January 15, 2001
Dr. Henry Gholz
Division of Environmental Biology, Rm 635
National Science Foundation
Arlington, VA 22230

Dear Henry,

With this letter, we request Supplemental Funding for two undergraduate REU students and for the continuation of our Schoolyard LTER (SLTER) education program. This would be a supplement to LTER grant DEB-0080609 to the University of Alaska, Fairbanks.

Schoolyard Supplement request
We have used our current Schoolyard LTER funds to continue and expand the research collaboration with and provide training for teachers from Joy Elementary School, University Park Elementary School and West Valley High School in the Fairbanks North Star Borough School District. We have continued the working partnership with existing K-12 science education programs in Fairbanks, the GLOBE (Global Learning and Observations to Benefit the Environment) program (funded by NOAA, NSF, NASA, EPA, and DOE) and the NSF Partners in Science Program. We have also worked at the national level to improve the SLTER program and provide it with supplemental funding outside DEB. Specifically we have accomplished the following goals:

* Expanded the research collaboration from two teachers in two schools to six teachers in three schools.
* Provided computers for the three schools, and upgraded internet and worldwide web connectivity for University Park and Joy Elementary Schools (through another supplemental LTER Schoolyard funding).
* Provided GLOBE training, GLOBE field kits, research and instructional support for these teachers including visits to their classrooms.
* Provided travel and subsistence support for two teachers to participate in the fourth annual GLOBE meeting in New Hampshire and for one teacher to participate in the national SLTER working group meeting at the San Diego Supercomputer facility..
* Established weather stations at the three schools. Weather data collected by students from three schools are available in the GLOBE Data Server (http://www.globe.gov).
* West Valley High School students have been collecting plant phenology data in their birch-willow stand study plot (90 m x 90 m) bordering their school for a long-term forest phenology study. The study, overseen by Dr. David Verbyla and Dr. Elena Sparrow at UAF, will include comparison of ground-based measurements with concurrent satellite based imagery for use in determining length of the plant growing season and greenness index values that truly represent the growing season.
* West Valley High School students (Jock Irons' students) conducted a land-cover mapping of Fairbanks and presented their findings on web pages they prepared.
* Provided support for West Valley science teacher (Jock Irons) who is further developing the BNZ Schoolyard program web site:

http://www.lter.alaska.edu/~jirons/schoolyard_lter/schoolyard.htm
* Provided support for high-school teacher Betty Connor to attend the LTER All-scientist meeting.
* Provided financial support to two high school students for field measurements (weather parameters) during the 2000 summer.
* Expanded the working partnership with existing K-12 science education programs in Fairbanks to include the Youth Farm and Ecology Program offered through the Calypso Farm and Ecology Center.

With continuation of Schoolyard LTER funds we propose to:

* Continue collaboration with the current participating teachers. This will include field support to teachers and students, coordination of data collection and analysis, and incorporation of Schoolyard LTER data and findings into the BNZ Schoolyard web site.
* Continue providing financial support to the schools (for teacher or student support) for summer-time field measurements (when school is not in session).
* Provide research and instructional support to teachers in their classrooms.
* Continue SLTER development work with the national SLTER working group.

We and the participating teachers in the Fairbanks Schools are excited by the possibility of continuing support for the Schoolyard LTER program. Although our Schoolyard effort is very young, we believe the program will yield both educational and training benefits for Fairbanks students and teachers as well as valuable long-term data for the BNZ LTER program.

REU Supplement request
This year we have selected projects directed by Wendy Davis (site manager) and Roger Ruess for research by the two REU students. One REU will be working with the site management team will assist in activities related to the collection of the long-term ecological data sets that the BNZ LTER has been maintaining. This year we will be upgrading all of our climate stations so that they record all parameters on data loggers, rather than requiring weekly visits. Selected sites will be equipped with wireless communications equipment for remote field data collection. In addition the site management team will be setting up new vegetation plots and climate stations in the recently burned FROSTFIRE site. One REU student will participate in these activities and will select an independent project related to these activities, for example documenting the difference in vegetation after the fire for comparison with that from the same sites immediately before the burn occurred.
The second REU student, working with Roger Ruess, will conduct a study to quantify the ratio of N2 to C2H2 (acetylene) reduced by Alnus crispa and Alnus tenuifolia, the two dominant N2-fixers in interior Alaska. All our research to date has utilized the acetylene reduction technique and assumed the ratio of 1:3, a long recognized, but rarely verified value. Unpublished work by Klingensmith using 15N2 on greenhouse-grown A. tenuifolia, suggested that this ratio could be closer to 1:4, which would substantially affect our estimates of ecosystem-level N2-fixation inputs. The REU student will compare in situ nodule reductions of both 15N2 and C2H2 for both species to determine a) the true ratio of N2 to acetylene fixed, b) if this ratio differs between the 2 species of Alnus, and c) if this ratio varies

throughout the growing season.

The two REUs that we request will play two roles in the project. First, they will participate in the LTER research and be an integral part of the research team. In addition, they will do their own independent project under the mentorship of an LTER lead investigator. We expect them to design the research with the help of their advisor, conduct the research, and analyze and write up the results. The goal will be to make the project of sufficient quality that it would be suitable for publication or become part of a larger publication in which the student would be a co-author. At the end of the summer the LTER REUs and other undergraduates will present their results in an REU symposium to the other undergraduates working on ecological research in Fairbanks.

Chapin and other LTER PIs have supervised 20 REUs in previous years. Of the previous REUs 70% have continued to grad school (two at Stanford) or are currently applying, one became an ecological technician, and one went into dentistry. Of these students, 80% have been women and 30% minorities. We continue to seek opportunities to train women and minorities in northern ecology.

We will follow the same procedure in choosing students that worked successfully in the past, which is to look for students with experience or coursework in ecology from the University of Alaska and from other universities. We will also write letters to colleages involved in similar research at other LTER sites to see whether they know of undergraduates with interests in this type of research who might be able to gain comparative experience by working in Alaska for the summer.

The total budget requested for this REU supplement includes student stipends, and some expenses for supplies. Travel costs to Alaska and other expenses for the REU projects will be paid from LTER funds.

Wendy Davis <wdavis@lter.uaf.edu>
LTER site manager

Wendy Davis
LTER site manager <wdavis@lter.uaf.edu>
BECRU P.O. Box 756780 University of Alaska Fax: (907) 474-6251
Fairbanks Work: (907) 474-5881
Fairbanks
Alaska
99775-6780
U.S.A.
Additional Information:
Last Name Davis
First Name Wendy
Version 2.1