ASM before, or who attended the 1st Student Symposium (at H.J. Andrews Exp. Forest in 2005) to submit ideas for workshops. At this point, if you are interested in leading a workshop, please e-mail Chelsea (chelsea1@unm.edu) with the general topic area (e.g., aquatic-terrestrial linkages, plant-microbe interactions, N retention in watersheds). We will put out another e-mail after we get this initial idea list, to call for a more detailed explanation of the workshop. After the full workshop proposal is put in by a leader, all of the students that are attending the meeting will be matched with a break-out group/workshop, which will meet for idea generation in the afternoon. The goal of these breakout sessions is to introduce you to people interested in your self-selected area, and to refine a potential question for the group to work on in the future. We hope you're as excited as we are to have a 2nd gathering of LTER students! Please let us know if you have any questions. Preliminary Schedule for Student Symposium: 8:30-9 Introduction and Welcome, 9-10 Fostering graduate student cross-site research - the what, why and how? (Seminar), 10-10:30 LTER Grand Challenges and Graduate Student Research (Seminar), 10:30-10:45 Break, 10:45-noon Avenues for cross-site synthetic research after graduate school (Seminar), noon-1 Lunch, 1-5 Breakout groups meet (workshops), 5:30-6:30 Dinner, 7 - ? Mixer and site poster session.

**7 - LINX II Workshop - Organizer: Patrick Mulholland; Room: Twin Sisters: Fireside**

Update on progress of the LINX project

**Wednesday, September 20, 2006, Ancillary: Working Group Session 4:  
1:00 PM - 5:00 PM**

**1 - LTER Information Managers Meeting: Planning Cyberinfrastructure for LTER Network Synthetic Science (11am-noon and 1-2:15pm) - Organizer: Barbara Benson; Room: Rainbow: Fireside; Breakout Rooms: Rainbow: Fireside, A, B, C D**

**Note:** This working group will meet in the morning from 11 am - noon and in the afternoon from 1-2:15 pm

See Ancillary: Working Group Session 3 Number 3 for abstract

**2 - LTER Information Managers Meeting: Design of Query Interface to LTER Data Catalog: Controlled Vocabularies Working Group (2:30 - 5 pm) - Organizer: Nicole Kaplan; Room: Rainbow: Fireside; Breakout Rooms: Rainbow: Fireside, A, B, C D**

**Note:** This working group will meet from 2:30 - 5 pm

This ASM session will discuss ongoing work in the design of query interfaces for LTER data through the use of controlled vocabularies, and develop plans for additional work. A common challenge for researchers involves discovery of data and information of interest. A working group formed at the 2005 LTER Information Management meeting developed a strategy for evaluating existing resources and possible collaborations in the development of a hierarchical controlled vocabulary for describing and discovering data sets. The LTER Metacat system does implement a rudimentary browse interface with six major categories with 15-20 terms each (total ~80), but the consensus of the group was that a richer hierarchy would be valuable addition. Currently the keywords used to characterize most LTER datasets are sparse and uncontrolled, meaning that they are specified entirely by the data creator and are inconsistent in their application. In this workshop, we would like to continue to identify possible ways of improving data discovery through the use of controlled vocabularies, with the goal of improving searchability and improving the "browse" interface. Subsequent to the 2005 IM meeting, keywords and key terms have been extracted from LTER metadata and bibliographic citations and tallied by number of sites and number of occurrences. The frequency of use of these keywords will be compared to existing thesauri that are already being developed. We have begun to evaluate existing resources and possible collaborations in the development of a hierarchical controlled vocabulary for describing data sets. These resources include the GEMET (<http://www.eionet.eu.int/GEMET>), which has the potential to translate terms to other languages and the NBII Thesaurus (<http://nbii-thesaurus.ornl.gov>). Additionally, the SEEK project, in collaboration with NCEAS, is also developing additional ontologies that should be evaluated. There are also more general resources such as Wikipedia that may be additional sources for ontology information. At this ASM session, interested participants will discuss next steps in the evaluation process and will explore developing prototype applications that capitalize on such existing thesauri and ontologies for the LTER Metacat query interface and/or creating "enriched" Ecological Metadata Language Documents.

**3 - LTER Executive Board Meeting - Organizer: John Magnuson; Room: Hobbs**

See Ancillary: Working Group Session 3 Number 5 for abstract

**4 - LTER Education Committee Meeting: Re-Inventing the Schoolyard LTER Web Pages - Organizer: Monica Elser; Room: Bilheimer Dodge**

The LTER network has recently redesigned their website. It seems appropriate at this time to provide the network with a framework and direction for creating Schoolyard LTER Web pages that better reflect all the education and outreach efforts of the network. LTER Education Representatives participating in this working group will create this new framework and provide suggestions to make the web pages more effective in communicating the outstanding education and outreach programs of the LTER network.

**5 - LTER Graduate Student Symposium - Organizer: Chelsea Crenshaw; Room: Wind River: A, B; Breakout Rooms: Wind River: A, B, C; Mt. Ypsilon: Lobby Tower I, II; Oak, Elm, Birch**

**Note:** This symposium lasts all day.

See Ancillary: Working Group Session 3 Number 6 for abstract

**6 - LTER Social Science Committee Meeting: LTER Social and Interdisciplinary Research and Applications - Organizer: Morgan Grove; Room: Sweet**

This meeting is for LTER social scientists and those interested in interdisciplinary research and applications. All individuals who attended the Athens workshop (2005) and any other interested parties are invited. The purpose of the meeting is to provide an update on

activities/findings/events/opportunities. For example, at least three of the sites submitting renewals this year explicitly include a SS component; where does NEON stand; where does LTER Planning stand; etc. "It's a shared communication and community thing."

**7 - LINX II Workshop - Organizer: Patrick Mulholland; Room: Twin Sisters; Fireside**

See Ancillary: Working Group Session 3 Number 7 for abstract

**Wednesday, September 20, 2006, LTER Graduate Student Mixer:  
5:00 PM - 6:30 PM**

**1 - LTER Graduate Student Mixer - Organizer: Chelsea Crenshaw; Room: Willome**

A social event for the LTER Graduate Students

**Thursday, September 21, 2006, Working Group Session 5:  
2:00 PM - 3:30 PM**

**1 - Terrestrial and aquatic N cycling: changing views - Organizer: Walter Dodds; Room: Hobbs**

Over the past few decades, researchers have begun to appreciate that some nitrogen transformations are more important than previously thought, and novel processes have been described that were previously unknown. Isotope tracer studies have often played pivotal roles in understanding these processes. Topics that will be considered are: rates of denitrification and nitrification (previously thought unimportant in oligotrophic environments), rates and pathways of N<sub>2</sub>O production, the importance of dissimilatory nitrate reduction to ammonium (DNRA), and the occurrence and prevalence of anammox (anaerobic ammonium oxidation) pathways. We will concentrate on whole-ecosystem perspectives and attempt to elicit participants studying stream, estuarine, wetland, soil, lake and pelagic ocean habitats.

**2 - Network Level Science Planning Workshop for Integrating Human Behavior into - Organizer: Stephen Swallow; Room: Bilheimer Dodge**

This workshop will initiate discussion to integrate ecological research with social science research at multiple sites, beginning with such questions as why do humans migrate between ecosystems and landscapes; how does human migration impact ecological functions and in turn, how do ecological alterations change the distribution, perception of and access to natural amenities; what leads some humans to fragment landscapes and cause more or less direct impacts on ecosystems; how do human values evolve as ecosystems change; and what aspects of social and natural systems affect the choices made and impacts created over time? A group of economists and social scientists are working to integrate natural scientists into a team to establish research around coastal, mountain and agriculture-related sites. Proposed plans include multi-scale, dynamic models of coupled linkages among ecosystem functioning, natural amenities, human settlement patterns, land use and conservation actions; surveys at multiple sites to track individuals' location decisions and plot-level changes over time and collect economic, institutional, land use, ecological and physical data at multiple scales; manipulative experiments to identify human reactions to change in knowledge or environmental literacy; and auction mechanisms to lead human communities to different local or global carbon balances or nutrient loadings. The workshop intends to initiate a multi-site plan for continental-scale integrated and comparative research within the LTER Network Level Research planning process, and to encourage sites to consider coordinating a part of their own research with this effort.

**3 - Ecosystem Response to changes in climate in cold regimes - Organizer: William Lyons; Room: Sweet**

This workshop will examine the impact of changing temperatures and precipitation on the structure and function of ecosystems in polar regions, alpine areas, and other regions where snow and/or ice are important environment factors.

**4 - Community age and assembly in a phylogenetic context: Forging links between ecology and evolution in the LTER framework - Organizer: Jeannine Cavender-Bares; Room: Mt. Ypsilon: Tower I**

Research at LTER sites has traditionally been dominated by an ecosystem perspective with links to community, population and organismal studies. Spatially reticulated species and environmental data collected in this context now provide a unique opportunity to incorporate an evolutionary perspective. This workshop will explore the role of evolutionary history and community age in the assembly of communities. Ecologists and evolutionary biologists have long hypothesized that closely related species are more ecologically similar and, hence, compete more strongly than distantly related species. Where competition dominates community assembly, closely related species should co-occur less than expected. At the same time, closely related species often share similar habitats and resource requirements. Therefore, where the abiotic environment dominates in the assembly process, closely related species should co-occur more often than expected. Contrasting expectations about the spatial proximity of closely related species arise depending on the relative importance of species interactions versus environmental filtering. Both depend on species' phenotypes. We therefore propose to compile a database of species functional traits that have previously been identified as critical to performance. The phylogenetic structure of communities may also be influenced by the extent to which constituent species have interacted over evolutionary time. LTER sites can be ordered by community age starting with sites in which species have interacted throughout much of their evolutionary history, to recently deglaciated sites. Of particular interest would be a comparison of closed communities, such as those with high degrees of endemism, to open communities that are recently assembled. The proposed analyses form the foundation for experimental manipulation. For example, exotic invasions provide a natural experiment to test whether communities with close relatives to non-native invaders are more or less vulnerable to invasion, and under what conditions. Species-addition experiments can test the importance of phylogenetic relationships versus functional similarity in community assembly. Previous studies addressing these questions are limited in scope and spatial scale. A cross-site initiative to examine the phylogenetic structure of communities and functional mechanisms underlying emergent patterns would forge an important link between ecology and evolution within the LTER framework.

**5 - LTER's "Schoolyard Series" of children's books: an overview of the publication plan and process - Organizer: Diane McKnight; Room: Wind River: A**

One important goal of the LTER network is to educate a new generation of scientists. As one measure to address this goal, the publications committee of the LTER network has launched the Schoolyard Series. The mission of the Schoolyard Series is to engage children and their families in learning about the earth's ecosystems, both locally and internationally, through narratives that reflect the dynamic research being conducted at the National Science Foundation's Long-Term Ecological Research Sites. This workshop will include an overview of the approach for the Schoolyard Series and current plans. The process of developing a book proposal for a site will be discussed in detail by the

publisher, Moonlight Publications, and an example proposal and timeline for a book "in process" will be presented. There will be an opportunity for informal discussion of a wide range of related topics, especially how to find a narrative, the importance of "voice", and the relationship between the narrative and the illustrations. Some of the participants from the children's publishing community who gave presentations included in the DVD prepared from the previous July 2005 workshop may attend and be available to answer questions.

**6 - High performance geographical information systems for synthesis across ecological research sites - Organizer: Theresa Valentine; Room: Wind River: B**

LTER sites are developing high performance Geographic Information Systems (GIS) to facilitate synthesis across sites. Technologies are emerging that will further enhance the ability to spatially analyze temporal data and develop models that can be shared across sites. The workshop will highlight GIS development projects around the LTER network, emerging tools, and will investigate additional GIS resources and tools needed to assist researchers with synthesis analysis. The workshop participants will identify issues, barriers, existing resources, and the potential for collaborative efforts with partners.

**7 - Chlorophyll fluorescence monitoring at selected LTER Network sites - Organizer: Richard Boyce; Room: Rainbow: D**

Fluorometry, the measurement of chlorophyll fluorescence, has become a fairly routine & field-worthy physiological technique in recent years as fluorometer instrumentation has been refined. We believe it has matured enough that it may now be used for ecologically valuable measurements. The two main parameters that can be measured are: a) plant stress as a function of environmental conditions (Fv/Fm); and b) quantum yield,  $\Phi$ PSII, of PSII (photosystem II). Fv/Fm, which is measured in the dark, can be used to quantify photoinhibitory damage caused by stress, as it is an integrated function of the stressors affecting the plant.  $\Phi$ PSII, which is determined in the light, can be used to calculate the electron transport rate, which is often related to the photosynthetic rate. More recently, it has been recognized as an indicator of the photoprotective role played by the xanthophyll cycle against excess radiation. An understanding of how these parameters vary across a range of dominant plant species, and as a function of environmental conditions, would be quite valuable input to ecosystem model parameterizations, especially when integrated with other physiological measurements. Foliar chlorophyll fluorescence measurements would be obtained under predawn and in high light conditions to obtain both Fv/Fm and  $\Phi$ PSII. It would be particularly useful to obtain a comparative predawn data set by ecosystem type, in concert with standard network monitoring programs, so that multivariate statistical models could be developed. These models would provide statistical quantification of plant stress dependence on potential stressors, both natural and anthropogenic, that are monitored at LTER sites. "LTER fluorometry" has been used at the Niwot subalpine forest, and we would like to initially bring fluorometry to a few other LTER forest sites. Harvard Forest and Andrews LTERs have indicated interest in having fluorometry measurements brought to their sites. Sampling standardization issues could be fully assessed and addressed by coordination across a small number of LTER sites. Fluorometers may be purchased for approx. \$13,000, and measurements usually take only a few minutes to perform. After standardization, field sampling could be undertaken by undergraduate students (possibly REU students) at quite low costs since commodity costs associated with the use of fluorometers are extremely low and largely confined to occasional battery replacement.

**8 - Disproportionality, Scale and Human Behaviors in Ecosystems - Organizer: Pete Nowak; Room: Rainbow: A**

Disproportionality can be defined as the degree of asymmetry emerging between a specific agricultural behavior, or a set of behaviors, and the resiliency or buffering capacity of the biophysical setting (i.e., space and time) where these actions occur. This relation implies that a small proportion of all social behaviors can cause a large proportion of degradation occurring within an ecological system. It differs from the "ecological footprint" concept in that it focuses on within group rather than between group variance. There are two critical questions that will be explored during this workshop; (1) besides agriculture, does disproportionality also characterize other human ecological relations, and (2) how does disproportionality manifest itself when moving from fine to coarse spatial and temporal scales? There are a number of interesting theoretical questions (linearity in moving from fine-grained to coarse-grained processes, and "legacy" impacts on ecological systems) that may be explored related to this concept. The first half of the workshop will be used to explore these two questions and related discussion, and the second half will focus on possible collaborative and cross-site research efforts.

**9 - Phenology: data, research, synthesis - Organizer: Geoffrey Henebry; Room: Rainbow: B**

Phenology can be broadly construed as the study of the pace and timing of biotic responses to seasonal forcings. Diverse data on various aspects of phenology exist across the LTER and ILTER networks. Only a few of these datasets have been collected explicitly as phenological data. However, there is phenological information latent in many more LTER datasets waiting to be revealed. Phenological phenomena of interest range from the organism (e.g., dates of flowering, insect emergence, arrival of migrants) to the landscape and beyond (e.g., the onset of spring growth observed from space, modulation of land surface phenology by climate modes). With the development of a National Phenology Network underway, the LTER network can bring some significant baseline information to the table to advance our understanding of phenological dynamics across a changing planet. This session will begin with an overview of some current topics in phenological research and their linkage to global change research. Site specific presentations will be considered for inclusion. The remainder of the session will focus on how to marshal the considerable human and data resources of the LTER/ILTER networks to bring phenological research to a point ready for cross-site synthesis.

**10 - The effect of nitrogen-fixing plants on diversity and species interactions - Organizer: Jennifer Shah; Room: Wind River: C**

The mechanisms influencing species coexistence are poorly understood for most ecosystems. Legumes increase inputs of nitrogen to ecosystems. Legumes have been shown to increase soil fertility and to increase tissue nitrogen and photosynthetic rates in neighboring plants. However, it is unknown (1) whether nitrogen-fixing plants promote increased community diversity by facilitating the coexistence of neighboring plants competing for nitrogen or (2) whether nitrogen-fixing plants generally influence community structure by favoring certain functional groups or species traits. This workshop will explore general patterns of influence by nitrogen-fixing plants on plant community structure. It also will build upon previous LTER workshops and publications addressing the effects of increased resource availability on primary productivity, species invasions, and biodiversity. The goals of this workshop are to: a) discuss conceptual models of multi-species plant competition in the presence of nitrogen-fixing plants; b) share information about the influence of nitrogen-fixing plants on plant biodiversity and community structure; c) compile datasets that can be used for meta-analysis or modeling; and d) pursue a cross-site comparative manuscript summarizing findings of the workshop.

**16 - Ad Hoc: Opportunities for Network Scale Analysis Emerging from the TRENDS Project - Organizer: Debra Peters; Room: Rainbow: C**

The Trends project has collected over 500 long-term data sets from LTER and other sites in the U.S. and Puerto Rico. Initial analyses

conducted by the Trends editorial committee clearly show the potential for interesting and important cross-site and network-level questions to be addressed by these data. The Trends committee invites participation in this workshop where we will discuss multi-site manuscripts that focus on the following topics: (1) ecological responses to ENSO signals, (2) responses to climate variability, (3) people, land use, and vegetation, (4) response to disturbances, (5) response to N fertilization, and (5) ecosystem state changes. Come prepared to think about multiple sites and to join a writing team to create exciting synthetic products.

### **Thursday, September 21, 2006, SPECIAL Working Group Session: 3:30 PM - 5:30 PM**

#### **1 - Private Work Group for Palmer LTER - Organizer: Hugh Ducklow; Room: Rainbow: B**

Private Working Group Session for the Palmer LTER to discuss support and logistics with Raytheon

#### **2 - LTER Information Managers IM discussion - Organizer: Susan Stafford; Room: Rainbow: Fireside**

Group will meet for LTER Information Managers and interested participants to get together to discuss strategic and tactical ways to advance Mentoring Opportunities for the IMs in alignment with the strategic future directions of the LTER Network.

#### **3 - Planning Grant - Site Reps - Organizer: Scott Collins; Room: Twin Sisters: Fireside**

Continued discussion of the LTER Planning Grant

#### **4 - US International Committee - Organizer: Steven Hamburg; Room: Twin Sisters: A**

Meeting of the US International Committee

### **Friday, September 22, 2006, Working Group Session 6: 9:30 AM - 10:30 AM**

#### **1 - Metabolic Theory of Ecology and Stream Ecosystems - Organizer: Jennifer Shah; Room: Wind River: C**

Metabolic rate is the most fundamental metric of living organisms. A Metabolic Theory of Ecology (MTE) has recently been developed that predicts how metabolic rate controls ecological processes at all scales; that is, from individuals to ecosystems. The theory is based on the premise that metabolic processes are some function of body mass, temperature, and the concentration of resources needed to fuel metabolism. The greatest strength of the MTE is that it describes the dependence of metabolic rate on organism size and temperature based on simple physical laws that govern reaction rates and resource distribution in networks. Temperature is a well-known correlate for whole stream metabolism. We will present a meta-analysis of published literature which shows that the slope of the relationship between whole stream metabolism and stream temperature is indistinguishable from that predicted by metabolic theory. We also will show that scaling exponents describing the relationship between production:biomass ratios and body mass for macroinvertebrates within three temperate stream communities are consistent with predicted quarter-power scaling relationships. Aquatic studies conducted through the LTER network provide datasets needed to more fully test the MTE. The MTE, in turn, provides a new framework for reassessing previous syntheses and inter-biome comparisons of whole stream metabolism, aquatic community structure, and rates of biomass turnover. The goals of this workshop are: a) synthesize datasets on whole stream metabolism, stream temperature, organismal mass and metabolic rates, population densities, and rates of biomass turnover; b) test the MTE using these datasets; c) discuss directions for future research; and d) produce a manuscript for publication. The datasets compiled during this workshop will be developed into a relational database and made publicly available through the LTER network web portal.

#### **2 - Biogeochemical complexity across LTER sites: the what, where and how - Organizer: Tiffany Troxler-Gann; Room: Wind River: B**

A unifying feature of many LTER sites is biogeochemical complexity. LTER sites including tundra, coastal, grassland, and riparian biomes express biogeochemical complexity at many spatio-temporal scales. The goals of this workshop are to: 1) identify, define and categorize biogeochemical complexity across LTER sites, and 2) utilize this information to develop new research and better understanding of the implications of biogeochemical complexity in landscape nutrient budgets and effects of human drivers including climate change. We are interested in contributions that capture a range of spatio-temporal scales and diversity of biogeochemical structure and processes. Examples may include, but are not limited to, coarse woody debris, hyporheic zone, tree islands, coastal ecotones, coastal upwelling, frost-boils, hummock-hollow, shrub patches, coupled biogeochemical cycles, enzyme activity. Ideas and contributions, especially from graduate students, are encouraged. Pre-workshop preparation will include: 1) a poll of LTER sites for information related to the structure and ecological functions of biogeochemical complexity and 2) a synthesis of available data to be presented to workshop participants. Two sessions are requested to complete this workshop. Session 1 will focus on information exchange where invited speakers will highlight research relating to biogeochemical complexity across LTER sites and session 2 will involve brainstorming to add new contributions to the current dataset, discuss current and new metrics for quantifying biogeochemical complexity, new research, implications and integrations with spatial datasets. We anticipate that a synthesis paper will result. Some questions and activities that may be addressed are: What are the number, range and diversity of biogeochemical structures and/or processes captured by LTER sites? What is the underlying structure that supports biogeochemical complexity across LTER sites? Where does biogeochemical complexity occur? How is biogeochemical complexity measured? What needs to be measured in order to assess what are the most biogeochemical complex LTER sites and why? Does understanding of biogeochemical complexity contribute to revised landscape biogeochemical budgets? Does biogeochemical complexity contribute to ecosystem resilience? What are the effects of human drivers on biogeochemical complexity across LTER sites i.e. climate change etc.?

#### **3 - The Sensitivity of Ecosystems to Climate Change: Bringing LTER Observations and Experiments to Bear on Predictive Capabilities - Organizer: A. McGuire; Room: Sweet**

We propose two sessions at the LTER All-Scientists' Meeting to discuss the following four questions: (1) What have LTER observations told us about the climate sensitivity of ecosystem processes at different time scales?; (2) What have LTER experiments told us about the climate sensitivity of ecosystem processes at different time scales?; (3) What progress has been made in bringing LTER observations and experiments to bear on improving the ability to predict the response of ecosystems to scenarios of future climate change? (e.g., using process-based models); and (4) How do we improve observational and experimental studies to improve the ability to predict the responses of ecosystems to scenarios of future climate change? This proposed working group directly addresses the issue of Ecological responses to

climate change and climate variability, which is one of the grand challenges that have been identified by the LTER planning grant. This working group also interfaces with the new Trends Project, which is collecting and synthesizing data from all sites on changes in climate and ecosystem processes. The first session will be a series of presentations of (1) relationships between the temporal variability of climate and ecosystem processes that have been identified in LTER observations and experiments, and (2) process-based modeling studies that have made use of LTER observations and experiments in predicting ecosystem responses to scenarios of future climate change. The second session will be a product-oriented discussion aimed at developing an assessment of the four questions that are the focus of the working group. The output will be relevant to LTER planning process for the grand challenge of Ecological responses to climate change and climate variability, and the group will determine whether this is best done as a manuscript for publication (e.g., *BioScience*), or a short report/white paper. In addition to the questions for the working group, we also expect to identify potential opportunities for cross-site research and analysis of data being organized by the Trends Project.

**4 - Changing Ecosystem Services: Responses to climate and disturbance and implications for policy change - Organizer: F. Chapin; Room: Wind River: A**

Stuart Chapin, Steve Carpenter, and Ann Kinzig We propose two sessions at the LTER All-Scientists' Meeting to discuss the impacts of changes in climate and disturbance regime on ecosystem services, i.e., the benefits that society derives from ecosystems. This directly addresses the overarching question of the LTER network, with an emphasis on the societal impacts of past and projected ecological changes. The workshop is a follow-up to at least three activities: (1) the 2004 Alaska LTER Coordinating Committee workshop on climate-disturbance interactions, (2) the Millennium Ecosystem Assessment of ecosystem services, and (3) the Resilience Alliance exploration of resilience and change in social-ecological systems. The first session will be a series of 3-4 short presentations followed by discussion. The talks will present conceptual frameworks for documenting climatic and disturbance impacts on ecosystem services across the LTER network. We will compare the climatic and disturbance sensitivities of different classes of ecosystem services: (1) supporting services (ecosystem and population processes), (2) regulating services (regulation of climate, water, disease, and disturbance regime), (3) provisioning services (food, water, wood, fuel), and (4) cultural services (aesthetic and spiritual benefits, cultural identity, and recreation/tourism). Each talk will emphasize circumstances where a change in ecosystem services has altered the management (positively or negatively) of ecosystems that provide these services. This should provide a basis for predicting what types of ecosystem changes are most likely to lead to policy responses. We hypothesize that changes in regulating and cultural services are most likely to lead to policy change in non-agricultural ecosystems. The second session will be a product-oriented discussion aimed at developing a simple rule-based conceptual model of the impacts of changes in climate and disturbance regime on social-ecological systems, with an emphasis on ecosystem services and policy feedbacks. The goal is to develop this conceptual model based on supporting evidence from LTER research. We aim to produce a paper in a journal such as *BioScience*. This paper will seek to identify those what of changes in ecosystem services are most likely to lead to policy shifts.

**5 - Engagement of LTER with Schools and the General Public - Organizer: John Moore; Room: Mt. Ypsilon: Tower II**

We live in an era when our collective future depends on the ability of citizens to understand environmental arguments as they make political and economic decisions. This brings added responsibilities to LTER scientists. We propose two sessions focusing on ways that LTER scientists can engage K-12 schools and the general public, based on discussions in the Education, Outreach, and Training (EOT) committee for the LTER planning grant. The first session will focus on LTER's engagement with schools and the school curriculum. We will focus on the idea of a "learning progression" leading to ecological literacy for high school graduates. Developing such a learning progression will require joint work with educational researchers and policy makers. It will also require attention to the role of scientific understanding with respect to other dimensions of environmentally responsible citizenship, such as social science (civics) literacy, values and awareness, self efficacy, and action/decision making. The discussion will present information on how educational researchers understand the progression of children's understanding and how LTER scientists could contribute to the development of a more effective curriculum. The second session will focus on LTER's engagement with the general public. We consider evidence about what the public understands and what the public needs to know about the public currently understands about environmental issues, as well as ways in which LTER is currently ineffective in communicating with the public. We consider what a culturally responsive dialog would look like and where should the locus of control should reside in defining ecological issues and ecological science. We consider how to be receptive and responsive to the public while maintaining a degree of autonomy as an academy.

**6 - Environmental Justice across the LTER Network: Long-term and multi-scale understandings of past, present, and future. - Organizer: Christopher Boone; Room: Rainbow: B**

Environmental justice (EJ) is the principle that all people have the right to equal protection from environmental laws and the right to participate in environmental decision making. A major component of EJ is the study of environmental equity, the analysis of the spatial distribution of environmental hazards (disamenities) in relation to racial, ethnic, and socioeconomic groups. Recent scholarship has also focused on the distribution of environmental amenities, such as green space and clean air, as an environmental equity and justice issue. This workshop will provide a forum for the exchange of information on novel and innovative methodologies for the collection and analysis of environmental justice data, at various temporal and spatial scales. In the first session, brief presentations will summarize applications of promising methodologies and data sources for analyzing outcome equity (pattern of environmental amenities and disamenities) and process equity (processes or drivers that create patterns of inequity) in environmental justice research. For the second session, the organizers will lead discussion on the potential and pitfalls for cross-site comparative work, and specifically address the challenges of using site-specific data, different spatial (from census block to global) and temporal scales (centuries to present and future), and varying ecologies (urban, agricultural, wilderness). The goal for discussion is to find ways to facilitate meaningful, rigorous, and creative cross-site comparative environmental justice studies within the LTER network. The workshop will finish with discussion on potential research proposals, cross-site research, papers, or future workshops.

**7 - Ecosystem Informatics Education and Research - Organizer: Julia Jones; Room: Mt. Ypsilon: Tower III**

The purpose of this workshop is to (1) exchange information on (a) research projects, (b) graduate programs, and (c) careers in ecosystem informatics; and (2) brainstorm possible future research collaborations in ecosystem informatics, especially those related to the LTER planning grant questions. An informatics revolution is underway in ecosystem science and natural resources policy and management. Many key research areas – climate change, disturbance, ecosystem services, resource management, and human responses to ecosystem change – are limited by common informatics problems. These include: accurately representing biophysical processes in mathematical terms; obtaining, storing, retrieving, and analyzing multiple datasets; testing hypotheses using various models and model versions; assessing

uncertainty in predictions; and scaling or extrapolating findings among systems. Ecosystem Informatics is at the intersection of • computer science (bringing algorithms and representations for manipulation, modeling, and prediction based on large data sets and complex models); • mathematics (bringing a cohesive analytic framework); and • ecosystem science (bringing complex systems rich in interactions, changing contexts, and challenging links with the natural resource management and policy arena). Many graduate students and researchers in the LTER network are involved in research in ecosystem informatics. Examples of research in this area include (1) application of game theoretic and agent-based modeling to markets for carbon credits and their likely impact on global carbon cycling; (2) applied probability and simulation modeling of emergence and spread of disease and/or natural disturbances such as wildfire; (3) network theory applied to understand the form and function of ecological communities, landscape corridors, and fluxes of material in stream networks. Information on graduate education in ecosystem informatics (in conjunction with the Andrews LTER) is available at <http://ecoinformatics.oregonstate.edu>. Background information on ecoinformatics research in the LTER network is available at: <http://www.ecoinformatics.org/>, <http://www.nceas.ucsb.edu/fmt/doc/?nceas-web/informatics>, <http://seek.ecoinformatics.org/>, <http://knb.ecoinformatics.org/index.jsp>. Additional national and international activities are described at <http://ecoinfo.eionet.eu.int/>, <http://www.waite.adelaide.edu.au/ISEI/>, [http://biodi.sdsc.edu/ei\\_informatics.html](http://biodi.sdsc.edu/ei_informatics.html).

**8 - Synthetic Retrospective and Paleo Ecology: Network-level investigations of broad-scale and long-term phenomena - Organizer: James Rusak; Room: Rainbow: C**

Paleoecology and other retrospective approaches present an incompletely realized ability to extend the temporal scope of long-term studies, provide fundamental ecological insights, and improve our ability to forecast, manage and conserve natural and human systems. This workshop seeks to enhance intersite and network-wide synthesis by identifying existing, emerging, and potential research activities that integrate retrospective approaches and datasets with traditional long-term ecological and social science approaches to address critical ecological phenomena (e.g., nutrient cycling, disturbance regimes, threshold dynamics, human adaptations to environmental change) and management issues (e.g., historical range of variation; conservation planning for biodiversity and uncommon taxa; sustainability issues). The workshop will identify current strengths as well as immediate and longer-term opportunities for collaborative efforts investigating integrated ecological phenomena at broad spatial and temporal scales.

**9 - Hydrologic Information Systems: LTER and Observatory Information System Collaborations - Organizer: David Maidment; Room: Bilheimer Dodge**

The Consortium of Universities for the Advancement of Hydrologic Science, Inc (CUAHSI) is an organization of more than 100 US universities are members which is supported by the National Science Foundation to develop infrastructure and services to advance hydrologic science in the United States. The CUAHSI Hydrologic Information System (HIS) program is the component of CUAHSI's activity dealing with providing better access to hydrologic data and analysis capabilities. There are many parallels between CUAHSI HIS and comparable LTER activities, including Climdb, and Hydrodb, the use of EML to describe datasets and tools. The purpose of this workshop is to exchange information about comparable activities in HIS and LTER and explore how each could better use the information system components developed by the other.

**10 - Powerful new molecular tools in soil microbial ecology: insights and utility for long-term studies - Organizer: Richard Boone; Room: Rainbow: D**

Ecosystem ecologists have long sought methods to best examine the microflora that regulate soil nutrient dynamics. Until roughly a decade ago direct examinations of the microflora that regulate key metabolic processes was limited mainly to direct counts, cultures, and biomass determinations. Many microflora, however, cannot be isolated or cultured easily or at all, and physiological processes in culture generally do not reflect those in situ. The past decade has seen the development of molecular tools that identify the functional components of soil microbial communities that regulate the soil nutrient dynamics long studied by ecologists at LTER sites. These powerful new tools offer ecologists the opportunity to directly measure the control of soil processes at the microbial gene level and to identify members of microbial communities that are directly involved in key metabolic processes. Examples of some of the new techniques include (1) stable isotope probing (SIP), which uses labeled nucleic acids as biomarkers and allows linkage between community composition and metabolic function, and (2) quantitation of mRNA, which can be used to directly measure expression of microbial genes that regulate soil nutrient transformations. Although these new tools offer great promise to capture more directly the functional status of the soil microflora, most ecosystem ecologists are not well informed about the value of the tools, the technical procedures, and methodological limitations. Furthermore there has been insufficient discussion about how best to link molecular information about soil microflora to properties of interest at the ecosystem and landscape levels. The purpose of this working group is to provide an overview of the emerging microbial molecular techniques and to stimulate discussion on how these new approaches can be used to address questions and objectives of the LTER program.

**11 - Exploring the Effect of Scale-dependent Processes on Ecological Systems using Networked Sensors - Organizer: John Porter; Room: Hobbs**

How do dominant drivers of ecosystem processes change as a function of temporal scale ranging from minutes to decades? The LTER network is well-suited to address this question because many sites have comprehensive ecological data that spans one or more decades. Additionally some LTER sites are using new sensor and network technologies that allow us to extend our ability to observe short-term phenomena at time scales of seconds to minutes. This workshop will have as its goal developing new research initiatives, proposals, and collaborative papers aimed at exploiting the capabilities of sensor networks to explore changes in drivers of ecological processes across temporal scales. One possible example is to assess how drivers of CO<sub>2</sub> fluxes change in both aquatic and terrestrial systems as a function of temporal scales ranging from minutes to decades. The workshop will include several brief presentations on existing efforts to understand scale-dependent phenomena using both sensor networks and traditional measurements, followed by discussions aimed at fostering new cross-site research initiatives. The development of new research programs relies on the inextricable links between three critical components: questions, models, and observations. Whenever one of these three components is emphasized or defined, it necessitates that the other two follow or be constrained. Recent advances in the development of sensor networks have pushed heavily on the observation component of this research triad. The other two components (models and questions) need to catch up. Participants in this workshop will explore ways the high-frequency observations enabled by sensor networks can drive both the questions and models of science. They will also address the need for new analytical techniques for extracting information from multiple scales. We hope that products of the workshop will include the organization of new cross-site research teams, the identification of needed analytical techniques, and a journal article on scale-dependent phenomena.

**12 - Biogeochemical cross-site intercomparison using the DayCent-Chem model - Organizer: Jill Baron; Room: Twin Sisters: B**  
Air pollution is a multidimensional problem. Atmospheric deposition stresses ecosystems over regional scales with inputs of acids and nutrients (e.g., sulfur dioxide, nitrogen oxides, ammonium, acidity). These chemicals are transported through soil, vegetation, ground- and surface-waters, causing complex, and seemingly contradictory, responses in ecosystems. A cascade of adverse ecological effects occur that can include fertilization-enhanced forest growth but also forest ecosystem decline, lake/stream eutrophication but also acidification, increases in plant and algal biomass but also a loss of species diversity. Loss of soil nutrient cations and alterations of disturbance regimes are further consequences of atmospheric deposition. Atmospheric deposition of pollutants clearly alters the structure and function of sensitive ecosystems. This workshop will present results from a cross-site modeling exercise that coupled an ecosystem model, DayCent, with a geochemical equilibrium model, PHREEQC, and applied it to a number of LTER, national park, and experimental forest sites. The new model, DayCent-Chem predicts C and N dynamics within forests and leaching of N species and cations from the forests to streams. LTER sites currently include Niwot Ridge, Coweeta, Hubbard Brook, and HJ Andrews. We will present results from the coupled model, DayCent-Chem, for the LTER sites, and compare them to measured values for stream discharge, water chemistry, and terrestrial C and N cycling. We will also present results of scenarios of ecosystem response for the sites under future atmospheric deposition and climate scenarios. Our objectives are to share our progress with LTER scientists, discuss application or results to development of ecological indicators and critical loads for changes in biogeochemistry at each site, consider what the model tells us about future data that need to be collected and made available for modeling at LTER sites, and consider future activities that include more LTER and non-LTER sites that have need for this kind of information. We also seek input for further model refinement to capture critical ecosystem processes that might affect the relationship between N and acid loading and stream water profiles.

**13 - Planning Grant - Altered biogeochemical and water cycles - Q1 - Organizer: TBD; Room: Rainbow: Fireside**  
Continued discussion of the LTER Planning Grant

**14 - Planning Grant - Altered biogeochemical and water cycles - Q2 - Organizer: TBD; Room: Twin Sisters: Fireside**  
Continued discussion of the LTER Planning Grant

**15 - Planning Grant - Altered biogeochemical and water cycles - Q3 - Organizer: TBD; Room: Rainbow: A**  
Continued discussion of the LTER Planning Grant

**16 - Planning Grant - Altered biogeochemical and water cycles - Q4 - Organizer: TBD; Room: Twin Sisters: A**  
Continued discussion of the LTER Planning Grant

**17 - Planning Grant - Altered biogeochemical and water cycles - Q5 - Organizer: TBD; Room: Twin Sisters: C**  
Continued discussion of the LTER Planning Grant

**18 - Infectious diseases across the LTER Network II - Organizer: Michael Antolin; Room: Twin Sisters: D**  
Hardly a day passes without some news of an emerging or introduced infectious disease that threatens health of plants and animals, and the ecosystems that depend upon them. A looming challenge is to predict how disease spreads and how it maintains itself in the environment, especially in wild populations. Potential feedbacks between ecosystem changes (e.g., climate change, land use shifts, species introductions, etc.) and epidemic disease also remain poorly understood. These kinds of ecological questions are the focus of several research groups of the LTER network, in collaborations with biologists studying wildlife, plants, and other organisms (e.g. invertebrates, arthropod vectors), the U.S. Geological Survey, state and federal departments of agriculture, and the Centers for Disease Control. In this workshop we hope that researchers will share 1) Which diseases have emerged or have been introduced into their sites, 2) The suspected or identified factors responsible for observed increases in infection or disease, 3) What long-term data are available to help initiate more detailed epidemiological modeling (e.g. distributions, densities, and movement of organisms), 4) Which kinds of epidemiological models best describe the influence of infectious diseases on ecological communities and ecosystem processes, 5) What tools are available for creating analytical and predictive models of disease spread and persistence? We hope to discuss wildlife and plant disease projects that may provide frameworks for research and for training the next generation of ecological epidemiologists. This workshop follows up on a similar one at the 2003 ASM meeting in Seattle, and a successful modeling workshop hosted at Colorado State University in May, 2005. The hope is, especially, to open LTER scientists to monitoring animal and plant pathogens at their sites, with an eye toward creating predictive models of disease prevalence and understanding the ecological consequences of pathogens on ecosystem properties.

## **Friday, September 22, 2006, Working Group Session 7: 11:00 AM - 12:00 PM**

**1 - Metabolic Theory of Ecology and Stream Ecosystems - Organizer: Jennifer Shah; Room: Wind River: C**  
See Working Group Session 6 Number 1 for abstract

**2 - Biogeochemical complexity across LTER sites: the what, where and how - Organizer: Tiffany Troxler-Gann; Room: Wind River: B**  
See Working Group Session 6 Number 2 for abstract

**3 - The Sensitivity of Ecosystems to Climate Change: Bringing LTER Observations and Experiments to Bear on Predictive Capabilities - Organizer: A. McGuire; Room: Sweet**  
See Working Group Session 6 Number 3 for abstract

**4 - Changing Ecosystem Services: Responses to climate and disturbance and implications for policy change - Organizer: F. Chapin; Room: Wind River: A**  
See Working Group Session 6 Number 4 for abstract

**5 - Engagement of LTER with Schools and the General Public - Organizer: John Moore; Room: Mt. Ypsilon: Tower II**  
See Working Group Session 6 Number 5 for abstract

**6 - Environmental Justice across the LTER Network: long-term and multi-scale understandings of past, present, and future. - Organizer: Christopher Boone; Room: Rainbow: B**  
See Working Group Session 6 Number 6 for abstract

**7 - Ecosystem Informatics Education and Research - Organizer: Julia Jones; Room: Mt. Ypsilon: Tower III**

See Working Group Session 6 Number 7 for abstract

**8 - Synthetic Retrospective and Paleo Ecology: Network-level investigations of broad-scale and long-term phenomena - Organizer: James Rusak; Room: Rainbow: C**

See Working Group Session 6 Number 8 for abstract

**9 - Hydrologic Information Systems: LTER and Observatory Information System Collaborations - Organizer: David Maidment; Room: Bilheimer Dodge**

See Working Group Session 6 Number 9 for abstract

**10 - Powerful new molecular tools in soil microbial ecology: insights and utility for long-term studies - Organizer: Richard Boone; Room: Rainbow: D**

See Working Group Session 6 Number 10 for abstract

**11 - Exploring the Effect of Scale-dependent Processes on Ecological Systems using Networked Sensors - Organizer: John Porter; Room: Hobbs**

See Working Group Session 6 Number 11 for abstract

**12 - Biogeochemical cross-site intercomparison using the DayCent-Chem model - Organizer: Jill Baron; Room: Twin Sisters: B**

See Working Group Session 6 Number 12 for abstract

**13 - Planning Grant - Altered biogeochemical and water cycles - Q1 - Organizer: TBD; Room: Rainbow: Fireside**

See Working Group Session 6 Number 13 for abstract

**14 - Planning Grant - Altered biogeochemical and water cycles - Q2 - Organizer: TBD; Room: Twin Sisters: Fireside**

See Working Group Session 6 Number 14 for abstract

**15 - Planning Grant - Altered biogeochemical and water cycles - Q3 - Organizer: TBD; Room: Rainbow: A**

See Working Group Session 6 Number 15 for abstract

**16 - Planning Grant - Altered biogeochemical and water cycles - Q4 - Organizer: TBD; Room: Twin Sisters: A**

See Working Group Session 6 Number 16 for abstract

**17 - Planning Grant - Altered biogeochemical and water cycles - Q5 - Organizer: TBD; Room: Twin Sisters: C**

See Working Group Session 6 Number 17 for abstract

**18 - Infectious diseases across the LTER Network II - Organizer: Michael Antolin; Room: Twin Sisters: D**

See Working Group Session 6 Number 18 for abstract

**Friday, September 22, 2006, Planning Grant: Working Group Session 8:  
3:30 PM - 5:30 PM**

**1 - Planning Grant - Climate variability - Q1 - Organizer: TBD; Room: Rainbow: Fireside**

Continued discussion of the LTER Planning Grant

**2 - Planning Grant - Climate variability - Q2 - Organizer: TBD; Room: Twin Sisters: Fireside**

Continued discussion of the LTER Planning Grant

**3 - Planning Grant - Climate variability - Q3 - Organizer: TBD; Room: Rainbow: A**

Continued discussion of the LTER Planning Grant

**4 - Planning Grant - Climate variability - Q4 - Organizer: TBD; Room: Twin Sisters: A**

Continued discussion of the LTER Planning Grant

**5 - Planning Grant - Climate variability - Q5 - Organizer: TBD; Room: Twin Sisters: C**

Continued discussion of the LTER Planning Grant

**6 - Planning Grant: Altered biogeochemical and water cycles - Synthesis - Organizer: TBD; Room: Twin Sisters: D**

Continued discussion of the LTER Planning Grant

**Saturday, September 23, 2006, Working Group Session 9:  
9:30 AM - 10:30 AM**

**1 - Bacterial diversity and dynamics: cross-site contrasts, comparisons and synthesis - Organizer: Hugh Ducklow; Room: Sweet**

We propose a session at the LTER All-Scientists' Meeting to address and compare bacteria diversity and dynamics in a range of aquatic and terrestrial soil systems exemplified by LTER Sites. Within the last few years the topic of microbial diversity and its relationship to system function has exploded on the scene of ecology, and many new ideas and advances have come about. We will discuss these advances organized around the following questions: (1) What are the levels of bacterial (and Archaeal) abundance, biomass and production in different systems? (2) What is our current understanding of factors controlling these properties over local to global and synoptic to annual scales? (3) What is known about bacterial community composition (diversity) and its variability in space and time? (4) Can bacterial dynamics be reliably modeled? (5) Are there fundamental similarities and differences among aquatic vs. soil systems? (6) What general principles can we deduce from answers to these questions? We propose an all-day workshop (4 sessions). In preparation for the workshop we will contact all LTER sites and ask interested investigators to complete a questionnaire on their site activities with respect to methods, studies, monitoring, and experiments on microbial diversity and function. The results of this survey will be synthesized, and prior to the ASM we will distribute a guiding document to meeting attendees. Using this document we will structure the first half of the workshop (2 sessions) into a series of invited/contributed talks that will provide basic information and acquaint participants with the diversity of habitats and dynamics studied (this falls under "Format 1, Information Exchange"). A second set of 2 sessions will be devoted to discussion and

synthesis (Formats 2 and 3). First a brainstorming session will be held to revisit our initial workshop questions and discuss possible approaches to answering them. The final session will be devoted to planning for potential cross-site experiments, and we will consider a synthesis paper as a product of the workshop.

**2 - ILTER: the challenges, contributions, principles of integration, and added value of international collaboration in conducting global multi-scale integrated environmental management and research - Organizer: Patrick Bourgeron; Room: Bilheimer Dodge**

The ILTER is at present developing both a new strategic plan and a science plan. The objectives of the workshop are to benefit from and participate in these two on-going initiatives to further develop potential linkage(s) and the process for promoting effective collaboration among members of the ILTER. The workshop will therefore explore whether common national goals are necessary and to what extent the ILTER can sustain differences in domestic needs (e.g., research vs. monitoring). It will also explore the kind of process that can best promote effective collaboration among sites in different national networks. Network-to-network, site-to-site, and multi-site collaboration will be discussed as complementary tools. In light of the two distinguishing features of the ILTER (site-specific questions in the context of long-term research networks), the workshop will address: (1) the challenges and potential contributions of ILTER collaboration in the integration of information and knowledge across disciplines, spatio-temporal scales, ecosystem types, and geographic locations; (2) the principles of integration of information about the biological, physical, and socio-economic domains of ecosystems across scales that are best suited to an international environmental research network; and (3) some of the research and information management themes common to the ILTER environmental research networks. Network-to-network linkages take place at two of three levels of activities conducted in the ILTER network. Network-to-network collaboration can be conducted by cross-site research (e.g., spatial and temporal variability, regionalization, biodiversity) and at the highest levels of network activities (e.g., technical committees, lessons learned). The goal of the workshop is to produce specific recommendations that can be rapidly implemented in light of these two possible scales of linkages. Challenges, contributions, principles of integration, and the added value of ILTER collaboration will be formulated to define future projects, especially in the areas of synthesis and IM, using the following criteria: why collaboration is done, how it is done, the role of theory and decision-makers in framing the problem/question/approach, and the challenges and benefits of the activity.

**3 - Urbanization in context: how problems and their solutions vary among biophysical and societal settings - Organizer: Nancy Grimm; Room: Wind River: A**

Urbanization is a pervasive and increasing type of land-use and land-cover change that is global in scope, even though areal coverage by urban lands is small. The effects of urbanization on ecological systems, and the emerging science of urban ecological systems that incorporates the human component, are traditionally viewed from a local perspective. We wish to move beyond this concept to a more systemic approach, asking what are commonalities in environmental problems (and potential solutions) among all cities, and what differences can be predicted with a knowledge of how individual cities vary along one or more axes. In a workshop at the ESA meeting in Merida, Yucatan, we began to answer this question by comparing coastal, tropical, and desert cities—i.e., a biogeophysical axis. We learned that biogeophysical axes were necessary but not sufficient to account for differences among cities. If urban ecological understanding is to move beyond local, idiosyncratic findings to a more robust theory that addresses how intense human interaction with and manipulation of local environments is driven by and, in turn, influences phenomena at larger scales, socioeconomic, cultural, and political axes must also be considered. Development of this theory will be relevant to integration of urban or settled areas into regional- or continental-scale understanding of ecological systems. DRAFT AGENDA Saturday, 23 September 2006 9:30–10:30 AM Introduction: Objectives of Workshop Grimm Report from the Merida workshop, “The Rise of Cities” Grimm Discussion I. Refining the question all (Grimm, facilitator) Presentations from participants (5 min each) 4 participants Discussion II. Identifying the axes all (Lobo, facilitator) 10:30–11:00 AM Break – individual follow-up discussion 11:00–12:00 noon Presentations from participants (5 min each) 4 participants Discussion III. Data availability all (Redman, facilitator) Form writing teams/small groups Grimm, facilitator 12:00–2:00 pm Working lunch teams or all 2:00–5:30 pm Small group work, as needed PLEASE FILL OUT A QUESTIONNAIRE (obtain from lead PI at your site) prior to the workshop!

**4 - Shrub Expansion and Dynamics Across the LTER Network: A Cross-Site Synthesis of Patterns, Mechanisms and Consequences - Organizer: John Briggs; Room: Wind River: B**

Increased cover and abundance of shrubs in herbaceous-dominated ecosystems is occurring worldwide. Purported drivers of the increase in shrub abundance are numerous and include changes in climate, CO<sub>2</sub> concentration, increased radiation balance, nitrogen deposition, grazing pressure and changes in disturbance regimes such as the frequency and intensity of fire. The general goals of the workshop group proposed are to (1) examine the impact of the expansion of shrubs and short-statured woody plants, (2) determine if there are some general “rules” that are driving this dramatic shift in ecosystem structure (e.g. linked to changes in resource availability or disturbance patterns) (3) to synthesize how these changes affect ecosystems (e.g. biodiversity and carbon budgets) and (4) to discuss how to design experiments to examine the impact of shrub removal across a variety of biomes. We have met once and have established an outline of a manuscript that we hope to submit in the very near future. This working group will allow us to continue our work and to begin developing a grant that will be submitted to NSF.

**5 - Toward a synthesis of LTER studies of small mammal populations and communities in arid and semiarid ecosystems - Organizer: Paul Stapp; Room: Rainbow: B**

Small mammals (rabbits, rodents) are integral components of semiarid and arid systems because of their roles as consumers of plants, seeds and arthropods, as soil disturbance agents, and as food for predators. The proposed Working Group will take advantage of data from more than a decade of similar, long-term studies of small mammals, their resources and predators that have been conducted at western grassland and desert LTER sites and possibly, other long-term studies of small mammals, to identify key biotic and abiotic drivers of small mammal abundance and community structure over time. An examination and synthesis of results emerging from individual sites will be used to generate and test new hypotheses about the relative importance of bottom-up vs. top-down factors in determining patterns in these communities, and about possible interactions between ecological factors and human land use in these systems. Participants will be invited to share results from analyses at individual sites in a symposium format (15-20 min presentations) in the 1st and, possibly, part of the 2nd sessions; the 2nd and 3rd sessions will be devoted to discussion and brainstorming to identify and devise strategies for an eventual cross-site synthesis of these patterns that addresses key questions about the determinants of small mammal community structure and about the roles of small mammals in arid and semiarid ecosystems. Specific questions to be addressed may include: - How does variation in the timing and amount of precipitation influence the structure and composition of vegetation as a resource for small mammals? - To what extent do agricultural land uses interact with climatic variation to influence long-term population dynamics? - What is the relative

importance of secondary (arthropods) vs. primary production as predictors of variation in small mammal population densities, especially given differences among sites in representation of omnivores? - Do changes in community structure over time suggest variation in relative importance of biotic interactions such as competition and predation among sites? - How does the amount and spatial juxtaposition of different landscape types affect small mammal diversity and productivity in adjacent grasslands, and the spatial distribution of their predators? - How effective are existing LTER protocols at addressing the needs and objectives of each of the sites? What changes or new studies should be implemented?

#### **6 - Next Generation Tools for Sensor Network Information Systems - Organizer: Kenneth Chiu; Room: Wind River: C**

Ecologists partnering with computer scientists are advancing tools to manage and process sensor network data. Much computer science has focused on fundamental problems, usually studied in simplified sensor networks. Less attention, however, has been focused on the cyberinfrastructure to scale real sensor networks to thousands of sensors, where the limitations are often not of energy, routing, and bandwidth, but rather of management. This working group will inform the community of ongoing developments in information systems for sensor networks and solicit feedback. North Temperate Lakes LTER received an NSF NEON award to develop technologies to automate the manual configuration, deployment, and maintenance of sensor networks. They are investigating ontologies and RDF to augment traditional metadata for instrument management, and intelligent agents to streamline the data product process. Additional activity includes lake circulation modeling and verification with ADCP, automatic SDI-12 sensor detection and inventory, and the integration of the Antelope Real-Time System. Researchers at the Harvard Forest and the University of Massachusetts are developing tools to ensure that scientific datasets are reproducible and are used correctly to support environmental models and forecasts. Data reliability is a fundamental requirement of science but is increasingly threatened by the growing complexity of collecting and processing data. This project addresses the problem through the development of the “analytic web” (a precise definition of scientific processes using formalisms drawn from software engineering) and software tools to execute such webs. Application to a real-time system for calculating water budgets at HFR using sensor network data will validate the approach. The LTER Network Office (LNO) conducted a pilot study of grid computing's applicability to LTER science. The LNO selected NCSA and Stuart Gage at the Kellogg LTER to implement a scientific computing application using his environmental acoustics research. Gage provided the NCSA Team with an acoustic data set, associated metadata, and code to enable remote querying of the acoustic database and on-line analysis via web services developed at NCSA. The wide-area distribution of acoustic data, metadata, and signal processing to different computational environments highlighted both the capability and bottlenecks to moving and processing large data sets across networks.

#### **7 - Coastal LTER sites in observing systems - Organizer: Robert Christian; Room: Mt. Ypsilon: Tower III**

US LTER and ILTER networks and their sites have been considered an important part of the global observing systems from the inception of these systems. The networks are explicitly incorporated into the “TEMS” database of the Global Terrestrial Observing System (GTOS). The sites are considered prime examples of where long-term and coordinated experiments can be preformed to aid in the assessment and prediction of global and large-scale change. However, the value of LTER in the global observing systems has not been fully realized. Recently, a Coastal GTOS (C-GTOS) has been formed. It is designed to coordinate with global efforts by the Coastal Global Ocean Observing System (C-GOOS) and its regional alliance members, including the US Integrated Ocean Observing System. The coordination entity has been recognized by the Global Earth Observations System of Systems (GEOSS) as its Coastal Community of Practice (C-COP). The proposed workshop is designed to bring together scientists from coastal LTER and ILTER sites to discuss ways in which the network can contribute. This includes both coordinated observations and experimentation that will lead to a better understanding of global change on coastal ecosystems. Bob Christian serves as the C-GTOS Panel Chair and member of the C-COP design team. He will organize the workshop to support their efforts. The workshop will begin with an overview of various coastal observing system efforts, including C-GTOS and C-GOOS. Representatives from each site will be asked to highlight the general themes of their sites. This will be followed by discussion of how more formal arrangements and coordination can occur. C-GTOS has identified a small number of priority products. These will be described to help structure the ensuing discussion. A report will then be prepared to present to the appropriate observing system programs.

#### **8 - Cross-Site Synthesis of ANPP Grasslands Research - Challenges in Data Integration - Organizer: Judy Cushing; Room: Hobbs**

IM's from SEV, JRN, and SGS have been working with computer scientists to develop an integrated NPP database. Their PI's have suggested ecological questions that such a database would address, e.g., How are inter-annual variability in NPP and precipitation related in different biomes? If precipitation is the primary predictor of NPP, then why are JRN and SEV (drier than SGS) more productive? How is production linked to biodiversity, soil type, or topographical positions on the landscape? The next step for this group is to refine these larger questions, translate them into queries on the database, and work collaboratively with ecologists to analyze results. We seek collaboration with ecologists interested in grasslands NPP to work together toward three outcomes: 1) refinement of the broader ecology questions that could be asked about more than one site, 2) determination of how the integrated database can be used to answer those questions, and 3) suggestion of whether this experiment might be broadened to other sites. Specific possible outcomes include: publishable scientific results, a publishable ecology data integration case study, or a contribution to the NIS. We propose two 1.5 hour sessions, the first a brainstorming session and the second a product-oriented session: 1. What is the ecological promise of cross-site NPP synthesis? How do we go beyond prior work on total NPP (e.g., as by Osvaldo Sala) to perform analyses by species or topographic position? What are the important questions, what analyses could be performed, and what data visualizations would ecologists like to see to accomplish this? The session will start with a summary of the Grasslands NPP data integration and the preliminary analyses based on questions posed by contributing ecologists (45 min). This will be followed by a discussion to refine the scientific questions that might be addressed using such a database (45 minutes). 2. Extending the study, in terms of scientific coverage, data, and software. In the second (product-oriented) session, ecologists and informaticians will develop a plan for extending the study in space (more sites, such as KNZ and CDR), in time (to the future), or technically. Technical extensions might include pre-programmed, parameterized analyses, further database work, or extension of the tools, e.g., to work with LNO on a web based data repository of the integrated data that would be “automatically” updated from the site data sets.

#### **9 - A multi-scale comparison of hydrologic and biogeochemical impacts of insect and disease outbreaks with forest harvesting - Organizer: Brian Kloeppe; Room: Mt. Ypsilon: Tower II**

We propose to convene a workshop to review and investigate the impact of plant mortality on watershed hydrology and biogeochemistry. Plant mortality has been increasing in many ecosystems as a result of insect and disease outbreaks. These outbreaks may be by native or exotic organisms that impact areas predisposed to attack due to changes in climate or ecosystem management objectives. Historically, plant

removal by harvesting led to hypothesis-driven experiments to test the impacts of plant removal on watershed hydrology and biogeochemistry. We see numerous parallels and notable exceptions between vegetation manipulation associated with harvesting and impacts from insect and disease outbreaks. We plan to compare the hydrologic and biogeochemical processes operating across multiple scales during these distinct disturbance types. The internal cycling of water and nutrients at individual plant and local soil scales likely control these processes and determine what impact if any we may be able to detect at larger watershed and regional scales. After summaries of case studies from various ecosystems, we will convene a round table discussion of the published, active, and planned field measurements and experiments that are attempting to summarize and forecast the impacts of plant removal by insect and disease outbreaks and harvesting. It is important that we work towards experimental questions and designs that will allow us to ask, analyze, answer, and synthesize regional impacts from various scales of plant mortality. Multiple-scale summary and analysis will also allow us to better forecast the impacts of plant losses on regional hydrology and biogeochemistry and hence on regional financial and social resources.

**10 - Stable Isotopes: new technologies, novel elements and approaches - Organizer: Stephen Macko; Room: Rainbow: C**

Stable isotope analyses remain proven technologies for characterizing long term change within ecosystems. This workshop/ brainstorming group will focus on new technologies of continuous monitoring, or continuous flow analyses, as well as new elements that could be or are being employed for assessment of processes and sources within ecosystems.

**11 - Planning New Cross-Site Research on Dynamics of Coupled Human-Natural Ecosystems - Organizer: William Freudenburg; Room: Rainbow: D**

This session is intended for both social and ecological scientists who want to work on a proposal for the kind of “multi-site, highly collaborative and integrated research initiative” envisioned by the LTER planning group. The focus will be on what the LTER planning process calls the “centerpiece” of the group’s conceptual framework, as well as one of four “Grand Challenges” to be addressed at the network level – “the dynamics of coupled human-natural ecosystems.” This session will build on the work done in the Athens workshop on social sciences (Aug. 2005) and the updates being provided in the Grove and Nowak sessions, but the intention will be to move to the next steps – developing an actual proposal for funding, and planning the coordination of research across sites. The session is open both to persons from sites that have a history of focusing on social science questions and those that do not.

**12 - Planning Grant - Biotic structure - Q1 - Organizer: TBD; Room: Rainbow: Fireside**

Continued discussion of the LTER Planning Grant

**13 - Planning Grant - Biotic structure - Q2 - Organizer: TBD; Room: Twin Sisters: Fireside**

Continued discussion of the LTER Planning Grant

**14 - Planning Grant - Biotic structure - Q3 - Organizer: TBD; Room: Rainbow: A**

Continued discussion of the LTER Planning Grant

**15 - Planning Grant - Biotic structure - Q4 - Organizer: TBD; Room: Twin Sisters: A**

Continued discussion of the LTER Planning Grant

**16 - Planning Grant - Biotic structure - Q5 - Organizer: TBD; Room: Twin Sisters: B**

Continued discussion of the LTER Planning Grant

**17 - Planning Grant - Climate variability - Synthesis - Organizer: TBD; Room: Twin Sisters: C**

Continued discussion of the LTER Planning Grant

**Saturday, September 23, 2006, Working Group Session 10:  
11:00 AM - 12:00 PM**

**1 - Bacterial diversity and dynamics: cross-site contrasts, comparisons and synthesis - Organizer: Hugh Ducklow; Room: Sweet**  
See Working Group Session 9 Number 1 for abstract

**2 - ILTER: the challenges, contributions, principles of integration, and added value of international collaboration in conducting global multi-scale integrated environmental management and research - Organizer: Patrick Bourgeron; Room: Bilheimer Dodge**  
See Working Group Session 9 Number 2 for abstract

**3 - Urbanization in context: how problems and their solutions vary among biophysical and societal settings - Organizer: Nancy Grimm; Room: Wind River: A**  
See Working Group Session 9 Number 3 for abstract

**4 - Shrub Expansion and Dynamics Across the LTER Network: A Cross-Site Synthesis of Patterns, Mechanisms and Consequences - Organizer: John Briggs; Room: Wind River: B**  
See Working Group Session 9 Number 4 for abstract

**5 - Toward a synthesis of LTER studies of small mammal populations and communities in arid and semiarid ecosystems - Organizer: Paul Stapp; Room: Rainbow: B**  
See Working Group Session 9 Number 5 for abstract

**6 - Next Generation Tools for Sensor Network Information Systems - Organizer: Kenneth Chiu; Room: Wind River: C**  
See Working Group Session 9 Number 6 for abstract

**7 - Coastal LTER sites in observing systems - Organizer: Robert Christian; Room: Mt. Ypsilon: Tower III**  
See Working Group Session 9 Number 7 for abstract

**8 - Cross-Site Synthesis of ANPP Grasslands Research - Challenges in Data Integration - Organizer: Judy Cushing; Room: Hobbs**  
See Working Group Session 9 Number 8 for abstract

**9 - A multi-scale comparison of hydrologic and biogeochemical impacts of insect and disease outbreaks with forest harvesting - Organizer: Brian Kloeppel; Room: Mt. Ypsilon: Tower II**  
See Working Group Session 9 Number 9 for abstract

**10 - Stable Isotopes: new technologies, novel elements and approaches - Organizer: Stephen Macko; Room: Rainbow: C**

See Working Group Session 9 Number 10 for abstract

**11 - Planning New Cross-Site Research on Dynamics of Coupled Human-Natural Ecosystems - Organizer: William Freudenburg; Room: Rainbow: D**

See Working Group Session 9 Number 11 for abstract

**12 - Planning Grant - Biotic structure - Q1 - Organizer: TBD; Room: Rainbow: Fireside**

See Working Group Session 9 Number 12 for abstract

**13 - Planning Grant - Biotic structure - Q2 - Organizer: TBD; Room: Twin Sisters: Fireside**

See Working Group Session 9 Number 13 for abstract

**14 - Planning Grant - Biotic structure - Q3 - Organizer: TBD; Room: Rainbow: A**

See Working Group Session 9 Number 14 for abstract

**15 - Planning Grant - Biotic structure - Q4 - Organizer: TBD; Room: Twin Sisters: A**

See Working Group Session 9 Number 15 for abstract

**16 - Planning Grant - Biotic structure - Q5 - Organizer: TBD; Room: Twin Sisters: B**

See Working Group Session 9 Number 16 for abstract

**17 - Planning Grant - Climate variability - Synthesis - Organizer: TBD; Room: Twin Sisters: C**

See Working Group Session 9 Number 17 for abstract

**Saturday, September 23, 2006, Working Group Session 11:  
2:00 PM - 3:30 PM**

**1 - Losses of foundation species and the consequences for ecosystem structure and function - Organizer: Brian Kloeppel; Room: Mt. Ypsilon: Tower II**

This workshop will focus on the impact that the removal or significant reduction in foundation species has on ecosystems. We define foundation species following Dayton (1972) as “a single species that defines much of the structure of a community by creating locally stable conditions for other species, and by modulating and stabilizing fundamental ecosystem processes.” We will review the terrestrial and aquatic impacts and lessons learned from past and on-going foundation species losses (e.g. American chestnut *Castanea dentata* and eastern hemlock, *Tsuga canadensis*, die-back of *Spartina alterniflora* in eastern salt marshes, and decline of coral reefs worldwide). These impacts include both the direct structural ecosystem changes as a result of the foundation species losses as well as indirect impacts on ecosystem function of other abiotic and biotic ecosystem processes including productivity, nutrient cycling, hydrology, food web dynamics, and abiotic conditions. In addition, we will summarize some of the current and projected foundation species losses due to exotic and native pests and pathogens, global climate changes, and direct human impacts. We will convene a round table discussion by workshop participants of the current and planned field experiments that are attempting to summarize and forecast the impacts that changes in foundation species will have on ecosystem structure and function. It is important that we work towards standardized experimental designs that can be implemented at a range of LTER sites, the results of which will allow us to analyze and synthesize regional impacts from various foundation species losses. Broad scale summary and analysis will also allow us to better forecast the impacts of foundation species losses on ecosystem services and hence on regional financial and social resources.

**2 - Ecosystem Modifications of Terrestrial Carbon Sequestration Across LTER Sites - Organizer: Alvin Smucker; Room: Hobbs**

The entire ecosystem relies on the recycling of organic matter and the nutrients it contains. LTER sites have a plethora of metadata and current research projects addressing numerous management practices that modify terrestrial C. We propose a workshop that will compile and summarize both baseline soil C and changes in terrestrial C at several LTER sites. Discussions will be lead by experienced scientists from collaborating LTER sites. Each of the 6 sessions will include round table discussions by experienced scientists from collaborating LTER sites. These data will be assembled from responses to inquires sent to PIs and data managers as well as public data collected from participating LTER websites. It is anticipated that workshop participants will generate outlines for co-authored manuscripts of current LTER soil C data, we anticipate these discussions will generate preliminary plans for cross site multi-disciplinary terrestrial C research, and establish agreed upon C monitoring methods across multiple LTER sites that lead to ongoing evaluations of new techniques for the best monitoring soil C by both LTER sites and future NEON sites. Session One: Listed participants in sessions 1-3 will serve as roundtable discussants along with a Coordinator. Each of the three sessions, 1.0 -3.0, will require 30-40 minutes. 1.0 Ecosystem modifications of terrestrial C Chuck Rice, KNZ and Alvin Smucker, KBS; Roundtable discussions. 2.0 Predictive modeling of terrestrial C sequestration Keith Paustian, Colorado, Cesar Izaurralde, JGCRI, PNNL, Phil Robertson, KBS, Join above roundtable discussants. 3.0 Ecosystem modifications of soil C spatial variability Sasha Kravchenko and Alvin Smucker, KBS, Join above roundtable discussants. Develop outline of projections for future research Session Two: Same format as above. 4.0 Forest, grassland and agroecosystem controls that deposit terrestrial C Serita Frey, HFR, Chuck Rice, KNZ, Kurt Thelen, KBS, Roundtable discussion. 5.0 Ecosystem modifications that control withdrawals of terrestrial C David Wedin, CDR, Jeffrey Heric, JRN, Josh Schimel, BNZ, Join above roundtable discussants. 6.0 New biogeochemistry mechanisms that scale up C sequestration rates in ecosystem soils. Johnne Lehman, Cornell, Join above roundtable discussants 7.0 Specific Recommendations for cross site research (Chuck Rice, Alvin Smucker and two discussion coordinators listed above).

**3 - Bacterial diversity and dynamics: cross-site contrasts, comparisons and synthesis - Organizer: Hugh Ducklow; Room: Sweet**

See Working Group Session 9 Number 1 for abstract

**4 - International Information exchange, sharing, and cooperation activities - Organizer: Hen-biau King; Room: Bilheimer Dodge**

Science is inherently a global activity. Issues of ecology and environment know no boundaries. In order to gain a deeper understanding of ecological processes, the ability to share basic data is essential, across international boundaries. The US LTER Network has understood the need for information management to share data for more than two decades. Other members of the ILTER have not been as active in information management. This is changing, by country and by region (e.g., efforts by East Asia Pacific LTER sites to conduct training and focus on common science issues). We feel it is important to raise the visibility of information management in the ILTER context, and to

share experiences. By sharing experiences and taking first steps to build the human connections between the ILTER information managers, we will be positioning ILTER to help address the need to promote international long term ecological research by sharing data. We envision both presentations to build awareness of the state of country or regional efforts, and a panel discussion of issues of building the community and involving information technology in the future. This workshop will be coordinated with others, on observing systems or sensor networks, thereby increasing possible collaborations among ILTER (which includes US LTER) networks.

**5 - Status of Emerging Environmental Observatories and Opportunities for LTER Collaboration - Organizer: William Michener; Room: Wind River: C**

Three environmental observatories are in various stages of planning, design and implementation. Each observatory is envisioned as creating significant new infrastructure that will transform associated scientific disciplines. The observatories include: (1) the National Ecological Observatory Network (NEON); (2) the Ocean Observatories Initiative (OOI); and the WATer and Environmental Research Systems Network (WATERS Network) which is being developed by the CLEANER Project Office (Collaborative Large-Scale Engineering Analysis Network for Environmental Research and CUAHSI (Consortium of Universities for the Advancement of Hydrologic Science, Inc. We propose a half-day workshop (two 1 and ½ hour sessions). The first session, largely focused on information transfer, will consist of a brief introduction to the workshop, updates on the status of each of the observatories (Barbara Minsker, representing WATERS Network; Bruce Hayden and Todd Crowl, representing NEON and the broader stakeholder community; and one representative from OOI). The second session, focused on product development, will seek input from the audience regarding the various ways that LTER can collaborate with the three environmental observatories. We expect to identify overlapping scientific issues and common cyberinfrastructure needs. A resulting document will identify and prioritize next steps to be undertaken by LTER in conjunction with the three observatories—e.g., participation in workshops where common standards are developed, inter-network communication strategies.

**6 - Urbanization in context: how problems and their solutions vary among biophysical and societal settings - Organizer: Nancy Grimm; Room: Wind River: A**

See Working Group Session 9 Number 3 for abstract

**7 - Shrub Expansion and Dynamics Across the LTER Network: A Cross-Site Synthesis of Patterns, Mechanisms and Consequences - Organizer: John Briggs; Room: Wind River: B**

See Working Group Session 9 Number 4 for abstract

**8 - Toward a synthesis of LTER studies of small mammal populations and communities in arid and semiarid ecosystems - Organizer: Paul Stapp; Room: Rainbow: B**

See Working Group Session 9 Number 5 for abstract

**9 - Using GIS in Education - Organizer: Allison Whitmer; Room: Rainbow: C**

Data visualization and analysis technologies have transformed the practice of science in recent years by capitalizing on the power of the human visual perception system to identify patterns in complex data. Rapid progress in the computing field over the past two decades has made visualization tools increasingly useful in education, making real scientific inquiry even more accessible in classrooms. This workshop will examine new visualization software and technologies designed for rapid-learning curve situations; opportunities for teacher professional development; and examples of GIS-based lesson plans. Presentations will include education researchers, software developers, professional development and evaluation specialists and teachers.

**10 - Linking science with humanities and arts at LTER sites - Organizer: Frederick Swanson; Room: Mt. Ypsilon: Tower III**

Several LTER sites have begun programs to bring together scientists and humanists (e.g., philosophers, nature writers, poets, visual artists) in the field and in other settings to confer about the linked nature of ecosystems, ecological change, and human perception. For example, see: <http://www.fsl.orst.edu/lter/research/related/writers.cfm?topnav=37>). The objectives of these programs include using the tools of the humanities to learn about these ecosystems and to communicate LTER science to the general public. This workshop will involve brainstorming and sharing of experiences among groups that have such programs or who are interested in developing them. If the participants are interested, the scope of discussion could extend to environmental (including human) history and science journalism.

**11 - Trends & Legacies in the Social Realm - Organizer: Ted Gragson; Room: Rainbow: D**

This session would draw from current and emerging strengths in the spatial and temporal analysis of socio-ecological information across the LTER Network. High quality data of various kinds including demographic, economic, and land-based currently exist and are being selectively used to examine past-to-present trends, infer legacies and project to the future a diverse range of processes. Using such data rests on the ability to reconcile between and overcome the challenges inherent to: digital and analog formats drawn from diverse types of archives; different spatial, temporal and conceptual resolutions; disparate category and variable definitions; and, even distinct disciplinary standards. There are also significant technical and cyberinfrastructure issues to collecting, documenting, and managing such information to maximize their utility and ensure their longevity for known as well as unanticipated uses by researchers of various orientations. Presentations appropriate for this session include empirical, data-driven case studies based on the use of demographic, economic, and land-based information; technical and methodological discussions addressing scalability, semantic and format translation of such information; and examples of the incorporation of the knowledge gained from analysis and technical domains to educational venues or to develop user communities able to share approaches and products.

**12 - Plant community responses to nitrogen enrichment: Results from a cross-site synthesis - Organizer: Elsa Cleland; Room: Twin Sisters: B**

Nitrogen (N) is a limiting nutrient to plant growth in many ecosystems, and human-caused N enrichment has the potential to fundamentally alter the structure and functioning of plant communities. Nutrient limitation of primary production has been of interest to ecologists for many years, as a result there are many fertilization experiments in diverse sites across the LTER network. A group of LTER researchers founded PDT-Net (Productivity, Diversity & Traits Network), to synthesize datasets from these fertilization experiments. Although responses to N addition were highly variable, several clear patterns emerged. We found that N addition increased productivity, reduced plant species diversity, and that plant species with particular functional traits (e.g. N-fixation ability, native and annual species) declined with fertilization, while others increased in dominance. Differences among responses of particular species common to several sites, as well as responses of species diversity in general, could be explained by differences in environmental context across sites. Finally, we found that

fertilization altered community structure, by altering the distribution of species rank abundances, and by creating greater spatial heterogeneity. This workshop is an opportunity to share our results with the LTER community and to discuss future directions.

- Elsa Cleland - "Description of the PDT-Net datasets"
- Katharine Suding - "Functional- and abundance-based mechanisms explain diversity loss due to N fertilization"
- Chris Clark - "Biodiversity loss caused by N enrichment depends on environmental context"
- Joe Fargione - "A negative relationship between species richness and productivity response to N addition"
- Steven Pennings - "Do individual plant species show predictable responses to N addition across multiple experiments?"
- Stephen Cox - "N addition increases heterogeneity in plant communities"
- Elsa Cleland - "Functional distance between native and non-native species is not altered by N addition"
- Scott Collins - "Fertilization induced switches in rank abundance - the rare do not rise to power"
- Laura Gough "Responses of clonal plants to nutrient enrichment."

**13 - Planning Grant - Biotic structure - Synthesis - Organizer: TBD; Room: Rainbow: Fireside**

Continued discussion of the LTER Planning Grant

**Saturday, September 23, 2006, Working Group Session 12:  
4:00 PM - 5:30 PM**

**1 - Losses of foundation species and the consequences for ecosystem structure and function - Organizer: Brian Kloeppel; Room: Mt. Ypsilon: Tower II**

See Working Group Session 11 Number 1 for abstract

**2 - Ecosystem Modifications of Terrestrial Carbon Sequestration Across LTER Sites - Organizer: Alvin Smucker; Room: Hobbs**

See Working Group Session 11 Number 2 for abstract

**3 - Bacterial diversity and dynamics: cross-site contrasts, comparisons and synthesis - Organizer: Hugh Ducklow; Room: Sweet**

See Working Group Session 9 Number 1 for abstract

**4 - International Information exchange, sharing, and cooperation activities - Organizer: Hen-biau King; Room: Bilheimer Dodge**

See Working Group Session 11 Number 4 for abstract

**5 - Status of Emerging Environmental Observatories and Opportunities for LTER Collaboration - Organizer: William Michener; Room: Wind River: C**

See Working Group Session 11 Number 5 for abstract

**6 - Urbanization in context: how problems and their solutions vary among biophysical and societal settings - Organizer: Nancy Grimm; Room: Wind River: A**

See Working Group Session 9 Number 3 for abstract

**7 - Shrub Expansion and Dynamics Across the LTER Network: A Cross-Site Synthesis of Patterns, Mechanisms and Consequences - Organizer: John Briggs; Room: Wind River: B**

See Working Group Session 9 Number 4 for abstract

**8 - Toward a synthesis of LTER studies of small mammal populations and communities in arid and semiarid ecosystems - Organizer: Paul Stapp; Room: Rainbow: B**

See Working Group Session 9 Number 5 for abstract

**9 - Using GIS in Education - Organizer: Allison Whitmer; Room: Rainbow: C**

See Working Group Session 11 Number 9 for abstract

**10 - Linking science with humanities and arts at LTER sites - Organizer: Frederick Swanson; Room: Mt. Ypsilon: Tower III**

See Working Group Session 11 Number 10 for abstract

**11 - Trends & Legacies in the Social Realm - Organizer: Ted Gragson; Room: Rainbow: D**

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**12 - Plant community responses to nitrogen enrichment: Results from a cross-site synthesis - Organizer: Elsa Cleland; Room: Twin Sisters: B**

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- Poster 2 - Public Outreach** Author(s): T. McOwiti
- Poster 3 - External Relations** Author(s): LNO Staff
- Poster 4 - Examples of International Space Station Imagery for LTER Sites** Author(s): W. Stefanov, J. Vande Castle
- Poster 5 - Information Management Research and Support** Author(s): M. Servilla, J. Brunt, D. Costa, I. San Gil
- Poster 6 - LTER Network Computing and Communication Infrastructure** Author(s): J. Brunt, J. McGann, D. Farris, G. Shore, M. White
- Poster 7 - Network Office Administration & Services** Author(s): M. McConnell, P. Griego-Madrid
- Poster 8 - Network Research and Education** Author(s): T. McOwiti
- Poster 9 - The Andrews LTER** Author(s): B. Bond, S. Johnson, F. Swanson, J. Jones, K. O'Connell, L. DiGregorio, T. Valentine
- Poster 10 - Arctic LTER: Predicting the Future Ecological Characteristics of the Toolik Lake Region** Author(s): J. Hobbie, G. Shaver, B. Peterson, L. Deegan, A. Giblin, E. Rastetter, J. Vallino, A. Hury, W. Bowden, G. Kling, K. Nadelhoffer, C. Luecke, S. Bret-Harte, L. Gough, S. Hobbie, J. Moore, W. O'Brien, M. Stieglitz, M. Mack
- Poster 11 - Overview of the Baltimore Ecosystem Study LTER: New Integrative Approaches and Urban Legends** Author(s): S. Pickett
- Poster 12 - Alaska's Changing Boreal Forest** Author(s): F. Chapin, J. Hollingsworth, T. Hollingsworth, T. Hanley, A. Lloyd, A. McGuire, B. Riordan, R. Ruess, T. Wurtz
- Poster 13 - Central Arizona-Phoenix Long-Term Ecological Research (CAP LTER) Project** Author(s): N. Grimm, C. Redman, J. Briggs, C. Gries, M. Elser, R. Bolin, J. Allen, S. Harlan, S. Faeth, M. Anderies, J. Stutz, C. Martin, P. Westerhoff, J. Arrowsmith, J. Zehnder, J. Wu, A. Kinzig
- Poster 15 - Nonlinear transitions in the California Current Pelagic Ecosystem** Author(s): M. Ohman, L. Aluwihare, F. Azam, K. Baker, K. Barbeau, S. Bograd, R. Burton, D. Cayan, D. Checkley, T. Chereskin, R. Davis, E. Di Lorenzo, P. Franks, R. Goericke, D. Hyrenbach, M. Landry, A. Miller, G. Mitchell, B. Palenik, D. Rudnick, C. Reiss, B. Simmons, K. Smith, G. Sugihara, W. Sydeman, E. Venrick
- Poster 16 - Cedar Creek Natural History Area** Author(s): J. Corney, D. Tilman
- Poster 17 - Coweeta LTER Research Overview** Author(s):
- Poster 18 - The Next Phase Of Coastal Oligotrophic Ecosystems Research By The FCE LTER Program** Author(s): D. Childers, M. Ruge
- Poster 19 - The Georgia Coastal Ecosystems LTER Program** Author(s): S. Pennings, M. Alber, A. Burd, J. Hollibaugh, S. Joye, W. Sheldon
- Poster 20 - The Harvard Forest, 1907 – 2007: A Century of Investigating Forest Dynamics in New England** Author(s): A. Barker Plotkin, D. Foster
- Poster 21 - Jornada Basin LTER: Landscape Linkages In Arid And Semiarid Landscapes** Author(s): D. Peters, B. Bestelmeyer, K. Havstad, J. Herrick, C. Monger
- Poster 22 - KBS: Long-Term Ecological Research in Intensive Agriculture** Author(s): G. Robertson, S. Gage, K. Gross, S. Hamilton, D. Landis, T. Schmidt, S. Swinton
- Poster 23 - The Konza Prairie LTER Program: Long-Term Research on Grassland Dynamics and Global Change** Author(s): J. Blair, J. Briggs, W. Dodds, K. Gido, D. Hartnett, A. Joern, L. Johnson, D. Kaufman, A. Knapp, B. Sandercock
- Poster 24 - The Luquillo LTER Program** Author(s): N. Brokaw, A. Lugo, W. McDowell, C. Pringle, F. Scatena, W. Silver, R. Waide, J. Zimmerman
- Poster 25 - Recent Research Findings from the McMurdo Dry Valleys LTER** Author(s): W. Lyons, P. Doran, A. Fountain, H. Hunt, D. McKnight, J. Prisco, R. Virginia, D. Wall
- Poster 26 - The Moorea Coral Reef LTER** Author(s): R. Schmitt, S. Holbrook, R. Carpenter, P. Edmunds
- Poster 27 - Synthetic and Interdisciplinary Research at North-Temperate Lakes LTER** Author(s): S. Carpenter, B. Benson, W. Brock, P. Hanson, R. Hunt, T. Kratz, J. Magnuson, B. Provencher, J. Rusak, J. Walker
- Poster 28 - Niwot Ridge LTER Program and Linked Bio-Math Program For Undergraduates** Author(s): M. Williams, T. Seastedt, W. Bowman, A. Townsend, D. McKnight
- Poster 29 - Palmer, Antarctica LTER: Long-Term Ecological Research on the Antarctic Marine Ecosystem: Climate Migration, Ecosystem Response and Teleconnections in an Ice-Dominated Environment** Author(s): H. Ducklow, A. Clarke, W. Fraser, K. Baker, L. Quetin, H. Quinby, R. Ross, B. Simmons, R. Smith, D. Martinson, M. Vernet
- Poster 30 - Plum Island Ecosystems (PIE) LTER Research Program** Author(s): L. Deegan, A. Giblin, R. Buchsbaum, J. Hobbie, J. Morris, M. Mather, R. Pontius, B. Peterson, W. Wollheim, J. Vallino, C. Vorosmarty
- Poster 31 - The Santa Barbara Coastal LTER** Author(s): D. Reed, M. Brzezinski, S. Gaines, S. Holbrook, J. Melack, H. Page, J. Schimel, D. Siegel, L. Washburn
- Poster 32 - Sevilleta LTER IV: Abiotic Pulses And Constraints: Dynamics and Stability in an Aridland Ecosystem** Author(s): S. Collins, C. Dahm, M. Litvak, W. Pockman, K. Vanderbilt, R. Sinsabaugh, E. Muldavin, B. Wolf
- Poster 33 - Shortgrass Steppe Long Term Ecological Research** Author(s): E. Kelly, M. Antolin, I. Burke, J. Derner, J. Detling, A. Knapp, W. Lauenroth, D. Milchunas, J. Moore, J. Morgan, W. Parton, K. Paustian, R. Pielke, P. Stapp
- Poster 34 - Research and Education at the Virginia Coast LTER** Author(s): K. McGlathery, D. Smith, P. Wiberg, J. Porter
- Poster 35 - The Venezuelan Long Term Ecological Research (LTER) Network "Ecored-Venezuela": An Opportunity to Strengthen the Ecological Investigation in the Neotropics** Author(s): A. Torres Lezama, H. Ramirez, E. Vilanova, R. Torrens
- Poster 36 - The Mexican Long Term Ecological Research Network (Mex-LTER)** Author(s): M. Maass, L. Rentería, A. López
- Poster 37 - Sakerat ILTER: Demonstration Site for Sustainable Forest Management in Thailand** Author(s): Y. Trisurat, D. Marod, P. Duengkae, W. Tasen, N. Laemsak
- Poster 38 - The Development of the South African Environmental Observation Network (SAEON)** Author(s): J. Pauw
- Poster 39 - Monitoring environmental and socio-economic change in wetlands at Harry Oppenheimer Okavango Research Centre (HOORC), University Of Botswana** Author(s): C. VanderPost, S. Ringrose

## Session 2: Thursday, September 21, 2006

- Poster 1 - Software tools for automated synthesis of LTER, USGS and NOAA climate and hydrologic data** Author(s): W. Sheldon, S. Remillard
- Poster 2 - Relationships between aboveground woody biomass and soil organic carbon in a semi-desert grassland** Author(s): H. Throop, S. Archer
- Poster 3 - Nitrogen dynamics in the Luquillo Experimental Forest: microbes, biogeochemical cycling, and global change** Author(s): W. Silver, J. Pett-Ridge, D. Cusack, W. McDowell, G. Gonzalez, M. Firestone, D. Lodge
- Poster 4 - Quantifying Acoustic Diversity and Avian Species Occurrence in Selected Habitats at the KBS-LTER using Observations from Remote Wireless Sensor Platforms** Author(s): W. Joo, S. Gage, B. Subir
- Poster 5 - Sea-level rise, salt marshes, and wildlife: Life on the edge at the Virginia Coast Reserve** Author(s): R. Erwin, L. Blum, M. Brinson, R. Christian
- Poster 6 - Effects of Forest Canopy Gaps on Leaf Litter Decomposition** Author(s): C. Kaminski, P. Scarborough, B. Reynolds
- Poster 7 - Effects of Forest Gap Creation on Soil Microarthropods** Author(s): B. Reynolds, C. Kaminski, C. Mckenzie, S. Madson
- Poster 8 - Multi-decadal variability of zooplankton stable N isotopes in two sectors of the California Current System** Author(s): P. Hull, M. Ohman, G. Rau, A. Pierrot-Bults
- Poster 9 - The Luquillo Mountains UNESCO HELP Project: Linking hydrology, water resources management, and water policy in Northeastern Puerto Rico** Author(s): J. Ortiz-Zayas, R. Benitez-Joubert, F. Scatena
- Poster 10 - China-XTBG and US-Luquillo Cross Site Studies** Author(s): M. Cao, L. Sha, M. Warren
- Poster 11 - Landscape-level assessment of native and non-native *Phragmites australis* within marine and mainland source watersheds and evaluation of island/marsh restoration efforts at the Virginia Coast Reserve** Author(s): E. Crawford, J. Fennell, D. Young, J. Porter
- Poster 12 - Cross-scale patterns in shrub thicket dynamics in the Virginia barrier complex** Author(s): J. Porter, C. Bachmann, D. Young
- Poster 13 - Cortical photosynthesis, light attenuation, litter production and physiological stress response in rapidly expanding shrub thickets at the Virginia Coast Reserve** Author(s): S. Brantley, J. Naumann, J. Vick, D. Young
- Poster 14 - Landscape variation in desert rodent community response to grassland-shrubland ecotones** Author(s): A. Campanella, B. Bestelmeyer, D. Peters, G. Roemer
- Poster 15 - Long-Term Studies at Flathead Lake Biological Station** Author(s): J. Stanford, B. Ellis, A. McKee, D. Schenck
- Poster 16 - Spatiotemporal variation in floodplain water chemistry and periphyton in relation to disturbance** Author(s): M. Anderson, T. Bansak, B. McGill, J. Stanford, E. Bernhardt, A. McKee
- Poster 17 - Dynamic respiration in floodplain groundwater: Potential for long-term monitoring** Author(s): B. Reid, R. Hauer, J. Stanford, A. McKee
- Poster 18 - Winter forest soil respiration controlled by climate and microbial community composition, Niwot Ridge, Colorado** Author(s): R. Monson, D. Lipson, S. Burns, A. Turnipseed, A. Delany, M. Williams, S. Schmidt
- Poster 19 - Translating LTER science for society: The Leadville tunnel decommission project** Author(s): M. Williams, M. Wireman, L. Fengjing, J. Gertson
- Poster 20 - The Expansion and Contraction of the Chihuahuan Desert** Author(s): S. Ricketts, C. Monger, B. Nolen
- Poster 21 - Plant Species Richness Patterns in the Forest-Alpine Tundra Ecotone at Niwot Ridge, Colorado** Author(s): H. Humphries, P. Bourgeron, L. Mujica-Crapanzano
- Poster 22 - Functional community structure influences diversity loss due to nitrogen fertilization** Author(s): K. Suding, S. Collins, E. Cleland, L. Gough, C. Clark, J. Fargione, J. Grace, K. Gross, S. Pennings
- Poster 23 - Succession and restoration in Michigan old-field communities** Author(s): S. Emery, K. Gross
- Poster 24 - Positive Non-Additive Effects of Species Richness and Composition on Ecosystem Function** Author(s): J. Kominoski, C. Pringle, B. Ball, M. Bradford, D. Coleman, D. Hall, M. Hunter
- Poster 25 - Perennial grass recruitment from 1858 to present following woody plant invasion at the Jornada LTER** Author(s): D. Peters, C. Monger, J. Herrick
- Poster 26 - Paleolimnology of Lake Fryxell, East Antarctica, based on a 48 kyr sediment sequence** Author(s): N. Topinka, P. Doran, F. Kenig, B. Wagner, R. Scherer, C. Sjunneskog, W. Lyons
- Poster 27 - Benefits of mutualistic tube-dwelling amphipods on coral growth and survival** Author(s): G. Bergsma
- Poster 28 - Bacterial physiological adaptation versus structural shifts in community composition** Author(s): H. Adams, B. Crump, G. Kling
- Poster 29 - Scale, Paleoclimate, and  $\delta^{13}C$  in Pedogenic Carbonate - From the Rhizosphere to the Biome** Author(s): C. Monger, D. Cole
- Poster 30 - Analyzing Mesquite Encroachment onto the Desert Grasslands of a Northern Chihuahuan Desert Playa** Author(s): N. Hansen, D. Parker, J. Herrick, D. Peters, L. Abbott
- Poster 31 - Links Between Banded Vegetation, Scarplets, and Arcuate Dunes in the Chihuahuan Desert** Author(s): S. Weems, C. Monger
- Poster 32 - Social-Ecological Sustainability of Ecosystem Services in a Directionally Changing World: Addressing Climatic Change in Interior Alaska** Author(s): F. Chapin, A. Lovcraft, M. Robards, S. Trainor, G. Kofinas
- Poster 33 - Potential impacts of measurement error on science-based decision-making** Author(s): S. Carpenter, B. William
- Poster 34 - Natural Amenities and Economic Growth – What Does the Research Tell Us?** Author(s): R. Skaggs, N. Gallegos
- Poster 35 - How can LTER data contribute to ecosystem management?** Author(s): B. Bestelmeyer, J. Herrick, C. Monger, C. Steele
- Poster 36 - Jornada Basin Schoolyard LTER: Quality Science Education in the Border Region** Author(s): S. Bestelmeyer
- Poster 37 - Tropical forest restoration: tree islands as recruitment foci in degraded lands of Honduras** Author(s): R. Zahawi
- Poster 38 - The Effect of Natural Enemies on Optimal Pest Control** Author(s): W. Zhang, S. Swinton
- Poster 39 - Woodland owner decision-making: the future of forest landscapes** Author(s): D. Kittredge, C. Schweik, M. LeVert, J. Fish, M. Rickenbach, P. Catanzaro
- Poster 40 - Linking the Konza Prairie LTER Program to Coupled Human and Natural Systems Research in the Flint Hills** Author(s): J. Harrington, Jr., J. Blair, W. Dodds, G. Middendorf
- Poster 41 - Understanding Social Dimensions of Ecological Change in the Luquillo LTER: Opportunities for Engaging the Social Sciences** Presenter(s): T.A. Munoz-Erickson

**Poster 42 - An Analysis of Recreational Target Shooting on The Pawnee National Grasslands, Colorado** Author(s): P. Newman, G. Wallace, W. Mckonly, A. Mcfarland

**Poster 43 - An Introduction to the Long Term Ecological Research (LTER) Trends Project: Comparisons of Human Activities in Ecosystems across Space and Time** Author(s): T. Gragson, B. Collins, N. Rosamilia

**Poster 44 - Trends in long-term ecological data: a network-level, synthesis project** Author(s): D. Peters, C. Laney

**Poster 45 - The Jornada Basin LTER Information Management System: An XML Driven Website and Content Management System** Author(s): K. Ramsey, J. Anderson, B. Nolen

**Poster 46 - Effective Presentation of Data to LTER Scientists and the Public via the Internet** Author(s): B. Collins, J. Derocher

**Poster 47 - An Integrated Environmental Narrative and Modeling of Dynamic Interactions between Landscapes and Humans in the Colorado Front Range, USA, During the 19th and 20th Centuries** Author(s): P. Bourgeron, H. Humphries, T. Seastedt

**Poster 48 - Towards a Theory of Urban Land Cover Classification and a Multidimensional Approach to Spatial Heterogeneity of Cities Integrating Natural Features and Social Artifacts** Author(s): M. Cadenasso, S. Pickett, K. Schwarz, W. Zhou, A. Troy, M. Grove, C. Boone

**Poster 49 - Scaling of metropolitan ecological footprints with population size: the importance of biogeophysical setting** Author(s): J. Lobo, N. Grimm

**Poster 50 - Changing Expectations for Science and Scientists in Natural Resources Decision Making: A Case Study of the Long Term Ecological Research Program** Author(s): D. Lach, B. Shindler, B. Steel, P. List

**Poster 51 - The Phoenix Area Social Survey (PASS): New Possibilities for LTER Cross-Disciplinary Research in the Social and Ecological Sciences** Author(s): D. Ruddell, S. Harlan

**Poster 52 - Research in Infrastructure Studies: Social and Organizational Perspectives on Ecological Data Management** Author(s): F. Millerand, K. Baker

**Poster 53 - Research in Infrastructure Studies: Social and Organizational Perspectives on Ecological Data Management** Author(s): F. Millerand, K. Baker

**Poster 54 - Development of Aralkum Desert in Central Asia** Author(s): W. Wucherer

**Poster 55 - The Harvard Forest Hemlock Removal Experiment: Experimental design and initial response to treatments** Author(s): A. Ellison, A. Barker Plotkin, E. Davidson, E. LeBlanc, H. Lux, B. Mathewson, P. Moorcroft, D. Orwig, K. Savage, P. Templer, D. Foster, B. Kloeppel, P. Bettman-Kerson

**Poster 56 - Grassland ecosystem responses to pulsed vs. pressed inputs of nitrogen** Author(s): M. Smith, A. Knapp, J. Blair, A. Berdanier, D. Hoover, S. Collins

**Poster 57 - Changes in Soil Nutrients in Response to Wind Erosion in Desert Grasslands of the Southwestern United States** Author(s): J. Li, G. Okin, L. Hartman, H. Epstein

**Poster 58 - Vegetation Dynamics in the Forest-Alpine Tundra Ecotone: Mechanisms and Consequences** Author(s): P. Bourgeron, H. Humphries, T. Seastedt

**Poster 59 - Internal wave effects on photosynthesis: experiments, theory, and modeling** Author(s): M. Evans, G. Kling

**Poster 60 - Education, Outreach, and Training (EOT) Activities at the Shortgrass Steppe LTER** Author(s): J. Moore, I. Burke, W. Hoyt, R. Jurin, E. Kelly, H. Al-Kubaisi, M. Lindquist, K. Melville-Smith, A. Pothoff, L. Reinsvold, W. Rosenberg, C. Seemueller, R. Simpson, S. Sprague, D. Swift, R. Tschillard, M. Quirk, R. Wang

**Poster 61 - Integrating Science and Education at the Plum Island Ecosystem Long Term Ecological Research Site** Author(s): L. Duff, R. Buchsbaum

**Poster 62 - Bosque Ecosystem Monitoring Program (BEMP): Partnering environmental education, ecosystem monitoring, and stewardship of the Middle Rio Grande riparian forest** Author(s): K. Eichhorst, D. Shaw, C. Crawford

**Poster 63 - Florida Coastal Everglades LTER Student Organization: Framework and Collaborations for the Future** Author(s): D. Iwaniec, S. Evans, B. Delius, G. Koch

**Poster 64 - University of Minnesota: Schoolyards, Science & Sustainability** Author(s): E. Young-Isebrand, K. Oberhauser, S. Barrott, R. Blair

**Poster 65 - Stream and lake monitoring combined with GIS for inquiry-based learning by middle and high school students** Author(s): S. Barry, S. Sippel, S. Hamilton

**Poster 66 - The Urban Ecosystem Education System in Baltimore: Current Practices and Constraints** Author(s): A. Berkowitz, J. Coffey, J. Gordon, R. Bell

**Poster 67 - Konza Environmental Education Program's Schoolyard LTER: Teaching Science Through Ecology** Author(s): V. Wright, A. Baker

**Poster 68 - Linking the Ecology of Food Production to Nutrition: If I Am What I Eat I'm in Trouble!** Author(s): J. Gordon, E. Reisner, A. Berkowitz

**Poster 69 - Teacher perceptions of the CAP LTER Ecology Explorers summer teacher internship program** Author(s): M. Elser

**Poster 70 - Andrews LTER Education Programs** Author(s): K. O'Connell, S. Bottoms, J. Jones, K. Keable, D. Tullos

**Poster 71 - A VCR Program of Enhancing Understanding of Marine Ecosystems through Teleeducation and Field Experiences** Author(s): T. Szuba, S. Macko

**Poster 72 - An introduction to Luquillo LTER Schoolyard Science and Information Management** Author(s): E. Melendez-Colom

**Poster 73 - Luquillo Schoolyard LTER Program** Author(s): S. McGee, J. Ortiz-Zayas, E. Lopez, C. Dominguez, A. Torres, E. Melendez-Colom, J. Zimmerman, A. Lugo

**Poster 74 - SBC LTER Watershed Education Program** Author(s): A. Whitmer, S. Simon

**Poster 75 - "Out-Reaching the Remote" Palmer Station, Antarctica Education & Outreach** Author(s): B. Simmons

**Poster 76 - "What's Current?" Outreach for Ocean Literacy with California Current LTER** Author(s): B. Simmons

**Poster 77 - School of Sustainability: A New Approach to Education** Author(s): C. Redman, C. Perrings, L. Murphy, B. Shears, L. Kuby

**Poster 78 - Temperature Patterns in Complex Terrain: A Case Study of the Rocky Mountains** Author(s): C. Rochford, J. Lundquist, M. Losleben, D. Clow

**Poster 79 - Cyberinfrastructure for the analysis of acoustic sensor data: Illustrating LTER grid services** Author(s): M. Servilla, R. Butler, M. Freemon, S. Gage

**Poster 80 - Technology and Outreach at MCM** Author(s): C. Gardner, W. Lyons, C. Landis

**Poster 81 - Baltimore Ecosystem Study Data Document, Management, and Sharing: Findings of a Site-Specific Study** Author(s): S. Dalton, J. Walsh

**Poster 82 - Tools for Facilitating Statistical Analysis using Ecological Metadata Language** Author(s): J. Porter

**Poster 83 - A metadata-driven information management system at the Andrews Forest LTER** Author(s): S. Remillard, D. Henshaw

**Poster 84 - A Metadata-Based Framework for Multi-Language Ecological Information Management in East-Asia Pacific International Long-Term Ecological Research** Author(s): C. Lin, J. Porter, M. Jeng, S. Lu, C. Hsiao, C. Chen

**Poster 85 - Palmer LTER: Designing a Queriable Community Data System** Author(s): K. Baker, S. Haber

**Poster 86 - CCE LTER: Information Management (2004-2006)** Author(s): K. Baker, L. Yarmey, J. Wanetick, M. Kortz

**Poster 87 - GIS Data and Tools Available at the SGS LTER** Author(s): B. Flynn, N. Kaplan

**Poster 88 - Antarctic climate cooling revisited: faster, bigger and uncut** Author(s): I. San Gil, C. Gardner, M. Servilla

**Poster 89 - Automating Scaling and Data Processing in a Network of Sensors: Towards a Global Network for Lake Metabolism Research and Education** Author(s): T. Kratz, B. Benson, P. Arzberger, K. Chiu, L. Ding, T. Fountain, P. Hanson, Y. Hu, R. McMullen

**Poster 90 - The CENTINEL Data Archiving Project** Author(s): C. Lehman, A. Keen

**Poster 91 - Eddy covariance measurements of CO<sub>2</sub> flux and the surface energy balance of alpine tundra at Niwot Ridge, Colorado** Author(s): P. Blanken, M. Williams, D. Millar

**Poster 92 - Simulating Energy, Water and Carbon Fluxes at the Shortgrass Steppe Long Term Ecological Research Site** Author(s): A. Beltran, R. Pielke, J. Morgan, I. Burke

**Poster 93 - A new continuum model of planktonic ecosystems** Author(s): H. Fuchs, P. Franks

**Poster 94 - Modeling the impact of recent land cover changes on the stream flows in North-Eastern Puerto Rico** Author(s): W. Wu, C. Hall, F. Scatena

**Poster 95 - Effects of littoral vegetation on hydrodynamic processes in a small shallow lake: What do they imply about water quality?** Author(s): H. Yuan, R. Lathrop, S. Carpenter, C. Wu

**Poster 96 - Intra-annual estimation of phosphorus recycling in Lake Mendota using a 3-D hydrodynamic model** Author(s): A. Kamarainen, H. Yuan, R. Lathrop, C. Wu, S. Carpenter

**Poster 97 - A Simulation Model of the Florida Bay Seagrass Community: Examination of Salinity Effects on Ecological Processes, Community Dynamics and Seagrass Die-Off** Author(s): C. Madden, A. McDonald

**Poster 98 - Spatially defining predator impacts on estuarine food webs: assessing striped bass movements via acoustic tracking in Plum Island Sound** Author(s): M. Mather, J. Finn, R. Muth, L. Deegan

**Poster 99 - Measuring Urban Parcel Lawn Greenness by Using an Object-oriented Classification Approach** Author(s): W. Zhou, A. Troy, M. Grove

**Poster 100 - Viewing land surface dynamics at LTER sites using cooler earthlight** Author(s): G. Henebry, M. Doubkova

**Poster 101 - Experimental investigations into processes controlling stream and hyporheic temperatures, Fryxell Basin, Antarctica** Author(s): K. Cozzetto, D. McKnight, T. Nysten, A. Fountain

**Poster 102 - Melt-water production on Canada Glacier, Taylor Valley, Antarctica: Controls on water availability for a desert ecosystem** Author(s): J. Ebnet, M. Hoffman, A. Fountain, G. Liston

**Poster 103 - Solute response to managed river flow during storm events** Author(s): B. McLean, E. Shock

**Poster 104 - Partitioning of the Water Balance at the Hillslope Scale: A Sprinkler Experiment at Watershed 10, H. J. Andrews LTER** Author(s): C. Graham, H. Barnard, W. Van Verseveld, J. McDonnell, J. Brooks, B. Bond, K. Lajtha

**Poster 105 - The influence of climate-induced variability in prey type and precipitation on growth of Adélie penguin (*Pygoscelis adeliae*) chicks in the Palmer Station Antarctica Long Term Ecosystem Research (PAL LTER) study region** Author(s): E. Chapman, W. Fraser, E. Hofmann

**Poster 106 - Circulation in a coral reef, lagoon, and pass system** Author(s): J. Hench, J. Leichter

**Poster 107 - Wetland Equilibrium Model II: Effect of Rate of Sea Level Rise and Tidal Amplitude on Relative Marsh Elevation and Sediment Organic Matter** Author(s): J. Morris

**Poster 108 - Reintroduction of Gunnison's prairie dogs as vegetation change experiment at Sevilleta LTER** Author(s): M. Friggens, A. Davidson, S. Collins

**Poster 109 - Recovery of intermittent prairie streams from drought** Author(s): J. Murdock, K. Bertrand, W. Dodds, K. Gido, M. Whiles

**Poster 110 - Fishes and floods: stream ecosystem drivers in the Great Plains** Author(s): K. Bertrand, J. Murdock, M. Stone, K. Gido, W. Dodds, M. Whiles

**Poster 111 - Streams and tropical urban landscapes: toward an understanding of their ecology and integrity** Author(s): R. De Jesus, S. Burgos-Caraballo, A. Ramirez

**Poster 112 - Variance and Extremes of Thermal Fluxes and Temperatures in Urban Streams: Effects of Impervious Surface Cover and Runoff** Author(s): H. Kim, K. Belt, C. Welty, R. Pouyat, G. Heisler, M. McGuire, W. Stack

**Poster 113 - Long-term Trends of Persistent Organic Pollutants in Antarctic Seabirds** Author(s): H. Geisz, R. Dickhut, M. Cochran, W. Fraser, H. Ducklow

**Poster 114 - Trade-offs in ecosystem services along a management intensity gradient** Author(s): S. Parr, G. Robertson, A. Corbin

**Poster 115 - A fungal loop model for the N cycle of semiarid grassland** Author(s): S. Collins, C. Crenshaw, L. Green, K. Lipinski, K. Odenbach, A. Porras-Alfaro, M. Stursova, R. Sinsabaugh

**Poster 116 - Precipitation control over watershed nitrogen retention across watersheds: A synthesis of Long-Term Ecological Research** Author(s): E. Kane, E. Betts, A. Burgin, H. Ciliverd, C. Crenshaw, J. Fellman, J. Jones, I. Myers-Smith, J. O'Donnell, D. Sobota, W. Van Verseveld

**Poster 117 - Global Climate change Effect on Soil Biogeochemistry** Author(s): S. Fashu-Kanu, C. Driscoll, P. Groffman, T. Fahey, J. Hardy

**Poster 118 - The Origin of DIRT: the Legacy of Francis D. Hole** Author(s): K. Townsend, B. Caldwell, K. Lajtha

**Poster 119 - Heterogeneity, scale, and biotic responses to disturbance in the Luquillo Experimental Forest: case studies from the Luquillo Forest Dynamics Plot** Author(s): C. Bloch, C. Zimmermann, N. Brokaw, J. Thompson, M. Willig

**Poster 120 - Molecular analysis of basidiomycete diversity in agricultural soils** Author(s): B. Bahnmann, G. Thorn

**Poster 121 - Physiological response of scleractinian corals to high frequency temperature fluctuations** Author(s): H. Putnam, P. Edmunds

**Poster 122 - The Effect of Increased Carbon Dioxide on the Calcification Rate, Linear Extension and Morphology of Reef Corals** Author(s): N. Muehllehner, P. Edmunds

**Poster 123 - Looking for climate change at the ecosystem level: Examination of a 50-year record from Hubbard Brook** Author(s): M. Vadeboncoeur, S. Hamburg, A. Richardson, A. Bailey

**Poster 124 - Impact of Urbanization on Cold Temperature Events in Metropolitan Phoenix, Arizona** Author(s): D. Hartz

**Poster 125 - Space competition and regime shifts on structured landscapes** Author(s): K. Buenau, R. Nisbet, A. Rassweiler

**Poster 126 - Long-term trends in tallgrass prairie grasshopper population and community dynamics, 1982-2005** Author(s): J. Jonas, A. Joern

**Poster 127 - Interactions between a widespread invasive plant and ectomycorrhizal fungi** Author(s): B. Wolfe, R. Stahr, V. Rodgers, K. Stinson, A. Pringle

**Poster 128 - The Konza Prairie Fire Reversal Experiment: Initial Plant and Soil Responses to a Change in Fire Frequency** Author(s): J. Blair, E. Towne, J. Briggs, A. Knapp

**Poster 129 - Assessing wildfire burn susceptibility to invasive plant colonization in black spruce forests of interior Alaska** Author(s): K. Villano, C. Mulder, T. Hollingsworth

**Poster 130 - Physical-biological coupling on coral reefs: current flow reduces coral bleaching and mortality** Author(s): H. Lenihan

**Poster 131 - Quantifying wildfire burn severity in Alaska's boreal black spruce forests: comparing visual and destructive methods of assessment** Author(s): L. Boby, M. Mack, E. Schuur, J. Johnstone

**Poster 132 - The Effects of a Prescribed Burn on Streambed Sediments and Macroinvertebrate Assemblages in the Valle Toledo, Valles Caldera, New Mexico** Author(s): J. McGann

**Poster 133 - Managing Fire with Fire in Alaskan Black Spruce Forests** Author(s): E. Tissier, E. Bernhardt, F. Chapin, T. Hollingsworth, J. Johnstone, M. Mack, T. Schuur, D. Verbyla

**Poster 134 - Effects of Floods on Fish Assemblages in an Intermittent Prairie Stream** Author(s): N. Franssen, K. Gido, K. Bertrand, C. Guy, C. Paukert

**Poster 135 - Effects on a salt marsh ecosystem during 2 years following a brown marsh event** Author(s): A. Marsh, R. Christian

**Poster 136 - Temporal Dynamics of Acoustical Signatures Associated with Alternative Management and Natural Ecosystems** Author(s): M. Quintanilla, G. Bird, S. Gage

**Poster 137 - Ocean glider-based measurements of the California Current Ecosystem** Author(s): M. Ohman, R. Davis, J. Sherman, B. Maurer

**Poster 138 - Understanding mechanisms of shrub invasion of Chihuahuan desert grassland** Author(s): L. Calabrese, S. Collins

**Poster 139 - The Biogeochemical Effects of a Nuisance Macroalgal Crash: A Field Monitoring and Mesocosm Approach** Author(s): A. Hardison, I. Anderson, E. Canuel

**Poster 140 - Forest disturbance history and stand dynamics of the Coweeta Basin, western North Carolina** Author(s): S. Butler, K. Elliott, A. White

**Poster 141 - Impact of Selective Logging on the Carbon Stocks of a Humid Tropical Forest in Venezuelan Guayana: A Need for Long Term Ecological Research in Forest Management** Author(s): E. Vilanova, H. Ramirez, A. Torres\_Lezama, J. Serrano

**Poster 142 - Long-term change in vegetation composition and biomass in a Central European oak forest at the Sikfokut International Long-Term Ecological Research (ILTER) Site, Hungary** Author(s): R. Bowden, L. Nagel, Z. Kotroczo, Z. Krakomperger, M. Papp, J. Toth

**Poster 143 - Physiographic Influences on Fire Patterns and Forest Age Structure in the Western Cascades of Central Oregon** Author(s): A. Tepley

**Poster 145 - Quantifying Categorical Associations to Assess Land Use Change** Author(s): J. Connors, R. Pontius

**Poster 146 - Rapid Assessment of Vulnerability to Drought in the Ipswich River Watershed, MA** Author(s): S. Assefa, K. Del Vecchio, L. Merner, I. Payano

**Poster 147 - Mapping forest disturbance history in the Southern Appalachian Mountains using multi-scale remote sensing imagery and terrain models** Author(s): R. Kirk, P. Bolstad

**Poster 148 - Effects of dominant grass removal on plant diversity in restored tallgrass prairie** Author(s): K. Schmitt, J. Blair

**Poster 149 - Effects of high vs. low rainfall conditions on base flow nutrient discharges to Eastern Shore Coastal Lagoons in the Virginia Coast Reserve LTER** Author(s): J. Wu Stanhope, I. Anderson

**Poster 150 - Altered Hydrology: Effects on the Transport and Breakdown of Organic Matter in Urban Streams** Author(s): K. Belt, C. Swan, R. Pouyat, S. Kaushal, P. Groffman, W. Stack, G. Fisher

**Poster 151 - Meteorological forcing and the connectivity between the hypolimnion and euphotic zone in Arctic lakes.** Author(s): R. Smyth, S. MacIntyre, A. Giblin, G. Kling

**Poster 152 - The Impact of Fire on Soil Microbial Composition, Function, and Subsequent Nutrient Mineralization Rates Along a Burn Severity Gradient in Interior Alaska** Author(s): J. Garron, E. Kane

**Poster 153 - Paleolimnology and paleoecology of the Lake Fryxell basin using molecular fossils: Preliminary results** Author(s): C. Jaraula, F. Kenig, P. Doran

**Poster 154 - An Investigation of the Brown Marsh Phenomenon** Author(s): W. Pate, K. Sundberg, J. Morris

**Poster 155 - Differentiation in drought response strategies of co-occurring willow (Salix) species** Author(s): J. Savage, J. Cavender-Bares

**Poster 156 - Post-fire landscape heterogeneity in the boreal forest: implications for moose winter foraging habitat** Author(s): R. Lord, K. Kielland

**Poster 157 - Acoustical Properties of Soil Aggregates Associated with Alternative Management and Natural Ecosystems** Author(s): M. Quintanilla, A. Smucker, S. Gage, G. Bird, E. Park

**Poster 158 - Fine-scale disturbance experiments reveal mechanisms of drought-induced vegetation shifts in semidesert grasslands in Hungary** Author(s): G. Kroel-Dulay, J. Garadnai, B. Lhotsky, E. Kovacs-Lang

**Poster 159 - Hurricane/Storm-driven Hydrology and Materials Exchange in the Estuarine Transition Zone of the Florida Coastal Everglades (FCE)** Author(s): S. Davis, D. Childers, M. Rugge, J. Woods, M. Zucker

### **Session 3: Friday, September 22, 2006**

**Poster 1 - The effects of habitat shape on home range size of Ord's kangaroo rat (*Dipodomys ordii*)** Author(s): B. Ross, B. Wunder

**Poster 2 - A Comparison of the Life History, Morphological, and Behavioral Changes of two Arctic Daphnids to Kairomone from an Invertebrate Predator, *Heterocope septentrionalis*** Author(s): M. Burris, W. O'Brien

**Poster 3 - Recruitment dynamics of the three-spot damselfish, *Dascyllus trimaculatus*, in Moorea, French Polynesia** Author(s): G. Bernardi, S. Holbrook, R. Schmitt, R. Beldade

**Poster 4 - Using livestock grazing to improve habitat for Mountain Plovers: Responses of arthropods, small mammals, and nesting birds to changes in habitat structure** Author(s): S. Newbold, P. Stapp, K. Levensailor, J. Derner, W. Lauenroth

**Poster 5 - Effects of increased temperature and moisture on nematode abundance, diversity and biomass in the McMurdo Dry Valleys, Antarctica** Author(s): B. Simmons, D. Wall, B. Adams, R. Virginia, J. Barrett

**Poster 6 - Indirect effects of cleaner fish on a branching coral** Presenter(s): T. Adam

**Poster 7 - Interactions between desert seed harvester ants (*Pogonomyrmex desertorum*) and granivorous kangaroo rats (*Dipodomys merriami*) in a Sevillea desert creosote bush (*Larrea tridentata*) community** Presenter(s): D. Lightfoot

**Poster 8 - Long-term Fish Population Trends at Andrews Experimental Forest** Author(s): S. Gregory, S. Johnson, R. Wildman, L. Ashkenas

**Poster 9 - The biogeography of reproduction in the sea urchin, *Strongylocentrotus purpuratus*** Author(s): S. Lester, S. Gaines

**Poster 10 - Environmental Variability and Long-Term Change in Adelle Penguin Populations** Author(s): W. Fraser, D. Patterson

**Poster 11 - Effects of taxonomic precision on studies of distribution ecology and the relationship between biodiversity and ecosystem functioning** Author(s): B. Adams, A. Dillman, D. Wall, B. Simmons, E. Ayres, R. Virginia, J. Barrett

**Poster 12 - The Metabolic Theory of Ecology and Resource Saturation Kinetics** Author(s): J. Follstad Shaw

**Poster 13 - Palmer LTER REU study – A Tail of Two Fishes** Author(s): K. Moore, C. Hoffman

**Poster 14 - Temporal and Spatial Patterns of Benthic Microbial Communities in a Subtropical Salt Marsh (Sapelo Island, GA)** Author(s): M. First, J. Hollibaugh

**Poster 15 - Using anadromous herring as an endpoint with which to evaluate the success of coastal river restoration: examining the link between human impacts, river function, and biotic integrity in the Ipswich River, MA** Author(s): J. Smith, M. Mather, J. Finn, R. Muth

**Poster 16 - Climate Change and Phytoplankton Population Dynamics in an Alpine Lake, Colorado, USA** Author(s): C. Flanagan, D. McKnight, E. Gardner, A. Roche

**Poster 17 – Microorganisms: Key players in ecosystem functions** Author(s): S. Cantrell, L. García, F. Rivera, C. Cruz, G. Gonzalez, X. Zou, J. Pett-Ridge, E. Dubinsky, D. Lodge, M. Firestone, W. Silver

**Poster 18 - Cross-site comparisons of root-associated dark septate endophytes from five Long Term Ecological Research sites** Author(s): S. Kageyama, J. Trowbridge, K. Mandyam, C. Fox, A. Riffel, R. Dunn, D. Myrold, A. Jumpponen

**Poster 19 - Patterns of Plant Diversity in Two Salt Marsh Regions** Author(s): A. Kunza, S. Pennings

**Poster 20 - The Luquillo Forest Dynamics Plot** Author(s): J. Thompson, N. Brokaw, J. Zimmerman, M. Uriarte, C. Canham, R. Waide, D. Lodge

**Poster 21 - Changes in 26 forest ecosystems in the Carpathians influenced by pollution and climate changes.** Author(s): J. Oszlanyi

**Poster 22 - Ant Biodiversity at the Simes Tract of Harvard Forest** Author(s): A. Ellison, S. Record, A. Arguello

**Poster 23 - Hydrocarbon Contamination and Biodegradation Within the Permanent Ice Cover of Lake Fryxell, Antarctica** Author(s): B. Arnold, C. Foreman, J. Mikucki, J. Priscu

**Poster 24 - Microbial diversity across landscape units in McMurdo Dry Valleys, Antarctica** Author(s): M. Sabacka, J. Priscu

**Poster 25 - Monitoring Coral Communities in Moorea: One Step on the Road to Understanding Why Coral Reefs are Changing** Author(s): P. Edmunds

**Poster 26 - Symbiotic Crabs Maintain Coral Health by Clearing Sediments** Author(s): H. Stewart, S. Holbrook, R. Schmitt, A. Brooks

**Poster 27 - Plant Phenology at the Sevillea LTER** Author(s): K. Vanderbilt, K. Wetherill

**Poster 28 - Mechanisms maintaining distinct community states in the Santa Barbara Channel** Author(s): A. Rassweiler

**Poster 29 - Drought and biodiversity in a southern Appalachian stream, or why are there more fishes downstream?** Author(s): G. Grossman, B. Ratajczak, M. Farr, T. Petty, M. Wagner

**Poster 30 - The importance of extreme climate events in hydrological and ecological processes in a polar desert** Author(s): J. Barrett, R. Virginia, D. Wall, P. Doran, A. Fountain, J. Bockheim, B. Adams, W. Lyons

**Poster 31 - Landscape design and bird community structure in Phoenix, Arizona: management implications.** Author(s): S. Lerman, P. Warren

**Poster 32 - The Role of Transportation Corridors in Plant Migration In and Around Phoenix, Arizona, an Arid Urban Area** Author(s): K. Gade, A. Kinzig

**Poster 33 - Shrub invasion decreases small-scale stability in an arid ecosystem** Author(s): S. Baez, S. Collins

**Poster 34 - Avian Conservation on the Virginia Barrier Island LTER Site: Observations, Monitoring and Experiments** Author(s): R. Dueser, N. Moncrief, B. Hayden, B. Truitt, A. Wilke, B. Williams, O. Keiss, J. Martin, J. Porter

**Poster 35 - Habitat alteration by black-tailed prairie dogs influences associated insect species** Author(s): L. Hartley, C. Alba, K. Hardwicke, J. Detling

**Poster 36 - Effects of Black Tailed Prairie Dog (*Cynomys ludovicianus*) Activity on Belowground Community Structure in the Shortgrass Steppe** Author(s): M. Quirk, J. Moore

**Poster 37 - Effects of Riparian Zone Width on Soil Microarthropod Communities** Author(s): J. O'Brian, B. Reynolds

**Poster 38 - Biological responses to environmental forcing: The Linear Tracking Window hypothesis** Author(s): Z. Hsieh, M. Ohman

**Poster 39 - Trophic dynamics in an urbanized desert ecosystem** Author(s): C. Bang, S. Faeth, J. Anderies

**Poster 40 - Long-term variation in food web structure in a north temperate lake** Author(s): C. Solomon, J. Vander Zanden, S. Carpenter

**Poster 41 - Habitat affinity presents opportunities and constraints for parasitoids and predatory flies to utilize an aphid invading the US Midwest field crop system represented at the KBS LTER** Author(s): M. Brewer, T. Noma, M. Kaiser, S. Langley

**Poster 42 - Early transmission of *Yersinia pestis* by the prairie dog flea *Oropsylla hirsuta*** Author(s): A. Wilder, R. Eisen, S. Bearden, J. Montenieri, K. Gage, M. Antolin

**Poster 43 - The anatomy of a white spruce reproduction event: 24 years of monitoring post-fire succession at Bonanza Creek LTER** Author(s): G. Juday

**Poster 44 - Black spruce population dynamics at its northern limit in Alaska** Author(s): A. Lloyd, H. Eisen, S. Nagi, C. Fastie

**Poster 45 - The enemy of my friend: An invasive plant disrupts mutualistic associations between native tree seedlings and mycorrhizal fungi** Author(s): **K. Stinson, R. Callaway, B. Wolfe, and J. Klironomos**

- Poster 46 - Long-term Ecological Research (ILTER) towards sustainable land use and biodiversity in a mosaic of Agriculture and Tropical forest in Costa Rica** Author(s): B. Haines, C. Peterson
- Poster 47 - Soil and sediment properties and invertebrate community structure across lake-soil transition zones in the McMurdo Dry Valleys, Antarctica** Author(s): E. Ayres, D. Wall, B. Adams, J. Barrett, R. Virginia
- Poster 48 - Urbanization and spatio-temporal patterns of flowering phenology in the Phoenix metropolitan area** Author(s): K. Neil, J. Wu
- Poster 49 - Fish-coral interactions: do resident fish alter the relationship between local water flow and coral growth?** Author(s): A. Brooks, H. Stewart, S. Holbrook, R. Schmitt
- Poster 50 - Variation in abundance and carbon allocation for *Sargassum mangarevense* across gradients in herbivory and hydrodynamic exposure in Moorea, French Polynesia** Author(s): S. Talmage, R. Carpenter
- Poster 51 - Morphological Variation in *Pocillopora verrucosa* across Spatial Scales in French Polynesia** Author(s): M. Maheigan, P. Edmunds
- Poster 52 - An ecosystem engineer influences temporal variability in community structure** Author(s): K. Arkema, D. Reed, S. Schroeter
- Poster 53 - Do coralline algae influence coral recruitment?** Presenter(s): N. Price
- Poster 54 - Climatic Links to Abyssal Megafauna Populations in the NE Pacific** Author(s): H. Ruhl, K. Smith
- Poster 55 - Do young Antarctic krill (*Euphausia superba*) feed selectively within the winter sea ice microbial community?** Author(s): S. Oakes, L. Quetin, R. Ross, J. Watson, T. Newberger, C. Boch, H. Rodriguez, J. White
- Poster 56 - Effects of Plant Type and Tidal Inundation on Soil Microbial Community Structure in an Eastern USA Salt Marsh** Author(s): G. Casciano, A. Floyd, L. Blum
- Poster 57 - The H.J. Andrews Microbial Observatory** Author(s): D. Myrold, P. Bottomley, B. Caldwell, K. Cromack, J. Spatafora
- Poster 58 - The Microbial Observatory of the Northern Temperate Lakes Long Term Ecological Research Site** Author(s): S. Jones, A. Kent, A. Shade, R. Newton, T. Yannarell, E. Triplett, K. McMahon
- Poster 59 - Spatial and temporal distribution of newly discovered bacterial phyla from seasonally snow covered soil: A phylogeny-based study from the Alpine Microbial Observatory** Author(s): E. Costello, S. Schmidt
- Poster 60 - *Tuber melanosporum* (Perigord black truffle) mycelium in soil under trees with different levels of truffle productivity** Author(s): L. Martinez, M. Martin, C. Colinas
- Poster 61 - Wave and Tidal Current Forcing in Lagoons on the North shore of Moorea: Consequences for Damselish Settlement** Author(s): L. Washburn, S. Holbrook, R. Schmitt, J. Repp
- Poster 62 - Brood size variability in California Current populations of *Euphausia pacifica*** Author(s): M. Decima, M. Ohman, M. Landry
- Poster 63 - Zooplankton in a Tropical Reef System: Physical-biological Coupling and Cross-habitat Linkages** Author(s): K. Hanson, J. Leichter
- Poster 64 - Ecological transformation via urbanization** Author(s): R. Bills, J. Briggs, L. Dugan, E. Holmes, D. Hope, M. Feldner, C. Gries, N. Grimm, A. Kinzig, L. Landrum, Q. Stewart, S. Whitcomb
- Poster 65 - Effects of white sweetclover on the colonization success of native plants in riparian ecosystems within Alaska** Author(s): B. Spellman, T. Wurtz
- Poster 66 - Survey200: CAP LTER's approach to extensive field monitoring** Author(s): C. Bang, J. Briggs, R. Bills, M. DiIorio, L. Dugan, R. Erickson, S. Earl, S. Faeth, N. Grimm, M. Feldner, E. Holmes, D. Hope, J. Kaye, A. Kinzig, C. Kochert, A. Majumdar, C. Redman, E. Shock, Q. Stewart, J. Walker, J. Stutz, M. Tseng, S. Whitcomb, X. Zhuo, C. Gries
- Poster 67 - The Role of Evolutionary History in Community Assembly** Author(s): J. Cavender-Bares, C. Willis, C. Lehman, M. Halina, A. Keen, P. Reich
- Poster 68 - Demographic response of two understory evergreen herbs along environmental gradients** Author(s): R. Warren
- Poster 69 - Clonality & Genetics of *Larrea tridentata*** Author(s): M. Robertson
- Poster 70 - Reproductive Biology of *Larrea tridentata*: A Comparison of Core and Isolated Shrubs** Author(s): K. Wetherill, R. Pendleton, B. Pendleton
- Poster 71 - Preference and performance in plant-herbivore interactions across latitude** Author(s): C. Ho, S. Pennings
- Poster 72 - Temporal, Spatial, and Topoedaphic Variation in Abundance of Elliot's Short-Tailed Shrew: A 25-Year Study in Tallgrass Prairie** Author(s): M. Gay, G. Kaufman, D. Kaufman
- Poster 73 - Complex dynamics of small fishes in the Everglades revealed in 10-year records of population density** Author(s): J. Trexler
- Poster 74 - Mechanisms of Shifts in Sea Urchin Size Structure Between a Marine Reserve and Adjacent Fished Areas** Author(s): T. Young, R. Nisbet
- Poster 75 - Composition of breeding bird communities along the Blue Ridge Parkway** Author(s): S. Pearson, A. Smith
- Poster 76 - Physics or Biology? What controls methane consumption in upland soils?** Author(s): J. Von Fischer
- Poster 77 - The Canopy Database Project – Determining Fundamental Structures of the Forest Canopy yield Component-Driven Database Design and Visualization for Ecologists, and subsequent Research Efficiency Gains and Better Metadata** Author(s): J. Cushing, N. Nadkarni, A. Fiala, L. Zeman
- Poster 78 - Development of an oceanographic observatory in the Mexican Pacific Ocean to understand the pelagic ecosystem response to the climate variability and climate change** Author(s): G. Gaxiola-Castro, B. Lavaniegos, R. Durazo, J. Lara-Lara, R. Aguirre-Gómez, J. Gómez-Valdés, J. Carriquiry, A. Parés-Sierra
- Poster 79 - The Food Habits of Rodents Inhabiting the Arid and Semi-arid Ecosystems of Central New Mexico** Author(s): A. Hope, R. Parmenter
- Poster 80 - Progress on Establishing a USA-National Phenology Network** Author(s): J. Betancourt, M. Schwartz

## Session 4: Saturday, September 23, 2006

- Poster 1 - Annual crop yield variability under alternative management systems** Author(s): R. Smith, F. Menalled, K. Gross, G. Robertson
- Poster 2 - Quantifying the resource dynamics of a Sevilleta LTER lizard community: Coupling abiotic drivers and ecosystem productivity** Author(s): R. Warne, A. Pershall, B. Wolf
- Poster 3 - Metabolism in a prairie stream** Author(s): A. Standorf, W. Dodds
- Poster 4 - Benthic Algal Productivity in the Florida Coastal Everglades** Author(s): E. Gaiser, D. Iwaniec, T. Frankovich

**Poster 5 - Ecosystem metabolism in an Arctic tundra river: potential responses to a warmer and wetter climate** Author(s): W. Bowden, C. Cappelletti

**Poster 6 - Controls on Carbon Assimilation by Red Mangroves** Author(s): K. Dowell, J. Barr, J. Fuentes, V. Engel, J. Zieman, D. Childers

**Poster 7 - Ongoing research at the Niwot Ridge AmeriFlux site** Author(s): J. Hu, R. Monson

**Poster 8 - Residential Carbon: Stocks and fluxes in residential ecosystems** Author(s): P. Groffman, M. Cadenasso, M. Cox, M. Grove, S. Pickett, R. Pouyat

**Poster 9 - Forest-to-atmosphere carbon and water exchange by forests of widely differing age and successional status at Harvard Forest LTER: Implications for ecosystem change caused by the hemlock woolly adelgid** Author(s): J. Hadley, P. Kuzeja, J. Schedlbauer, T. Mulcahy

**Poster 10 - Ecosystem response to atmospheric nitrogen (N) deposition in the Sonoran Desert** Author(s): N. Grimm, S. Hall, J. Kaye, J. Allen

**Poster 11 - Maximizing net carbon sequestration in agroecosystems of the North Central Region** Author(s): P. Grace, S. Gage, M. Colunga-Garcia, G. Robertson, G. Safir

**Poster 12 - The Role of Plants on Soil Weathering: a Quantification of Silica Mobilization and Weathering Rates in Grass Dominated Ecosystems** Author(s): S. Melzer, E. Kelly, A. Knapp, O. Chadwick, C. Yonker

**Poster 13 - Macro- and micronutrient limitation of phytoplankton at the California Current Ecosystem-LTER** Author(s): A. King, K. Barbeau

**Poster 14 - Monitoring Benthic Community Structure and Function of the Coral Reefs of Moorea, French Polynesia** Presenter(s): R. Carpenter

**Poster 15 - Moose browsing effects on white spruce (*Picea glauca*) seedling growth on the Tanana River Floodplain: changes in microhabitat and cover** Author(s): A. Angell, K. Kielland

**Poster 16 - Plant community stability across a natural gradient of soil disturbance in a Minnesota grassland.** Author(s): C. Jouseau, S. Naeem

**Poster 17 - Does soil N:P determine mycorrhizal response to N addition?** Author(s): E. Grman, T. Robinson

**Poster 18 - Canopy recovery after hurricane disturbance in the Luquillo Experimental Forest, Puerto Rico.** Author(s): B. Haines, N. Brokaw

**Poster 19 - Response of the Shortgrass Steppe to Fire** Author(s): M. Scheintaub, A. Knapp

**Poster 20 - Prescribed fire effects on above-ground primary production in a southwest desert grassland** Author(s): D. Moore, E. Muldavin, S. Collins, K. Wetherill

**Poster 21 - The Andrews Airshed Project: Using respired CO<sub>2</sub> in cold air drainage systems to monitor ecosystem processes in complex terrain** Author(s): B. Bond, E. Sulzman, M. Unsworth, T. Pypker, A. Mix, Z. Kayler, M. Hauck, H. Barnard, D. Conklin

**Poster 22 - Ecosystem response to climate change: Sensitivity of grassland ecosystems across the Great Plains to variability in precipitation** Author(s): J. Heisler, A. Knapp, J. Blair, E. Kelly

**Poster 23 - Ecosystem measurements of carbon and water flux in a subalpine forest in the Colorado Rocky Mountains** Author(s): M. Prater, R. Monson, S. Burns, D. Moore, L. Laffea

**Poster 24 - Gradients, primary productivity and maximum power in the Luquillo Mountains, PR: An empirical and modeling study scaled from leaves to landscapes** Author(s): N. Harris, C. Hall, A. Lugo

**Poster 25 - The fertility effect: resource supply increases across an experimental plant species diversity gradient** Author(s): R. Dybzinski, J. Fargione, D. Tilman

**Poster 26 - Plant community and ecosystem change on Conservation Reserve Program lands in Northeastern Colorado** Author(s): S. Munson, W. Lauenroth

**Poster 27 - Landscape-scale spatial and temporal patterns of aboveground net primary productivity (ANPP) in Everglades National Park (2001-2004)** Author(s): S. Ewe, E. Gaiser, D. Childers, V. Rivera-Monroy, D. Iwaniec, R. Twilley

**Poster 28 - Bayesian uncertainty analysis of net ecosystem CO<sub>2</sub> exchange in *Pinus ponderosa* stands at three age classes** Author(s): J. Freer, K. Beven, S. Mitchell, S. Mitchell

**Poster 29 - Rapid Ecosystem State Change: Seagrass Restoration in the VCR Coastal Lagoons** Author(s): K. McGlathery, S. Lawson, L. Cole

**Poster 30 - Effects of fiddler crab burrows in conjunction with increased flooding on sediment pore water profiles of a *Spartina alterniflora* salt marsh: a mesocosm experiment** Author(s): R. Michaels, J. Zieman

**Poster 31 - Nutrition in a Temperate Seagrass Ecosystem: An Evaluation by Stable Isotope Analysis of Individual Fatty Acids** Author(s): S. Harbeson, S. Macko, N. Egge

**Poster 32 - Estimating biomass in northern hardwoods: comparing allometric equations for aboveground biomass** Author(s): F. Fatemi, R. Yanai

**Poster 33 - The Canopy Trimming Experiment – LUQ** Author(s): J. Zimmerman, A. Shiels, C. Bloch, S. Cantrell, T. Crawl, C. Cruz, L. Garcia, G. Gonzalez, P. Klawinski, L. Lebron, D. Lodge, W. McDowell, E. Melendez-Colom, C. Prather, A. Ramirez, B. Richardson, M. Richardson, F. Rivera, E. Reese, T. Schowalter, J. Sharpe, W. Silver, N. Brokaw

**Poster 34 - Woody Species Phenology, Prospect Hill Tract, Harvard Forest 1990-2006** Author(s): J. O'Keefe

**Poster 35 - Summer rainfall removal in upland and floodplain ecosystems within Interior Alaska** Author(s): J. Yarie

**Poster 36 - Application of a Small-Footprint, Full Waveform-Returning LiDAR to the Measurement of Barrier Island Forest Structure** Author(s): M. O'Connell, A. Navegandhi, H. Shugart

**Poster 37 - Seasonal patterns in the flux and <sup>13</sup>C composition of soil respired CO<sub>2</sub> of in a steep drainage** Author(s): Z. Kayler, E. Sulzman, B. Bond, A. Mix, B. Rugh

**Poster 38 - Carbon flux associated with management and disturbance, along an urban to rural gradient from Baltimore, MD to the New Jersey Pine Barrens** Author(s): K. Clark, N. Skowronski, S. Grimmond, B. Offerle, B. Crawford, M. Patterson, I. Yesilonis

**Poster 39 - Trophic Interaction Model predictions of nutrient fluxes in the Tabonuco forest at LUQ LTER** Author(s): C. Prather, G. Belovsky, T. Crowl

**Poster 40 - Long Term Effects of Air Pollution on Selected Forest Ecosystems in National Retezat Park, Romania** Author(s): O. Badea, A. Bytnerowicz, M. Tanase, F. Popescu, I. Barbu, M. Robert, W. Fraczek, M. Dumitru, S. Neagu, D. Robu

**Poster 41 - Kelp Density and Biomass Estimates from SPOT Satellite NDVI for the Santa Barbara Channel** Author(s): K. Cavanaugh, B. Kinlan, D. Reed, D. Siegel

**Poster 42 - Phytoplankton size-structure on the western shelf of the Antarctic Peninsula: A remote sensing approach** Author(s): M. Montes, M. Vernet, R. Smith, K. Baker

**Poster 43 - Phytoplankton composition and distribution along the Western Antarctic Peninsula of the Southern Ocean** Author(s): W. Kozłowski, D. Deutschman, C. Trees, M. Vernet

**Poster 44 - Acclimation to Change in Water Regime in a Mesic Temperate Grassland** Author(s): J. Koelliker, A. Knapp, J. Briggs, J. Blair

**Poster 45 - Phytoplankton diversity in lakes of the McMurdo Dry Valleys, Antarctica** Author(s): A. Chiuchiolo, R. Morgan-Kiss, J. Priscu

**Poster 46 - Regional-scale patterns of thin-leaf alder growth and population structure within the Tanana River basin, interior Alaska** Author(s): D. Nossov, R. Ruess, T. Hollingsworth

**Poster 47 - Iron and light limitation in subsurface waters of the California Current region** Author(s): B. Hopkinson, K. Barbeau

**Poster 48 - The CalCOFI Program – 55 year old Ocean Observing System** Author(s): R. Goericke

**Poster 49 - Decadal-scale variability in upwelling processes in the California Current Ecosystem and potential biological responses** Author(s): R. Rykaczewski

**Poster 50 - Temporal Variability in Primary Production West of the Antarctic Peninsula (-64°S)** Author(s): W. Kozłowski, K. Diaz, K. Sines, M. Vernet

**Poster 51 - Bio-Optical Modeling of the Santa Barbara Channel, California: Studying Coastal Ocean Dynamics Using Ocean Color** Author(s): T. Kostadinov, D. Siegel, S. Maritorena, N. Guillocheau, M. Brzezinski

**Poster 52 - The Pimple Dunes of Virginia's Barrier Islands** Author(s): B. McMillan, F. Day

**Poster 53 - Patterns and causes of variation in NPP in the giant kelp, *Macrocystis pyrifera*** Author(s): D. Reed, K. Arkema, A. Rassweiler, R. Zimmerman

**Poster 54 - Competition influences nitrogen partitioning patterns and rhizosphere extracellular enzyme activity of alpine plants** Author(s): I. Ashton, K. Suding, A. Miller, W. Bowman

**Poster 55 - Long-term monitoring of tree size and condition across non-residential patch types in Phoenix, Arizona** Author(s): C. Martin, J. Stutz

**Poster 56 - Variation in plant photosynthetic and biomass responses to species richness, CO<sub>2</sub>, and N: the role of unique functional attributes** Author(s): T. Lee, P. Reich

**Poster 57 - Responses of aboveground primary production to changes in water availability: Understanding the meristem density limitation** Author(s): L. Reichmann, O. Sala

**Poster 58 - Do Disturbances Enhance the Rate of Change in Alpine Plant Species Composition Resulting from Nitrogen Deposition? Tests Using Long-Term Experiments.** Author(s): C. Brown, L. Wallach, S. Farell, N. Ascarrunz, S. Reed, T. Seastedt

**Poster 59 - Belowground bud banks as regulators of grassland dynamics** Author(s): H. Dalglish, D. Hartnett

**Poster 60 - Anaerobic Ammonium Oxidation in Tidal Marshes** Author(s): K. Koop Jakobsen, A. Giblin

**Poster 61 - Using Stable Isotope Techniques to Understand N Dynamics Along the Canal-Marsh Interface in the Southern Everglades** Author(s): D. Childers, W. Anderson

**Poster 62 - Effect of Snow Cover on Atmosphere-Surface Gas Exchange at Mid-Latitude and High-Latitude Sites** Author(s): B. Seok, D. Helmig, F. Bocquet, J. Hueber

**Poster 63 - Multiple pathways of nitrate removal in freshwater sediments: Implications for N removal by wetland, lake and stream sediments** Author(s): A. Burgin, S. Hamilton

**Poster 64 - Complex Interactions between Snow, Soil Freezing and Moose in a Northern Hardwood Forest** Author(s): L. Christenson, P. Groffman, M. Mitchell, G. Lovett

**Poster 65 - Nutrient Removal and Stream Size in the Ipswich R. Network, Plum Island LTER** Author(s): W. Wollheim, C. Hopkinson, C. Vorosmarty, B. Peterson

**Poster 66 - Surface-subsurface hydrologic exchange and nitrogen dynamics in the hyporheic zone of the Tanana River in interior Alaska.** Author(s): H. Ciliverd, J. Jones, K. Kielland

**Poster 67 - Linkages between riparian vegetation and nitrate dynamics in streams of western Oregon, USA** Author(s): D. Sobota, S. Gregory, S. Johnson, L. Ashkenas

**Poster 68 - Nitrogen deposition and cycling across an elevation and vegetation gradient in southern Appalachian forests** Author(s): J. Knoepp, J. Vose, W. Swank

**Poster 69 - Relationship between nitrate removal rates and dissolved organic carbon in streams** Author(s): J. Thouin, W. Wollheim, C. Vorosmarty, C. Hopkinson

**Poster 70 - Analysis of sulfur and oxygen isotope ratios of sulfate in precipitation and stream water to better understand sulfur cycling at Hubbard Brook Experimental Forest** Author(s): G. Miles, M. Mitchell

**Poster 71 - Controls over the distribution of biologically available soil phosphorus pools in the McMurdo Dry Valleys, Antarctica** Author(s): D. Bate, J. Barrett, M. Poage, R. Virginia

**Poster 72 - Development of an automated chamber system for temporally integrated estimates of nitrous oxide flux from soil** Author(s): K. Smemo, G. Robertson, N. Ostrom, S. Bohm, M. Opdyke, P. Ostrom

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# YMCA of the Rockies Alcohol Policy

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The YMCA of the Rockies does not have a liquor serving license and our employees cannot touch alcoholic beverages. If you decide to have alcoholic beverages served at your banquet, these are the guidelines:

- Only bottled beer, wine and champagne are allowed.
- We will provide ice, wine glasses and champagne glasses only. We do not have beer glasses or cups.
- We do not have wine openers. The customer may bring their own bottle openers.
- You may hire a bartender or someone of your party may take care of serving the beverages.
- There will be no alcohol sales allowed. No cash bar permitted.
- No alcoholic beverages may be taken outside of the room.

There is ZERO TOLERANCE concerning the Alcohol Policy. We reserve the right to terminate said function at any time the alcohol policy is abused. The contract signer is responsible for all attendants' actions, including underage drinking.