

Western Upper Peninsula Center for Science, Mathematics and Environmental Education 2010-2011 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 fourteen schools, assistance with stewardship projects, and facilitation of school-community collaborations and community events. 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.

Global Watershed Program:

This program is a collaborative effort of the Western UP Center and Michigan Tech Center for Water and Society and it is funded by a National Science Foundation grant. It provides two-year fellowships for Michigan Tech PhD students (GK12 fellows) to work with middle and high school teachers to create lesson plans and activities that engage students in research on watershed science topics. This project will place 18 graduate fellows over 5 years in science classrooms in the Western UP Center's service area.

Outdoor Science Field Trip Program: This program provides students with an opportunity to explore forests, fields, wetlands, and streams where they can apply scientific concepts and gain new skills through a variety of hands-on activities. Teachers select field trips from a brochure containing descriptions of each field trip and the Michigan Grade Level Content Expectations addressed. A member of the Western UP Center's staff travels to the school site or a natural area near the school to conduct the field trip. This program is funded by a grant from the Kinship Foundation.

13th Annual Western U.P. Science Fair and Festival

Approximately 400 students participated in the 13th Annual Western Upper Peninsula Science Fair on Monday, February 28, 2011 at the Michigan Tech's Memorial Union Ballroom (MUB). Students in grades four through eight submitted projects on experiments they conducted using the scientific method. They were judged on the scientific content of their written report, a display and an oral interview with two judges. Seventy Michigan Tech faculty, students and staff, and community volunteers served as judges. Students and their families participated in more than two dozen, hands-on activities conducted by Michigan Tech and Finlandia University students. Award winning projects were displayed at the Carnegie Museum in Houghton from March 15-April 14, 2011.

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 (MMSP). The 2010-11 school year was the third year of this project focused on developing 52 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. The Western UP Center received more funding from MMSP to involve 85 more teachers in REMI through a teacher leader model during the 2011-12 school year.

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 Indiv. Total Hours		Reported Gender**		Position					
			M	F	Admin	Math Tchr	Sci Tchr	Tech	Comb Subj	Other or Unknown*
Pre-School	9	151	1	8	0	0	0	0	3	6
Elementary	86	1933	9	76	1	4	1	0	68	12
Middle/Jr. High	10	152	2	8	0	1	4	0	0	5
High School	41	1146	20	21	0	7	25	0	2	7
K-12 Mixed Levels	22	474	7	14	0	1	10	0	3	8
Other*	109	3223	40	63	0	0	6	0	0	103
Total	277	7079	79	190	1	13	46	0	76	141

*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 25.6 hours on mathematics, science, or technology professional development.

Table 2: Professional Development Activities

		Math	Science	Technology	Other	Total
Elementary School	Events	2	1	0	2	5
	Hours	58	6	0	10.5	74.5
	# Participants	42	20	0	17	79
Elementary and Middle School/Jr. High	Events	0	3	1	0	4
	Hours	0	40	6	0	46
	# Participants	0	40	8	0	48
Middle School	Events	0	1	0	0	1
	Hours	0	6	0	0	6
	# Participants	0	7	0	0	7
High School	Events	2	3	0	1	6
	Hours	43	24	0	1.5	68.5
	# Participants	24	48	0	16	88
K-12 Mixed Levels	Events	1	8	0	1	10
	Hours	45	189	0	6	240
	# Participants	13	156	0	8	177
Total	Events	5	16	1	4	26
	Hours	146	265	6	18	435
	# Participants	79	271	8	41	399



Spotlight on Professional Development

The Western UP Center provides professional development to meet the needs of teachers in our service area and help teachers provide quality instruction aligned to the Michigan Content Standards. A variety of environmental science and science professional development opportunities were offered through the Lake Superior Stewardship Initiative (LSSI). These sessions provided teachers with resources and strategies to engage students in stewardship projects in their community and develop an understanding of the Great Lakes watershed. Topics covered in these workshops were environmental stewardship, community based education, terrestrial and aquatic ecosystems, and effective outdoor field trips

The Rethinking Elementary Mathematics Instruction and Algebra for All projects provided sustained professional development to 69 mathematics teachers in the service area. The focus of these projects was to change instructional practices to engage students in meaningful mathematics tasks and discourse.

During the summer, the Western UP Center in collaboration with Michigan Tech provided quality teacher institutes to teachers throughout the state of Michigan. The focus of the institutes was to help teachers design and implement instruction that involves students in hands-on and minds-on learning experiences. The institutes were taught by a variety of scientists from Michigan Tech and Western UP Center staff. Participating teachers had the opportunity to earn graduate credit through Michigan Tech. The institutes that were offered were Great Lakes Maritime, Forest Resources and Environmental Science, Future Fuels from Forests, and Global Change.

Spotlight on Statewide Projects

The Algebra for All program addressed a pressing need to improve student achievement in Algebra I for all students. Fifteen algebra teachers, who participated in two years of this Initiative, indicated that the program had a valuable impact on their instructional practice. The following are participant comments on workshop reflections: “Through this experience I know I need to have clearer goals. I am motivated to become a better teacher.”

“I really enjoyed hearing everyone else’s projects- so many good ideas to use in my classroom.”

“This program has kicked started my brain.”

“I plan to become more knowledgeable using the TI-Inspire and using it to enhance learning in my classroom.”

“AFA program helps to keep me fresh on ways to think about math and teaching.”

“I have come to learn that there is a different way to teach. I am now using more student engaging activities.”

Spotlight on Partnerships

The Western U.P. Center for Science, Mathematics and Environmental Education is a partnership of the Copper Country and the Gogebic-Ontonagon Intermediate School Districts and Center for Science and Environmental Outreach at Michigan Technological University (MTU). Western UP Center's staff spend a considerable amount of time and expertise to foster a wide variety of partnerships to provide quality programming to the 19 school districts in their service area. These partnerships are crucial to the continued operation of the Center. The Center collaborated with various entities during the 2010-2011 school year to secure funding to maintain math and science programs for the 2011-2012 school years.

The Western U.P. Center brought together businesses, community organizations, local educators and MTU faculty to secure continuation funding through June 30, 2013 from the Great Lakes Fishery Trust to implement the Lake Superior Stewardship Initiative, which will engage schools in community-based learning opportunities.

The Western U.P. Center collaborated with faculty from various departments at Michigan Tech to secure funding for a wide variety of student and teacher programs.

- Secured five years of funding from the National Science Foundation to implement the *Global Watershed* project. This project will involve teachers and their students in scientific research of the human impact on local watersheds and the far-reaching impacts on the global watershed starting in the 2010-11 school year.
- Secured funding from the National Science Foundation to implement the Environmental Cyber-Citizen program for the 2011-12 and 2012-13 school years. This program will bring together a multidisciplinary team of scientists and undergraduate students from Michigan Tech to collaborate with citizen scientists and high school students to develop and deploy data collection and visualization tools on smart-phones.
- Secured funding from the National Science Foundation to implement the Teacher Research Experience: Woods to Wheels for 2011-12 and 2012-13 school years. This program will bring together scientists and teachers to research the production and utilization of bio-fuels. Teachers will create teaching units that bring this cutting edge research to the classroom.
- Secured funding from the Mathematics and Science Partnership Grant program to expand the Rethinking Elementary Mathematics program to include 85 more teachers. This program will provide teachers with strategies to build students' mathematical understanding of the concepts in Grade Level Content Expectations for grades K-7 through June 2012.

Students and faculty from Michigan Tech and Finlandia University provide a tremendous volunteer resource for conducting student programs such as Western U.P. Science Festival, TiViTz tournament, family science nights and community programs. In addition, the expertise of MTU faculty is a crucial component to the success of the Center's summer institute program. Staff worked closely with MTU faculty to provide the teachers with relevant ways to present cutting edge technology to their students.

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 2010-2011

		Math	Science	Other	Total
Elementary Schools	Events	0	187	0	187
	Hours	0	308.75	0	308.75
	# Participants	0	7132	0	7132
Elementary and Middle School/Jr. High	Events	1	35	0	36
	Hours	4	285	0	289
	# Participants	198	1421	0	1619
Middle School	Events	0	14	0	14
	Hours	0	77.5	0	77.5
	# Participants	0	608	0	608
High School	Events	0	13	0	13
	Hours	0	57.5	0	57.5
	# Participants	0	224	0	224
K-12 Mixed Levels	Events	0	7	1	8
	Hours	0	7.5	1	8.5
	# Participants	0	365	100	465
Total	Events	1	256	1	258
	Hours	4	736.25	1	741.25
	# Participants	198	9750	100	10048

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 and the Michigan Department of Environmental Quality. Since then, approximately 2240 students and 79 teachers in 14 schools together with over 48 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 a 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. The Green Film Series consisted of six events that provide a forum for community members to watch a film concerning an environmental issue and then participate in a facilitated discussion focused on positive action that can be taken. This series was very successful and will be continued in the 2011-12 school year.

LSSI was recognized by the Lake Superior Binational Forum for exemplary work involving youth in environmental stewardship of the Lake Superior watershed. For more information about LSSI, visit www.lakesuperiorstewardship.org.

Spotlight on High-Priority Schools

A majority of the schools in the Western UP Center's service area made AYP for the 2010-11 school year. Horizons Alternative High School of the Public Schools of Calumet, Laurium and Keweenaw and Copper Country ISD Learning Center did not make AYP for first time due to low achievement in mathematics. Increasing student achievement in Algebra I and Michigan Math Merit Exam is a major need across all districts not just these two schools. If this need is not addressed through quality professional development, it will affect the future AYP status of high schools in our service area. In response to this need, 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 (MMSP) program in the summer of 2008 to initiate an innovative professional development program for teachers in grades K-7. This three-year program provided 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 completed the professional development offered in this program. The Western UP Center received more funding from MMSP to involve 85 more teachers in REMI through a teacher leader model during the 2011-12 school year.

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.

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.

Locally, fifteen teachers from eight districts participated in Year 2 of Algebra for All during the 2010-2011 school year. This statewide initiative was made possible with funding from Michigan Department of Education, Michigan Mathematics and Science Centers Network, and Michigan Virtual University.

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

<p style="text-align: center;">Impact on Students</p> <p>A survey of LSSI teachers indicated:</p> <ul style="list-style-type: none"> • 90% of their students demonstrated an increased awareness of issues concerning the stewardship of the Great Lakes and were willing to take positive actions. • 100% of their students were more knowledgeable about resources and stewardship issues in their community and 50% were actively involved in their community through stewardship projects. 	<p style="text-align: center;">Impact on Teachers</p> <ul style="list-style-type: none"> • Pre and Post classroom observations using the SAMPI Instrument, of teachers involved in REMI, teachers had significant gains in the areas of implementation of instruction, math content of lessons, and classroom culture. • Pre and Post Survey of Enacted Curriculum of same teachers indicated positive changes in instructional practice. The survey showed an increased use of instructional practices such as active learning, making connections, analysis of information, and the demonstration of mathematical understanding.
<p style="text-align: center;">Impact on Communities</p> <p>LSSI has resulted in the following positive improvements to local communities:</p> <ul style="list-style-type: none"> • Community garden in Calumet • Nature trail at Lake Perreault • Nature trail on the grounds of L'Anse Area Schools. • Bird and Butterfly Garden in Pelkie • Rain Garden in Hancock • Interpretative signage and trail improvements at Keweenaw Land Trust preserves and Calumet School Forest. • Stewardship of various natural areas in the Lake Superior Watershed. • Collection of environmental monitoring data for various community and government agencies. <p>Nature trail and disc golf course in Lake Linden.</p>	<p style="text-align: center;">Impact on Schools</p> <p>Survey of principals from schools involved in REMI showed that 78% of these principals indicated this professional development program supported the teaching of grade level content expectations, aligned to school improvement goals, and will have a direct impact on student achievement.</p>

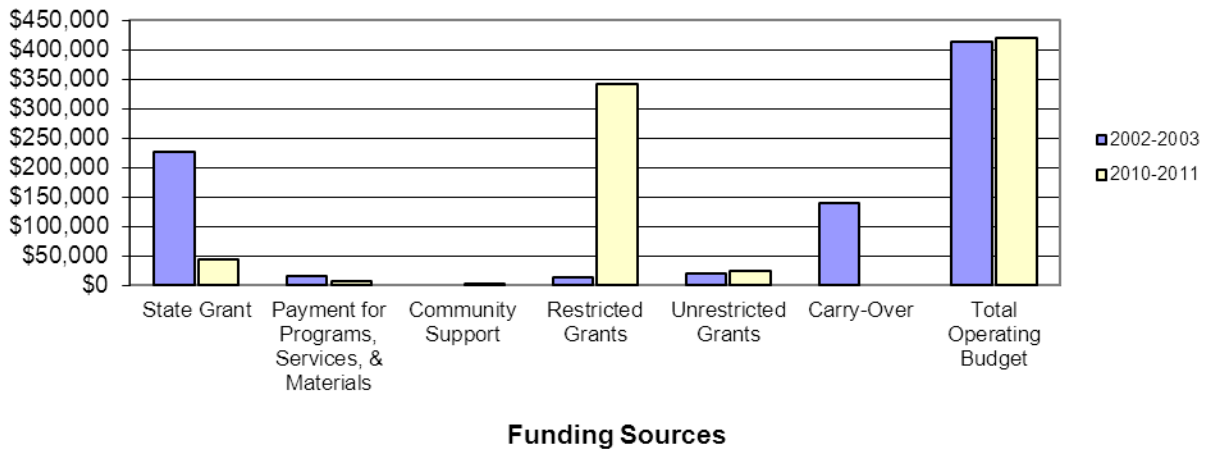
Director's 2010-2011 Budget Discussion

The Western UP Center provided a wide variety of student programs and professional development opportunities by combining funds from Section 99 with seven restricted grants during the 2010-2011 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 2010-2011 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 2010-2011 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 2010-11 accounted for 13% of the revenue of the Western UP Center. The rest 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 2010-2011

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 2010-2011 school year and into the 2011-2012 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, US Forest Service, 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, and Green Film Series 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.