2001 Schoolyard LTER Education Supplement to Andrews LTER (DEB 96-32921)

Introduction

The first three years of Schoolyard LTER activities associated with the Andrews LTER Program have gone well. We continue to expand our efforts with leveraged support from several Oregon school districts and an Oregon State University-based K-12 program (SMILE). SMILE received a Presidential award for excellence in '99 and has grown to include school districts in urban as well as rural counties in Oregon.

With the help of several dedicated secondary school teachers and teacher educators, we are working toward our collective goal of developing a networked program of Schoolyard LTER activities that is closely coupled to Andrews LTER. Another year of funding will greatly further that effort.

We are requesting $15,000 of supplemental funding to support two areas of effort:
A) Schoolyard LTERs.

1. SMILE (Science and Math Investigative Learning Experiences), a partnership among eight school districts and OSU to provide science and math enrichment for minority and low-income students in grades 4-12.
2. The WELL Program led by Stuart Perlmeter within the Eugene and Springfield, OR school districts. WELL (Water and Energy Learning Lab) addresses watershed and energy issues such as the hydrologic cycle, water yield and quality, energy generation and consumption, greenhouse gases, and so on in an ecosystem context.
3. Continued affiliation with the middle and high school program of the Northwest Center for Sustainable Resources (NCSR), an NSF-supported Advanced Technology Center affiliated with Chemeketa Community College < http://new.chemeketa.edu/ncsr/secondary/>. This program, led by Jon Yoder, a Salem-Keizer School District high-school teacher, organizes field exercises throughout the school year and conducts summer workshops for elementary and secondary teachers (about 20 per workshops).

B) Teacher enhancement workshops.

Continue development of workshops for K-12 teachers to be held at the Andrews Forest. Consisting of a programmatic series of weekend sessions, the workshops will include basic research design segments and hands-on trials of schoolyard-based studies. In addition to the basic goal of promoting Schoolyard LTER concepts, these should provide an opportunity to share ideas for projects, and expose participants to existing web-accessible materials for their classes.

The above components will form the core of Andrews Schoolyard LTER activities, but we will also continue to explore linkages with additional school districts.

Andrews Forest scientists will also continue to participate in the NSF-sponsored teacher enhancement program we refer to as "Teachers in the Woods", led by Andy Moldenke (Dept. Entomology, OSU). This program has three years of success behind it, immersing K-12 teachers in field research with the intent of conveying the excitement of "science doing and discovery" as well as providing new material for their classes. Participants work as research assistants on LTER research projects and convene two to three times a week to discuss among themselves how to incorporate the information into their classes back at their home school district.

Description of Proposed Activities

A. Continuation of On-Going Projects

1. SMILE Program.

Initially started with the intent of promoting interest in higher education among students in rural school districts, particularly those with a high proportion of underrepresented minority students, the SMILE program has broadened to

include larger school districts and promote improved science and math curricula across the State. The Andrews Schoolyard LTER involvement will be directed toward promoting networking and developing curricula for schoolyard projects. Because of the structure of SMILE, all SMILE sites have the potential to become educational resource centers for surrounding communities and school districts.

We will continue to cooperate with SMILE to develop Schoolyard LTER demonstration study sites at the Oregon 4-H Center near Salem along with relevant curriculum materials for different age groups. The 4-H Center is used as a statewide training site for students and teachers. SMILE uses this site for their "Outdoor Science Adventure" for several hundred elementary school students each spring. SMILE is expending the scope to include projects and activities for high school students with the help of the scientists involved in the Andrews LTER projects.

2. WELL Program, Eugene & Springfield School Districts

We will continue our partnership with a high school program in the Eugene-Springfield area (pop. About 150,000) called WELL (Water and Energy Learning Lab) that is directed by Stuart Perlmeter, a biology teacher with the Springfield School District. The WELL Program focuses on watershed and energy issues such as the hydrological cycle, water yield and quality, energy generation and consumption, and greenhouse gases in an ecosystem context. Students visit field sites and conduct field lab exercises. The intent is to make these field labs a long-term component to the high school science program.

This request would provide participant support (transportation, materials and supplies) for the WELL Program. It would also fund continued development of web-based data management protocols for WELL studies that could be a model for other schools/sites.

3. Salem-Keizer School District Program

This program has two components, a schoolyard LTER set of activities and an annual teacher enhancement workshop. These activities, directed by Jon Yoder, are currently covered by the NSF award that supports NCSR (described above). Jon has developed a set of field exercises for middle and high school students at sites on and near schoolyards. Jon also conducts summer workshops for elementary and secondary teachers (about 20 per workshop) to increase their science knowledge in biology and ecology and acquire new curriculum materials and field and lab projects/activities. These are largely, but not exclusively, ecosystem-oriented educational activities.

This request would support this District's efforts by providing additional participant support costs (transportation from other District schools, materials and supplies).

B. Teacher Training Workshop

We will continue the development of hands-on teacher workshops that address the many "hows" of research design and implementation. It has become clear from discussions with K-12 teachers that while they often can give the textbook components of the "scientific method", they really do not understand the scientific method in practice. Specifically, they need training in how to ask good testable questions, how to design an install a simple research project, and how to collect data and analyze their results.

We believe workshops on research methods go a long way to helping K-12 teachers better understand and explain research to their students. The structure we've developed involves a programmatic series of weekend workshops at the Andrews Forest. Following a basic introduction to research design we'd move onto specific examples of some schoolyard LTER activities. The long-term goal of these workshops is to develop sufficient skills at schoolyard LTER sites that students would be collecting actual research data on permanent plots for the Andrews LTER program. We feel this is possible if it is kept simple enough, and should give the students a heightened sense of participation.

This request would provide funds to hold a series of three to four weekend workshops for up to 30 teachers, and cover participant support costs (meals, lodging at the Andrews, supplies and materials). We are not requesting funds for stipends.

Budget and Budget Justification.

The Summary Proposal Budget is shown on the next page. An itemized breakdown is offered below.

ITEM	Amount ($)
SMILE Program	
Participant support costs	
Stipends (SMILE teachers)	3,296
Travel (school buses)	400
Subsistence	200
Other (materials and supplies for existing SMILE school-yard sites)	1,400
WELL Program	
Participant support costs	
Stipends	0
Travel (school buses)	1,000
Subsistence	0
Other (materials and supplies)	500
Salem-Keizer Program	
Participant support costs	
Stipends	0
Travel (school buses)	1,000
Subsistence	0
Other (materials and supplies)	500
Teacher Training Workshop	
Participant support costs	
Stipends	0
Travel (3 vans for 6 days plus mileage)	1,100
Subsistence (meals/lodging for 20)	3,500
Other (prep of materials, supplies, facilities fees)	1,280
Indirect Costs (25% of stipends)	824
Grand Total	15,000