

Western Upper Peninsula Center for Science, Mathematics and Environmental Education 2012-2013 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

LSSI and Global Watershed

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 the stewardship of Lake Superior and its watershed. The initiative provided sustained professional development for teachers, mini-grants to fifteen schools, assistance with stewardship projects, 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). LSSI is funded by the Great Lakes Fishery Trust, Wege Foundation, NOAA BWET program and EarthForce. For more information, visit www.lakesuperiorstewardship.org.

Global Watershed 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 Ph.D. students to work with LSSI teachers to engage students in research on watershed science topics through lessons and field experiences. This project placed eleven graduate fellows in science classrooms during the 2012-13 school year. For more information, visit www.globalwatershed.mtu.edu.

Lake Superior Youth Symposium (LSYS)

Lake Superior Youth Symposium took place at the Michigan Tech's Great Lakes Research Center on May 16-19, 2013. The symposium brought together 236 students and teachers from 24 schools located in the Great Lakes Watershed to prepare them to learn about the ecosystem, geology and culture of the Great Lakes and their watershed and acquire skills to do beneficial stewardship work in their community. For more information, visit <http://lakesuperioryouth.org>.

GPM and Project PRIME

Comprehensive sustained professional learning in mathematics was available to districts in the Copper Country and Gogebic Ontonagon ISD through the Greater Proficiency in Mathematics (grades K-8) and Project PRIME (grades 6-12). Both projects focus on helping teachers implement the Common Core State Standards for mathematics in their classroom and prepare students for the Smarter Balanced Assessment. More information about these projects is discussed in Professional Development (page 3) and Partnership (page 4) of this report.

Family Science and Engineering

During 2012-13, fifteen Family Engineering and Science Nights were held at elementary schools in Houghton, Baraga, Gogebic and Ontonagon counties and reached 1,365 students and their parents. Students and their parents attend two 40-minute inquiry-based activities led by Michigan Tech students. Elementary students solved a problem, did an experiment, tackled an engineering challenge, or conducted an investigation. The program was conducted in collaboration with Michigan Technological University's Departments of Education and Civil & Environmental Engineering.

Outdoor Science Programs

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 aligned to the Michigan Grade Level Content Expectations. 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. To extend the impact of this program when school is not in session. Students could participate in the Outdoor Science program during spring and summer break. The spring and summer break programs were held at the Great Lakes Research Center. This program is funded by a grant from the Kinship Foundation.

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 high-priority 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 the 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 table below describes who participated.

Table 1: Participants Receiving Professional Development

| Participants | | | Reported Gender | | Position | | | | | |
|-------------------|------------|-------------|-----------------|------------|----------|-----------|-----------|-----------|-----------|-------------------|
| | | | M | F | Admin | Math Tchr | Sci Tchr | Tech Tchr | Comb Subj | Other or Unknown* |
| Pre-School | 1 | 47 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| Elementary | 96 | 3449 | 11 | 85 | 1 | 2 | 1 | 0 | 90 | 2 |
| Middle/Jr. High | 16 | 333 | 5 | 11 | 0 | 2 | 5 | 1 | 2 | 6 |
| High School | 45 | 1251 | 16 | 29 | 0 | 12 | 16 | 0 | 1 | 16 |
| K-12 Mixed Levels | 26 | 730 | 11 | 15 | 2 | 4 | 8 | 0 | 5 | 7 |
| Other* | 8 | 87 | 2 | 6 | 0 | 0 | 0 | 0 | 0 | 8 |
| Total | 192 | 5897 | 45 | 147 | 3 | 20 | 30 | 1 | 99 | 39 |

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

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 (one building on the previous one 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 30.7 hours on mathematics, science, or technology professional development.

Table 2: Professional Development Activities

| | | Math | Science | Technology | Other | Total |
|--|----------------|------|---------|------------|-------|-------|
| Elementary | Events | 1 | 2 | 0 | 0 | 3 |
| | Hours | 10 | 13 | 0 | 0 | 23 |
| | # Participants | 36 | 72 | 0 | 0 | 108 |
| Elementary & Middle/Jr. High | Events | 3 | 1 | 0 | 0 | 4 |
| | Hours | 84 | 6 | 0 | 0 | 90 |
| | # Participants | 96 | 15 | 0 | 0 | 111 |
| Middle/Jr. High & High School | Events | 3 | 3 | 0 | 0 | 6 |
| | Hours | 68 | 58 | 0 | 0 | 126 |
| | # Participants | 37 | 24 | 0 | 0 | 61 |
| K-12 Mixed Levels | Events | 0 | 16 | 1 | 3 | 20 |
| | Hours | 0 | 236 | 2 | 23 | 261 |
| | # Participants | 0 | 239 | 20 | 55 | 314 |
| Total | Events | 7 | 22 | 1 | 3 | 33 |
| | Hours | 162 | 313 | 2 | 23 | 500 |
| | # Participants | 169 | 350 | 20 | 55 | 594 |

Spotlight on Professional Development

Comprehensive sustained professional learning in mathematics was available to districts in the Copper Country and Gogebic Ontonagon ISD through the Greater Proficiency in Mathematics (GPM) (grades K-8), Project PRIME (grades 6-12) and SaM³ Math Learning Communities. These projects focus on helping teachers implement the Common Core State Standards for mathematics in their classroom and engage their students in meaningful math learning activities. Project PRIME and GPM will continue into the 2013-14 school year.

Greater Proficiency in Mathematics (GPM) provided teachers with 84 hours of professional learning focused on building a deep understanding of concepts in the Common Core State Standards (CCSS), nurturing mathematics leadership in participating districts and using student work to inform instruction. GPM is a partnership between the five Math/Science Centers located in the Upper Peninsula, Lake Superior State University, Northern Michigan University, Michigan Technological University, Bay de Noc Community College and the Intel[®] Math Program (Vermont Mathematics Initiative) and the Mathematics Learning Communities program in Massachusetts.

Project PRIME and SaM³ are statewide projects of the Michigan Mathematics and Science Centers Network and the Western UP Center served as a regional site. Project PRIME focused on providing teachers with the skills and knowledge to teach the mathematics in the CCSS and engage students in rich math tasks that require them to apply the math practices in the CCSS.

SaM³ gave teachers a framework for addressing misconceptions that surface in the mathematics classroom especially in the area of fractions. Teachers were asked to try strategies out in their classroom and then meet in professional learning communities to discuss the implementation.

Spotlight on the Value of Statewide Projects

The Project PRIME and SaM³ programs addressed a pressing need to improve student achievement in mathematics for all middle and high school students. Many of the secondary math teachers in the Western UP Center are the only or one of two math teachers in their district. These programs provide a valuable opportunity for these teachers to collaborate and share with other teachers in the Western UP Center service area and statewide, concerning how to teach all students the content in the Common Core State Standards. Twenty-six (26) middle and high school math teachers (approximately 70% of secondary math teachers in the Western UP Center's service area) participated in Project PRIME or SaM³ or both programs. A majority of these teachers make participation in these programs a priority in their professional development and participate in all sessions.

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 2012-2013

| | | Math | Science | Technology | Other | Total |
|---|----------------|------|---------|------------|-------|-------|
| Elementary | Events | 0 | 172 | 2 | 1 | 175 |
| | Hours | 0 | 342.9 | 33 | 21 | 396.9 |
| | # Participants | 0 | 6005 | 38 | 15 | 6058 |
| Elementary & Middle/Jr. High | Events | 1 | 2 | 0 | 0 | 3 |
| | Hours | 4 | 3.5 | 0 | 0 | 7.5 |
| | # Participants | 254 | 52 | 0 | 0 | 306 |
| Middle/Jr. High | Events | 0 | 15 | 0 | 0 | 15 |
| | Hours | 0 | 63.5 | 0 | 0 | 63.5 |
| | # Participants | 0 | 900 | 0 | 0 | 900 |
| High School | Events | 0 | 1 | 0 | 0 | 1 |
| | Hours | 0 | 1 | 0 | 0 | 1 |
| | # Participants | 0 | 13 | 0 | 0 | 13 |
| K-12 Mixed Levels | Events | 0 | 1 | 0 | 0 | 1 |
| | Hours | 0 | 2 | 0 | 0 | 2 |
| | # Participants | 0 | 13 | 0 | 0 | 13 |
| Total | Events | 1 | 191 | 2 | 2 | 196 |
| | Hours | 4 | 412.9 | 33 | 24 | 473.9 |
| | # Participants | 254 | 6983 | 38 | 55 | 7330 |

Spotlight on Innovative Student Services

The Western UP Center has two offices, one located at the Copper Country ISD and Michigan Tech Great Lakes Research Center (GLRC). This allows the center to build partnerships with in the K-12, university and community arena to bring innovative student programs that engage students in STEM learning activities and explore STEM careers. The Western UP Center staff at the GLRC collaborated with various departments at Michigan Tech to provide many high quality programs to students. Many student events took place at Great Lakes Research Center giving students access to research facilities there.

The Water Festival—October 5, 2012

This event gave 1,019 students in grades 4-8 the opportunity to participate in four 40-minute sessions on a wide range of topics related to Lake Superior and water resources. Sixty-seven presenters volunteered their time throughout the day to conduct the sessions. Presenters were scientists, graduate and undergraduate students from Michigan Tech, National Park Service, U.S. Forest Service, U.S. Fish & Wildlife Service, Copper Country Arts Center, Friends of the Land of Keweenaw, Keweenaw Land Trust, U.S. Coast Guard, Copper Country Trout Unlimited, Lake Dance in Chicago, and the Michigan Nature Association.

Engineering Exploration Day—February 27, 2013

This event gave 21 middle school girls and their parents an opportunity to explore careers in engineering through hands-on activities conducted by young engineering students from Society of Women Engineers and Society of Hispanic Professional Engineers.

Science and Engineering Spring Break Day Camp—April 2-4, 2013

This camp was held at Great Lakes Research Center and taught by WUP Center staff and two MTU Forestry graduates. Several Michigan Tech faculty and students were guest presenters and hosted tours of an aquaponics lab and sturgeon fishery research labs.

Lake Superior Celebration Day—April 23, 2013

This free community open house took place at Michigan Tech's Great Lakes Research Center (GLRC) from 6:00-8:00 p.m. and marked the five year anniversary of the Lake Superior Stewardship Initiative (<http://lakesuperiorstewardship.org>). Activities included: tour of the new GLRC, green roof and aquaponics lab, "superior tasting" of products grown in the Lake Superior watershed and two 30 minute concerts (6:30 p.m. and 7:15 p.m.) by popular Michigan children's musician, Joe Reilly, on his U.P. Tour for Earth Week. Several informative displays by LSSI community partners—Dollar Bay High School SOAR Team's ROV, Keweenaw Land Trust, Isle Royale National Park—were available.

Lake Superior Youth Symposium—May 16-19, 2013

This event provided a unique opportunity to enhance grade 8-12 students' and teachers' appreciation for the Great Lakes Watersheds, increase understanding of challenging environmental and scientific issues, and encourage personal involvement in creating solutions. The goal of the symposium was to promote stewardship amongst tomorrow's leaders and decision-makers.

Ride the Waves—June 2013

This program allowed 500 students in grades 4-12 to explore Lake Superior and adjacent waters aboard Michigan Tech's research vessel, the *Agassiz*. Explorations were led by a member of Michigan Tech's faculty with expertise on the topic, assisted by undergraduate student mentors. There were four explorations that students could participate in: Aquatic Food Web & Lab Investigation; Mine Waste Tour & Torch Lake Remediation Investigation with Remotely-Operated

Vehicles, and Lake Superior's Ring of Fire.

The Ride the Waves Program was funded by GM (General Motors) and Michigan Tech's Great Lakes Research Center and coordinated by Dr. Marty Auer, professor, Department of Civil & Environmental Engineering and Western UP Center Staff.

Summer Science Camp—April, June 18-20 and June 25-27, 2013

These programs offered 3 half day programs for grades 1-3 and grades 4-6 students. Students participated in science explorations aligned to the Michigan Content Expectations. The explorations that were available to students were: Forest Explorations; Things That Move; and Exploring the Great Lakes and Outdoor Explorations. The explorations took place in the GLRC research labs or at Nara Nature Park.

Spotlight on Partnerships

The Lake Superior Youth Symposium is an excellent example of how the Western UP Center nurtures partnership to bring a high quality event to teachers and students in their service area and in the Great Lakes area. Lake Superior Youth Symposium was held at Michigan Tech's Great Lakes Research Center on May 16-19, 2013. The symposium goal was to engage students and teachers in learning activities about stewardship of Lake Superior and the Great Lakes Watersheds and to prepare them to bring their experiences back to their classrooms and community. There were 236 teachers and students from 24 schools located in Michigan, Wisconsin, Minnesota and Ontario who participated.

The symposium was the result of the collaborative work of various educational, government and community organizations.

- Forty-two (42) presenters conducted sessions on a wide variety of topics focusing on the Great Lakes history, culture, economic impacts, conservation issues, geology, and water quality. Student stewardship initiatives and artwork were featured. Presenters included Michigan Tech faculty and graduate students; biologists, foresters and geologists; and community activists, artists, writers, educators and model student groups.
- Twelve (12) Superior AmeriCorps members assisted with the symposium.
- Michigan Tech donated the use of Great Lakes Research Center, Student Development Complex and Fisher Hall for symposium activities.
- Thirteen community organizations hosted stewardship projects in the local communities within the Lake Superior watershed on the Saturday of the symposium. Participants built community gardens and birdhouses, planted trees, removed invasive species from natural areas, maintained trails, and cleaned Lake Superior beaches and local parks.
- Funding was secured from a variety of sponsors to host the event. Sponsors were Michigan Tech's School of Forest Resources & Environmental Science, Michigan Tech's Great Lakes Research Center, Great Lakes Stewardship Initiative, NOAA BWET Program, EarthForce, Michigan Space Grant Consortium, and the Keweenaw Community Foundation (KCF) Environmental Endowment.
- Student scholarships were contributed by the KCF Youth Advisory Council, Upper Peninsula Environmental Council, Superior Watershed Partnership, Friends of the Land of Keweenaw, Copper Country Trout Unlimited, Copper Country Audubon Club and Dale Nichols.

Detailed description of the sessions can be found in the Program booklet available on <http://lakesuperioryouth.org>

Spotlight on High-Priority Schools

The Western UP Center serves schools in the Copper Country and Gogebic Ontonagon Intermediate School District. The following schools in this area were recognized as MDE Focus Schools for the 2012-13 school year—Houghton Elementary, Houghton Middle School, Houghton High School, Lake Linden Hubbell Elementary and Ontonagon Elementary.

The schools in this service area are small with 79% of the districts serving less 500 students, so teacher participation in programs such as Project PRIME, Greater Proficiency in Mathematics (GPM) and SaM³ can have a substantial impact on teaching practices within a school.

Seven teachers from Houghton Elementary participated or are currently participating in GPM. Three math teachers from Houghton Middle and High School participated in Project PRIME and SaM³. Two teachers from Lake Linden Hubbell Elementary are currently participating in GPM.

Schools are identified as Focus Schools because they have a big achievement gap between top 30% of students and bottom 30% of students. The Western UP Center has partnered with the CCISD Special Education Department to address this gap through sustained professional development program for the 2013-14 school year. The program is called MI² Enhancing Math Instruction for Students with Learning Disabilities. Teacher teams of a math teacher and special education teachers are participating from Houghton, Lake Linden Hubbell and Ontonagon districts.

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

Impact on Students

- The data from a pre and post Engineering Exploration survey of 21 middle school girls who attended the Engineering Exploration Day on February 27 indicated a 2.55 point increase on a 10 point scale.

Impact on Teachers

- Data from Pre and Post Learning Math for Teaching surveys given to 11 teachers involved in PRIME during the 2012-13 school year indicate a 0.54 point increase on a 10 point scale.
- Data from Pre and Post Intel[®] Math surveys given to 30 teachers involved in GPM during the 2012-13 school year indicate a 24.6% increase.

Impact on Schools

- All of the schools identified as Focus Schools by MDE in the Western UP Center service area are participating in the comprehensive math professional learning offered by the Western UP Center. The math programs are GPM, Project PRIME and MI².

Impact on Communities

- As part of the Lake Superior Youth Symposium, 13 communities were improved through stewardship projects.
- The Lake Superior Stewardship Initiative impacted 14 local communities through stewardship projects and provided \$58,000 in funding to do this work.

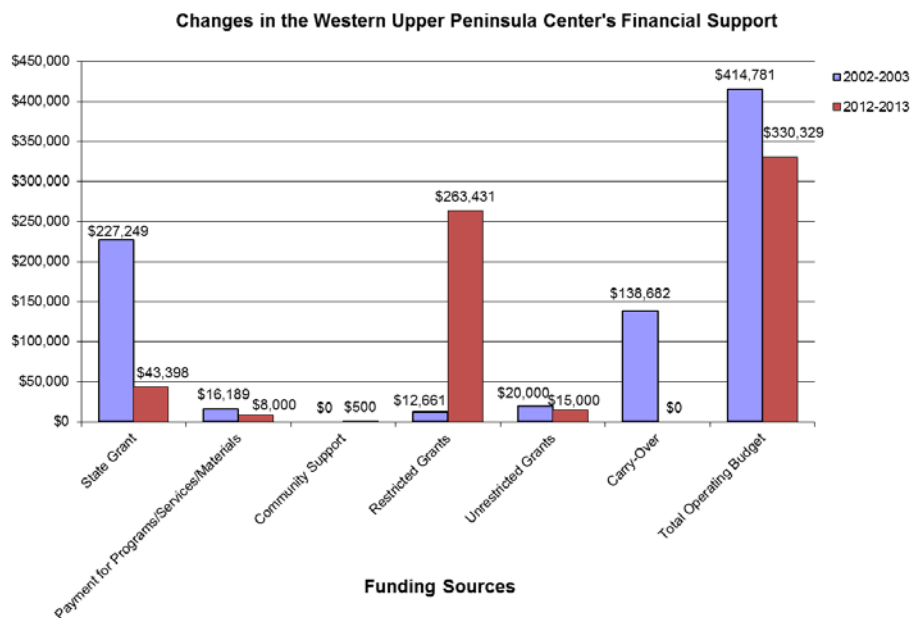
Director's 2012-2013 Budget Discussion

During the 2012-13 school year, the Western UP Center provided a wide variety of student programs and professional development opportunities by combining funds from Section 99 with fifteen grants, program fees and community donations. 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 were very aggressive in pursuing other grant funds to maintain programming and staff for the 2012-13 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 fee for family science nights, assembly programs and field trips offered through the Western UP Center in the 2012-2013 school year. These fees paid for materials, travel and a small portion of staff time. A majority of staff time for these programs was 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.

Section 99 funding for the 2012-13 accounted for 10.5% 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. Currently the Western UP Center has five staff members. A majority of staff salaries are covered by grant funds other than Section 99 funds. In addition, Western UP Center staff must take on other responsibilities and duties outside of the center activities to maintain their salary and benefits.

The Western UP Center budget for the 2013-14 school year will be comprised of Section 99 funds, seven restricted grants and program fees. The operating budget for the 2013-14 school year is approximately 60% of the amount of the operating budget for the 2012-13 school year. Currently, Section 99 funding will contribute 19% of the revenue for 2013-14 school year.



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

Director's Summary 2012-2013

The Western UP Center for Science, Mathematics and Environmental Education 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. This crucial partnership gives the Western UP Center the ability to provide student and teacher programming to the districts in our service area. It gives the center flexibility in securing grant funds and resources to implement these programs. The Western UP Center is the main provider of professional development in math and science for teachers in our service area. Center staff spent a substantial amount of time cultivating partnerships and pursuing grant opportunities to provide programming during the 2012-13 school year and into the 2013-14 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, National Oceanic Atmospheric Administration, EarthForce 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 Common Core State Standards in their classroom and improve their classroom practices. The Western UP Center provided comprehensive professional development in math and science through Greater Proficiency in Mathematics, Project PRIME, Enhancing Math Instruction for Students with Learning Disabilities and Lake Superior Stewardship Initiative. These programs 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, Lake Superior Youth Symposium, Water Festival, Outdoor Investigation Field Trip Program, and Green Film Series focused on individual and community actions to preserve the unique ecosystem of Lake Superior Watershed. Spring Break and Summer Camps, Ride the Waves, Family Science and Engineering Nights engaged students in innovative activities to teach science, technology, engineering and math concepts.