

Western Upper Peninsula Center for Science, Mathematics and Environmental Education 2009-2010 Annual Report

The Western Upper Peninsula Center for Science, Mathematics and Environmental Education provides services to 19 school districts and their communities in Baraga, Keweenaw, Houghton, Ontonagon, and Gogebic counties. The Center strives to develop scientifically literate and environmentally committed citizens, scientists, and community leaders for the 21st century by providing innovative and quality programming for students, teachers and the community.

Overview of the Year's Accomplishments

Lake Superior Stewardship Initiative (LSSI)

The major goal of this initiative is to prepare K-12 students to become knowledgeable citizens, concerned about the quality of life in their community, and actively engaged in stewardship of Lake Superior and its watershed. The initiative provided sustained professional development for teachers, mini-grants to fifteen schools, assistance with stewardship projects, and facilitation of school-community collaborations and public forums. The Lake Superior Stewardship Initiative (LSSI) is one of eight funded hubs that comprise the Great Lakes Stewardship Initiative (GLSI) funded by the Great Lakes Fishery Trust and the Wege Foundation. For more information, visit www.lakesuperiorstewardship.org.

Family Science/Math Program

The Western UP Center conducted twenty family science/math nights at local elementary schools in their service area. Students and their parents participated in two 40-minute age appropriate hands-on activities. Students from Michigan Technological University and Finlandia University conducted the activities and acted as role models for elementary students.

Rethinking Elementary Mathematics Instruction (REMI)

This professional development initiative is a collaborative effort of the Western UP Center and Michigan Tech's mathematics and education departments and funded by the Michigan Mathematics and Science Partnership program. This three- year project focuses on developing teachers' pedagogical and mathematical content knowledge to effectively teach the mathematics in the K-7th Grade Level Content Expectations (GLCEs) in a way that builds on students' prior knowledge and develops mathematical understanding; build and maintain a community of learners among the participating teachers; and engaging K-7th grade students in relevant learning experiences that develop mathematical understanding.

Algebra for All

The Western UP Center served as one of the ten regional sites in Michigan for the Algebra for All initiative. This statewide initiative was endorsed by the Governor's office and involved more than a thousand teachers statewide in sustained professional development to address student achievement in Algebra I. Teachers learned how to reach all learners through a wide range of instructional strategies that approach the teaching of algebraic concepts from the functions perspective. Teachers explored how to effectively use graphing calculators and other technologies to support student learning.

Locally, forty-five teachers from Houghton, Baraga, Gogebic, Ontonagon and Marquette counties are participating in this initiative through the Western UP Center. This statewide initiative was made possible with funding from Michigan Department of Education, Michigan Mathematics and Science Centers Network and Michigan Virtual University.

Scientific Field Experiences

The Outdoor Investigation Field Trip Program provided schools with opportunities to get students outside to explore forests, fields, wetlands and streams in their local community or schoolyard. All of these field experiences were lead by Western UP Center staff and aligned to the content expectations so that they serve as an integral part of the curriculum. 125 field trips were conducted that reached 2672 students.

The Western UP Center worked with scientists at Michigan Tech to offer Future Fuels Field Trips. High school students and teachers participated in a full-day field trips at Michigan Technological University to investigate the viability of using forests as a source of biofuels to help offset the country's dependence on petroleum-based fuels. These field trips provided a framework for high school students to examine the multiple issues associated with the development of liquid biofuels from forests in the Upper Peninsula. This program was made possible with a grant from the National Science Foundation to Michigan Tech.

Spotlight on Statewide Projects

The Algebra for All program addressed a pressing need to improve student achievement in Algebra I for all students. The participating teachers appreciated the resources and the learning community that this program offered as indicated by these participant comments on workshop reflections:

- I like the idea of having a simple introduction problem that I can use to 'drive' some of the ideas throughout the chapter. I like the group discussions to hear how other people are using the material.
- I very much liked the linear equation capstone project. I will be using that project in my classroom.
- I made connections graphically and physically and algebraically. Good group discussion regarding teaching methods.

A majority of teachers who participated in that first year are participating in year two of the initiative.

The Writing in Science Program (HSMASS-IV) gave teachers resources and strategies to assess student understanding of scientific concepts. Many high schools in the Western UP Center's service area have the school improvement goal of improving student achievement in writing across the curriculum. The participating teachers appreciated the opportunity to try out writing strategies with their students and discuss student work with their colleagues as indicated by the following comments on the workshop reflections.

- I learned a lot of ways to incorporate writing into science lesson plans.
- I found that my students were more engaged when they are writing.
- The workshops were fun for me! New ideas.
- I will incorporate more strategies into my classroom. Slowly but surely!

Organization of the Report

The Strategic Plan identifies six service areas: Leadership, Professional Development, Student Services, Curriculum Support, Community Involvement, and Resource Clearinghouse. This report will focus on Professional Development and Student Services for the entire service area. In addition, there will be a narrative targeting work done with underachieving schools in the area.

REGION-WIDE PROFESSIONAL DEVELOPMENT

Goal: For educators who participate in Center Professional Development to reflect best instructional practices in their own settings.

Who participated in professional development?

Professional development opportunities were provided for classroom teachers, classroom support staff, administrators, parents/community members, and others involved in K-12 education. The chart and summary descriptions show who participated.

Table 1: Participants Receiving Professional Development

Participants	# of Individ. / Total Hours		Reported Gender**		Position					
			M	F	Admin	Math Tchr	Sci Tchr	Tech	Comb Subj	Other or Unknown*
Pre-School	18	167.5	1	16	0	0	0	0	4	14
Elementary	91	2692	14	77	0	5	1	0	79	6
Middle/Jr. High	28	532	13	15	1	3	14	1	1	8
High School	70	1861	30	40	0	10	36	0	2	22
K-12 Mixed Levels	70	1075.5	25	42	2	2	29	3	4	30
Other*	114	2654.5	38	71	0	0	22	0	0	92
Total	391	8982.5	121	261	3	20	102	4	90	172

*Other includes persons who work across levels, are not teachers or administrators, or did not indicate position.

**Gender was not reported by all participants.

Professional development was delivered in many ways, depending upon the identified needs. Two primary formats included: (1) **Single events**, lasting for a portion of one day to several consecutive days, focused on a particular topic, skill, or issue; and (2) **Series**, which were a series of sessions (each building on the previous and conducted periodically over a several week/month period). The goal was to systematically strengthen teaching practices based on local needs and current research. Table 2 on the following page represents a picture of the number of sessions offered and the rate of attendance.

Teachers, on average, spent 23 hours on mathematics, science, or technology professional development.

Table 2: Professional Development Activities

		Math	Science	Technology	Other	Total
Elementary	Events	1	4	0	0	5
	Hours	40	35	0	0	75
	# Participants	32	32	0	0	64
Elementary and Jr. High	Events	1	0	0	0	1
	Hours	40	0	0	0	40
	# Participants	20	0	0	0	20
Middle School	Events	0	1	0	0	1
	Hours	0	28	0	0	28
	# Participants	0	7	0	0	7
High School	Events	2	4	0	0	6
	Hours	68	52	0	0	120
	# Participants	32	27	0	0	59
K-12 Mixed Levels	Events	0	19	2	6	27
	Hours	0	211.5	15	57.5	284
	# Participants	0	334	54	131	519
Total	Events	4	28	2	6	40
	Hours	148	326.5	15	57.5	547
	# Participants	84	400	54	131	669



Spotlight on Professional Development

During the 2009-2010 school year the Western UP Center provided comprehensive professional development for mathematics for K-9 teachers in the Copper Country and Gogebic-Ontonagon ISDs. This was done through the Rethinking Elementary Mathematics Instruction and Algebra for All programs.

Rethinking Elementary Mathematics Instruction: The Western UP Center, in collaboration with Michigan Tech's mathematics and education departments, received funding from the Michigan Mathematics and Science Partnership program in the summer of 2008 to initiate an innovative professional development program for teachers in grades K-7. This three-year program provides professional development to two cohorts of teachers, grades K-3 and grades 4-7 teachers. Each cohort participated in twelve school year workshop sessions, three-day summer workshop and a lesson study cycle. Fifty-two teachers from eleven school district and two private schools will complete the professional development offered in this program.

The program focused on developing the teachers' pedagogical and mathematical content knowledge to effectively teach the mathematics in the K-7th Grade Level Content Expectations (GLCEs) in a way that builds on students' prior knowledge and develops mathematical understanding. A learning community of participating teachers was maintained to focus on how to engage K through 7th grade students in relevant learning experiences that develop mathematical understanding. The Western UP Center is seeking funding from the Michigan Mathematics and Science Partnership Program to expand this program to more teachers in the participating districts through a teacher leader approach in the 2011-12 school year.

Algebra for All: The Western UP Center served as one of the 10 regional sites in Michigan for the Algebra for All initiative. This initiative involved more than a thousand teachers statewide in sustained professional development to address student achievement in Algebra I. Teachers learned to how to reach all learners through a wide range of instructional strategies that approach the teaching of algebraic concepts from the functions perspective. Teachers explored how to effectively use graphing calculators and other technologies to support student learning. Teachers at the Western UP site interacted with Algebra One teachers throughout the state through Adobe Connect web conferencing and REMC Michigan Steam Net.

Locally, seventeen teachers from eleven districts participated in Year 1 of Algebra for All during the 2009-10 school year. These teachers will continue onto Year 2 of Algebra for All. This statewide initiative was made possible with funding from Michigan Department of Education, Michigan Mathematics and Science Centers Network and Michigan Virtual University.

Student Services

Student services are delivered based on identified needs to improve and enhance mathematics and science education. Students who participate in enrichment activities have the opportunity to explore new concepts, develop process skills, cooperate on group tasks, and discuss their findings. Student services include:

- ❖ Family Science and Math Nights
- ❖ Environmental stewardship projects to address needs in local communities
- ❖ Field trips to natural areas to promote environmental stewardship.
- ❖ Science fairs and TiViTz Math tournament

Table 3: Student Services Activities Provided in 2009-2010

		Math	Science	Technology	Other	Total
Pre-K	Events	0	6	0	0	6
	Hours	0	10	0	0	10
	# Participants	0	115	0	0	115
Elementary	Events	0	169	0	0	169
	Hours	0	286.75	0	0	286.75
	# Participants	0	4659	0	0	4659
Elementary and Jr. High	Events	1	5	6	0	12
	Hours	4	16.5	8.5	0	29
	# Participants	203	918	282	0	1403
Middle School	Events	0	30	0	1	31
	Hours	0	47	0	4	51
	# Participants	0	1059	0	284	1343
Jr. High and High School	Events	0	1	0	0	1
	Hours	0	2	0	0	2
	# Participants	0	198	0	0	198
High School	Events	0	6	0	1	7
	Hours	0	27	0	2	29
	# Participants	0	172	0	30	202
K-12 Mixed Levels	Events	0	3	0	0	3
	Hours	0	8	0	0	8
	# Participants	0	193	0	0	193
Total	Events	1	220	6	2	229
	Hours	4	397.25	8.5	6	415.75
	# Participants	203	7314	282	314	8113

Spotlight on Innovative Student Services

The Lake Superior Stewardship Initiative (LSSI) focuses on helping students assume the role of contributing citizens in their community. Teachers, students, parents and community organizations partnered to address a stewardship need in their community. Students, with the guidance of teachers and community partners, designed and implemented projects that enhance the quality of life in their community and have a positive impact on the health of the Lake Superior watershed. Students contributed their talents and hard work to their project and developed an appreciation and understanding of how a community of individuals can work together.

LSSI was established in 2007 with grants from the Great Lakes Fishery Trust, Wege Foundation, Kinship Foundation, and the Michigan Department of Environmental Quality. Since then, approximately 1220 students and 72 teachers in 15 schools together with over 40 community partners have explored characteristics of healthy lakes, rivers, streams, and wetlands. This has motivated students to develop projects that address needs in their community.

LSSI is part of the Great Lakes Stewardship Initiative (GLSI), a larger statewide effort launched by the Great Lakes Fishery Trust in 2006, with major support from the Wege Foundation. The GLSI's goal is to increase awareness and understanding of the ecology of the Great Lakes so that Michigan's students become active stewards and advocates for strategies that support the long-term sustainability of the Great Lakes fisheries. To date, eight regional hubs have been established in Michigan and LSSI is the only hub located in the Lake Superior watershed.

School-community teams designed a wide variety of stewardship projects to address the needs of their own communities. Teachers and community partners participated in comprehensive professional development that provided resources to engage students in relevant learning experiences through stewardship projects that address Grade Level Content Expectations. The professional development was delivered in both formal workshop venue and informal Dinner and Dialogue events. Elementary students initiated a community garden using organic practices, a school wide program to compost food waste from their cafeteria, and three-mile nature trail. Middle and high school students are serving as active stewards of the Keweenaw Land Trust's Preserves, community beaches, township parks and Michigan Nature Association's sanctuaries.

LSSI provided many community activities to foster stewardship attitudes in the local communities. Family Adventure Hikes provided an opportunity to explore the Keweenaw's many sanctuaries and preserves guided by a local stewardship host or Western UP Center staff. The Get Outdoors Summit Events focused on fostering in children a connection with their natural surroundings. Parents, educators and community organizations explored how they can work together to encourage more outdoor time for children in order to enhance their physical, emotional and mental health.

The focus of the Lake Superior Stewardship Initiative (LSSI) is to prepare K-12 students to become knowledgeable citizens, concerned about the quality of life in their community, and actively engaged in stewardship of the health of Lake Superior and its watershed. For more information about LSSI, visit www.lakesuperiorstewardship.org.

Spotlight on High-Priority Schools

All of the schools in the Western UP Center's service area made AYP for the 2009-10 school year. The decline in student achievement in Algebra I and Michigan Math Merit Exam across all districts is a major need and may affect the future AYP status of high schools in our service area. The Western UP Center implemented the Rethinking Elementary Mathematics Instruction (REMI) and Algebra for All programs. These programs provided comprehensive professional development to K-9 teachers. Both programs provided teachers with instructional strategies to teach for deep understanding and engage students in meaningful mathematical tasks addressing the content expectations. The specific focus of REMI was establishing a deeper understanding of the Numbers and Operations strand in the K-7 Grade Level Content Expectations. Research shows that a working knowledge of the concepts in this strand is essential before students can master the more abstract concepts in Algebra.

What was the impact of the Western Upper Peninsula Center for Science, Mathematics and Environmental Education?

Impact on Students	Impact on Teachers
LSSI teachers report that their students involved in stewardship projects have better attendance and more motivation to work as result of their work in the community.	The Survey of Enacted Curriculum and the SAMPI Classroom Observation tool showed that the first cohort of teachers to complete the REMI program changed their instructional practice to incorporate learning experiences that allows students to build connection between ideas and develop deep understanding.
Impact on Communities	Impact on Schools
<p>15 LSSI community stewardship projects are taking place in local communities result in the following actions:</p> <ul style="list-style-type: none"> • Removal of trash from and water quality monitoring of beaches on Lake Superior watershed • Nature trails and signage built and maintained at L'Anse Public Schools, Michigan Nature Association and Keweenaw Land Trust preserves • Community garden in Calumet • Native wildflower garden in Pelkie • Rain garden in Hancock • Sustainable Forest Teaching Lab 	The Western UP Center provided quality professional development to help schools meet their school improvement goals in math and writing. Schools received \$70,000 in LSSI mini-grant funds to implement stewardship projects in their community.

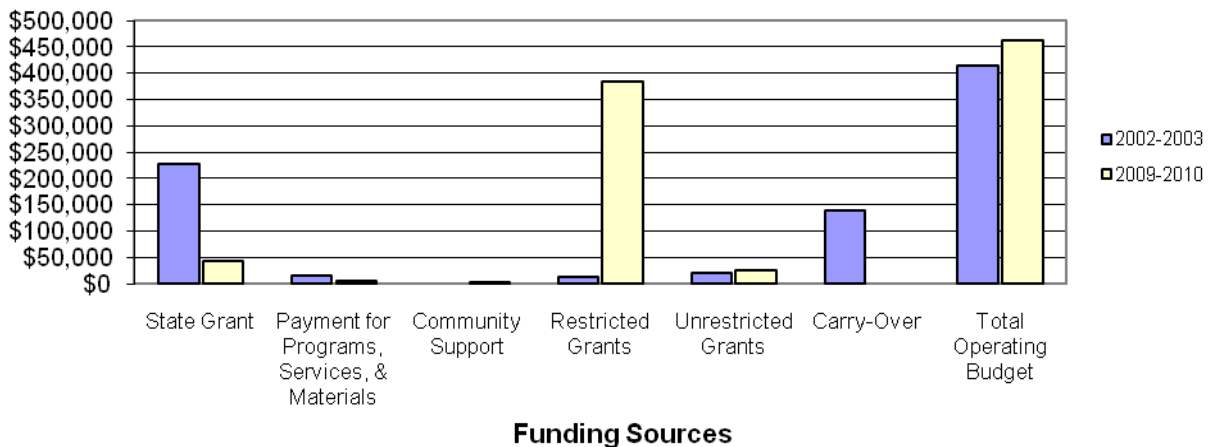
Director's 2009-2010 Budget Discussion

The Western UP Center provided a wide variety of student programs and professional development opportunities by combining funds from Section 99 with eight restricted grants during the 2009-10 school year. The Section 99 allocation to the Center does not provide enough funding for salary for one full time person or to maintain programming. As in previous years, the Center staff was very aggressive in pursuing other grant funds to maintain programming and staff for the 2009-10 school year. A substantial amount of staff time was spent pursuing grant opportunities and building collaborative partnerships.

The school districts in the CCISD and GOISD paid a minimal fee for family science nights, assembly programs and field trips offered through the Western UP Center in the 2009-10 school year. The fee paid for materials and travel but did not pay for staff time. Staff time for these programs is covered by grant funds. These programs are valued by the school districts and they are willing to pay the fees, even in the atmosphere of reduced school budgets.

Since Section 99 funding for the 2009-10 was 19% of full funding and this will be the case for 2010-11 school year. A majority of the Center's operating budget was based on other grant monies. Many grants are for one to three year projects and they do not provide sustained support for Center staff. Center staff must take on other responsibilities and duties outside of the Center activities to maintain their salary and benefits.

Changes in the Western Upper Peninsula Center's Financial Support



In addition to the financial support illustrated in the graph above, "in-kind" services received by the Center (donated volunteer time, facilities and equipment) were valued at \$22,700.

Director's Summary 2009-2010

The programs offered by the Western UP Center are essential to the districts in our service area. The Western UP Center is the main provider of professional development in math and science for teachers in our service area. Center staff made a commitment to continue to provide programming that meets the needs of school districts in our service area and engages students in real-world, relevant learning experiences. Section 99 does not provide adequate funding to provide this programming or employ the staff to provide this programming. The Center spent a substantial amount of time cultivating partnerships and pursuing grant opportunities to provide programming during the 2009-10 school year and into the 2010-11 school year. The efforts of Center staff resulted in successfully securing grant funds from Michigan Space Grant, National Science Foundation, Michigan Department of Education, Great Lakes Fishery Trust, Mathematics and Science Partnership and the Kinship Foundation.

The Western UP Center's professional development programs continue to focus on providing resources, strategies, and assistance to teachers as they implemented the content expectations in their classroom and improve their classroom practices. When planning professional development, we focus on strategies that help teachers improve student achievement in their classroom and meet their school improvement goals.

The Western UP Center's student and community programs focused on fostering stewardship of the communities in the Lake Superior Watershed and providing meaningful learning experiences for students and the larger community. The Lake Superior Stewardship Initiative, Outdoor Investigation Field Trip Program, Get Outdoors Summit and Family Adventure Hikes focused on individual and community actions to preserve the unique ecosystem of Lake Superior Watershed. Family Science, Math and Engineering nights engaged elementary students and their parents in innovative activities to teach math and science concepts.

The governance of the Western UP Center has remained the same. The Center is a partnership of the Copper Country Intermediate School District (CCISD) and Gogebic-Ontonagon Intermediate School District (GOISD) and the Center for Science and Environmental Outreach at Michigan Technological University (MTU) and provides services to schools in the CCISD and GOISD. The CCISD acts as the fiscal agent and the CCISD Board of Education reviews fiscal records.