

Economic Development Incentive Grant

2013-14 Annual Report

Institution Name(s): UW-Eau Claire	Project Title: The Responsible Mining Initiative: Building an Educated STEM Workforce for the Natural Resource Industry
Principal Investigator: Kent M. Syverson	Person submitting Report: Kent M. Syverson
Email: syverskm@uwec.edu	Contact Phone #: 715-836-3676
Grant Award Amount: \$451,317	Report Date: July 16, 2014
Grant Funding Spent (to date): \$44,761	Date project began: November 14, 2013
	Date project ends (projected): June 20, 2015

I. Status Report

The Responsible Mining Initiative, housed in the UW-Eau Claire Dept. of Geology, has three distinct, integrated outcomes to expand professional opportunities and improve workforce quality. First, summer short courses will allow Wisconsin high school teachers and students to explore career opportunities and develop interest in the mining and environmental industries. Second, curriculum development activities will lay the groundwork for a rigorous, interdisciplinary program focusing on economic geology, hydrogeology and restoration ecology. Third, the Initiative will develop a vibrant paid internship program directly benefiting both students and industry. Our goal is to prepare graduates for work in the mining industry, the environmental consulting industry, and in regulatory agencies such as the DNR.

Much progress has been made since the grant was received in November 2013. This annual report will address each outcome separately. Most efforts to date have been in the area of internship development, so this outcome will be discussed with more detail than the other outcomes.

Outcome #1. Outreach activities for Wisconsin high school teachers and students

In order for Wisconsin residents to fill jobs in the natural resources industry, they need to know about the job opportunities and how to prepare themselves for employment. For this reason, outreach to the public is a critical component of the Responsible Mining Initiative. The Initiative will provide high-quality short courses for Wisconsin high school teachers and students. This will help them build interest in career opportunities in the mining and environmental industries.

The first high school teacher workshop will be held this August in Eau Claire (see **App. A**). Faculty members Scott Clark and Lori Snyder are being paid this summer to develop the curriculum for this weeklong workshop. Teachers will learn about mining's role in Wisconsin's past, present, and future. The workshop goals are to give educators a solid understanding of the geologic formation and the location of economic rock and mineral resources in Wisconsin; their importance to society and the regional economy; and, the environmental impacts of their exploitation. To achieve the stated goals, the workshop will provide teachers with basic information about Wisconsin's geologic history, including the types of mineral deposits found within Wisconsin. Learning will occur via a hands-on approach, with field trips scheduled for four of the five days, including visits to a

landfill, an industrial sand mine, and the Iron Range of Minnesota. Teachers will receive a workshop packet and will have time to work on designing a mining-based lesson plan to take back to their classrooms.

Teacher input will be used to modify the workshop for future offerings. Also, teacher input will be sought to design the most appropriate and attractive summer 2015 workshop for high school students. It is hoped some of these students will see STEM employment in the natural resources area as their career choice and will enroll in our program at UW-Eau Claire.

The summer 2014 teacher workshop is being coordinated through UW-Eau Claire Continuing Education. Currently five teachers have registered for the workshop, and according to Continuing Education, they expect more to teachers to register as the workshop approaches. As teachers participate in the program, they will become avenues for publicizing future workshops.

Outcome #2. Laying the groundwork for a rigorous educational program in responsible mining

The ultimate goal of the Responsible Mining Initiative is to lay the groundwork for a new, rigorous program focusing on economic geology, hydrogeology, restoration ecology, public policy, and scientific communication. The university agreed to find the space for, and to hire, three new faculty members to support this Initiative – a contaminant hydrogeologist, a low-temperature geochemist, and a restoration ecologist (in Biology). Given the short duration of this grant, the curriculum for this new program will not be finalized in the course catalog until after the grant period ends. However, much foundational work is underway to accomplish this goal. Notable activities advancing educational program development include:

- **Curriculum conversations within the Dept. of Geology are ongoing.** The Department has met several times to discuss curriculum. After discussing potential courses, the Chair met with different departments to discuss the creation and/or inclusion of other classes within the new major. Future activities include:
 - A day-long Geology curriculum retreat is scheduled for August 2014 to solidify our proposed program curriculum.
 - Once the curriculum retreat occurs, the Department will hold a summit to obtain curricular input from industry (probably sometime in November 2014). We intend to gather representatives from the mining and environmental consulting industries, as well as the DNR, to gain additional insights about the most appropriate curriculum.
 - The Department will use industry input to shape a final curriculum proposal to send to university committees for approval.
- **New tenure-track economic geologist hired – Dr. Robert Lodge.** Dr. Lodge is a volcanogenic massive sulfide expert currently employed by the Ontario Geological Survey. Dr. Lodge has been hired to teach our Economic Minerals class, an important course in our new major. He will arrive on campus in August 2014.
- **Space has been located for the new Economic Geology/Hydrogeology laboratory – Phillips Hall 219.** Academic Affairs secured this new space for Geology in June. The space will be remodeled during the 2014-15 academic year with guidance from Dr. Robert Lodge and will be available for use in spring 2015. The grant has \$85,000 allocated for remodeling this space.
- **Informal approval has been granted to recruit a tenure-track Contaminant Hydrogeologist.** The search will take place during the 2014-15 academic year and the person will join the faculty in fall 2015. This hire will allow us to teach more water- and policy-related classes necessary to prepare graduates for employment in the mining, environmental consulting, and regulatory industries.
- **Conversations are ongoing with the Dept. of Biology about the Restoration Ecology hire.** Biology is conducting three searches during the upcoming academic year. Thus, it has been decided to postpone

the search for a restoration ecologist until the 2015-16 academic year. At that point the responsible mining curriculum will be nearly finalized, and this should facilitate the recruitment process. The position description will be finalized in spring 2015.

Outcome #3. Developing a vibrant paid internship program

Three UW-Eau Claire Geology faculty members have been working to develop paid internships for our students in different sectors: Kent M. Syverson (KMS, industrial sand mining industry), J. Brian Mahoney (JBM, metallic mining/petroleum), and Katherine R. Grote (KRG, hydrogeology/environmental consulting/DNR). Each faculty member has one month of salary this summer to build relationships with industry, but internship-building activities began long before the summer (see **App. B**).

Faculty members have been e-mailing industry contacts, meeting with potential industrial partners around the state (and elsewhere), and attending conferences to build industry relationships. Conferences include:

- Roundup (a meeting of international metallic mining companies), Vancouver, BC, Jan. 2014 (JBM)
- Prospectors and Developers Association of Canada (PDAC) meeting of international metallic mining companies, Toronto, ON, March 2014 (JBM)
- Wisconsin Ground Water Association (meeting dominated by environmental consulting companies, hydrogeologists, and DNR officials), Waukesha, WI, March 2014 (KRG)
- Society for Mining, Metallurgy, and Exploration-Minnesota Chapter, Duluth, MN, May 2014 (KMS)

These efforts have been very fruitful. The Initiative's internship goal for Year #1 was to have two Memoranda of Understanding (**MOUs**) signed. This goal was exceeded by signing *three* MOUs with two different companies. UW-Eau Claire Geology students have been given preference in the hiring process, and UWEC students were placed in each paid internship slot during summer 2014 (see position descriptions in **Appendices F, G, and H**):

- **Smart Sand Inc.** (Tomah, industrial sand mining) – Intern Nick M., Kimberly, WI. Pay ~\$8000 for the summer. Another graduating geology student who interviewed for the internship was offered (and accepted) a full-time “real” job with Smart Sand! He started working for Smart Sand in mid-June.
- **Unimin Corporation** (Tunnel City, industrial sand mining) – Intern Justin P., Altoona, WI. Pay ~\$13000 for the summer.
- **Unimin Corporation** (Mankato, MN, environmental affairs in industrial sand mining) – Intern Ryan C., Wausau, WI. Pay ~\$13000 for the summer.

In addition, a fourth student intern was hired by a company with which we do not have an MOU in place:

- **Freeport McMoRan Copper and Gold** (New Mexico, metallic mining) – Intern Samantha T., Roscoe, IL.

Each internship pays well and provides the interns with excellent on-the-job experience. When these students graduate, they will have a major advantage when seeking industry employment.

Internships with many other companies are still in the discussion stages (App. B). Building extended relationships with these companies is an important part of the process. It is hoped some of these contacts will bear fruit during the next year. The most promising leads at this point include:

- **Maptek**--A software company and developer of the program Vulcan, the top-rated three-dimensional mining software. Maptek currently supplies training worth about \$40,000/yr to UWEC students through short courses in Geol 320 (Sedimentation and Stratigraphy) and Geol 365 (Economic Geology). The

head of North American operations seems very interested in establishing an internship program with UW-Eau Claire.

- **SEH**--One of the principal environmental/engineering firms in the upper Midwest (closest office is in Chippewa Falls, WI). SEH is heavily involved in the sand mining industry in western Wisconsin. Mahoney met with several principals in April, and they are very interested in establishing an internship through the Responsible Mining program, even though they might not have an internship available each year.
- **Haley & Aldrich**--A nationwide environmental/engineering company with offices in the Northeast, Arizona, Idaho, and California. Dale Kerner, a UW-Eau Claire geology alumnus, recently was selected to open an office in Boise, Idaho. Haley & Aldrich has already hired one UW-Eau Claire graduate and is seeking to hire more. The CEO supports the Responsible Mining program, and wants applicants to apply across the entire company, not just to the Boise office. Discussions continue about an internship agreement.

Donations to the Geology program

Relationship-building with industry has facilitated unprecedented major donations to the Department of Geology (Fig. 1). During the 2013-14 academic year, \$47,845 was donated to Geology (versus \$18,490 during the 2012-13 academic year). This money has been used to fund scholarships, student grants, and purchase equipment.

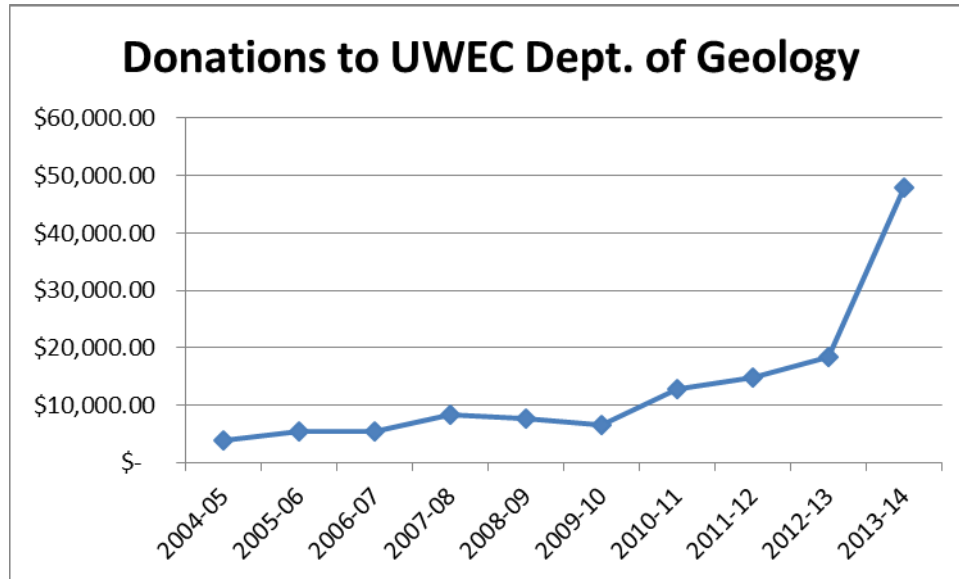


Figure 1. Donations started to increase in 2010-11 as the mining industry gained momentum in the State of Wisconsin. The Responsible Mining Initiative has made a major impact on donations to the department (see 2013-14 data point) and opportunities available to UW-Eau Claire students.

Unimin Corporation is committing \$25,000 annually to support UW-Eau Claire Geology students (see App. C). This is in addition to the two internships mentioned above, and the first \$25,000 installment already has made major positive impacts on students. This spring the money was used to fund the following initiatives:

- ***Unimin Freshman Geology Scholarships*** are merit-based, annual \$1000 scholarships for up to five high-potential incoming freshman who are majoring in Geology. It is hoped these scholarships will help recruit additional high-quality freshman geology majors to our program. The first three recipients are from Hartford, Mukwanago, and Cedarburg high schools in Wisconsin. (\$5000/yr)
- ***Unimin Sophomore Geology Scholarships*** are merit-based, \$2500 scholarships for four geology majors who will be taking Mineralogy-Petrology in the following fall semester. The first four recipients are from Green Bay, Prairie du Sac, and Weston, WI, and Springfield, IL. (\$10,000/yr)
- ***Unimin Field Geology Grants***. Unimin has agreed to sponsor our Field Geology II (Geol 471) course held in Whitehall, Montana (see story and photos in App. C). This year the sponsorship provided each field camp participant (nineteen students) with a \$525 grant from Unimin Corp. Unimin Corp. officials came to campus in April to announce the field camp sponsorship, and students were very excited! (\$10,000/yr)

Other major donations to the Responsible Mining Initiative include:

- ***Badger Mining Corp., \$5000***. Money will be used to help buy two reflected-light petrographic microscopes. The reflected-light microscopes will be important for our Economic Minerals class.
- ***Wisconsin Industrial Sand Association (WISA), \$5000***. Money used to award three \$1650 WISA Geology Scholarships for the 2014-15 academic year.

II. Updated Goals/Performance Metrics and Assessment Plans

The updated performance metrics and assessment plans are provided in **Appendix D**. No major changes to project activities are reported.

Three internship MOUs were signed in the first year of the grant. This exceeds our target of two MOUs during the first year (Required Performance Outcomes tab in App. D). Faculty have spoken with many other companies as well (App. B). Based on industry response to the Responsible Mining Initiative, the goal of five MOUs by the end of the grant period seems reasonable. However, much work must still be done to develop additional internships.

Actual outcomes for 2013-14 are reported in the General Performance Outcomes tab in Appendix D. During the next month the first assessment data will be collected. Exit interviews will be conducted with the Responsible Mining Initiative interns and their employers. In addition, feedback will be solicited from teachers participating in the first Responsible Mining workshop (App. A). These data will be used to improve future internships and workshops.

Currently only five teachers are enrolled in the Responsible Mining workshop. Although we anticipate more registrants, we are unlikely to reach our targeted goal of fifteen participants. Word of mouth should improve recruitment of teachers for the summer 2015 workshop. However, improved recruitment strategies will need to be discussed with UW-Eau Claire Continuing Education.

III. Project/Program Budget and Expenditures

The first summer during the funding period is the time for major spending, but most of this spending will be billed after June 30, 2014 (Table 1). In addition, construction has not yet begun on the Economic Geology/Hydrogeology laboratory space (Phillips 219). Thus, only \$44,760 has been spent to this point (Table 1) compared to the \$161,674 allocated for the first year (**App. E**). Once the construction, summer 2014 salaries, and summer 2014 travel expenses are posted, the spending amount will be similar to the amount allocated for Year #1 (see comments in Table 1).

<i>Table 1. Year 1 spending (compared to original Responsible Mining Initiative proposal budget supplied in App. E).</i>				
Outcome	Distribution	Amount Requested	Amount Spent 2013-14	Comments
1. Outreach Activities	HS teacher short course	10,250	0	Short course is in August, so entire amount will be spent by the end of summer 2014.
	Outreach coordination (1 mo FTE)	9,494	0	Short course is in August, so entire amount will be spent by the end of summer 2014.
2. Program Development	Laboratory construction	85,000	0	Space was identified in June 2014, so Facilities Management is now preparing construction plans. Construction (and spending) will begin in fall 2014 once the plans are finalized.
	Lab development (0.5 mo FTE)	11,364	3,962	Entire amount will be spent by the end of summer 2014.
	Equipment and supplies	0	27,659	An old microscope stepper stage died, so a new stepper stage, software, and some microscopes were purchased during Year #1, instead of Year #2 as originally planned.
3. Internship Development	Internship development (metallic, sand, environment) (2.5 mo FTE)	30,566	9,142	Entire amount will be spent by the end of summer 2014.
	Internship Development Travel	15,000	3,998	More travel has been conducted this summer to establish internships and will be billed this summer.
	<u>Year 1 subtotal</u>	<u>161,674</u>	<u>44,761</u>	

IV. Changes

As mentioned previously, Biology is conducting several tenure-track faculty searches during the upcoming academic year. Thus, the search for a restoration ecologist has been postponed until the 2015-16 academic year. The position description for the restoration ecologist search will be finalized in spring 2015.

Otherwise, we have no changes in the program timeline to report.

**UW System Incentive Grant
General Outcomes/Goals Reporting Matrix
2013-14**

Incentive Grant Program Name: The Responsible Mining Initiative: Building an Educated STEM Workforce for the Natural Resource Industry
Funding Allocation: \$451,317.00

#	Performance Outcomes Descriptions	Assessment Plan Description	Projected Goals 2013-14	Actual 2013-14 Outcomes	Projected Goals 2014-15
1	OUTREACH: Raise the awareness of STEM careers in Responsible Mining through outreach activities.	Develop and analyze of an initial survey of Wisconsin high school students.	Gauge HS students' knowledge and interest in Responsible Mining concepts	Will be developed in consultation with teachers attending the first Responsible Mining teachers' workshop in August.	
2		Offer High School Teacher short-course with pre-post-survey of participants (n=15-20).	Ensure high satisfaction reported by participants	Data will be collected during the August 2014 teachers' workshop. Current enrollment = 5. See App. A.	Ensure high satisfaction reported by participants
3		Host High School Student seminar (n=15-20).			Recruit 10-20% of participants to attend UWEC
4					
5	EDUCATION: Increase the number of highly skilled STEM graduates in the State of Wisconsin.	Economic Geology/Hydrogeology Laboratory construction.	Begin physical space realignment	A 900 sq ft space has been identified in Phillips Hall for the lab (Phillips 219). Construction will begin in fall 2014.	Finish laboratory construction
6		Track the number of majors in the Geology program and compare those to the four-year average present before the grant. As the new program will not be in place until after the grant period, this will become significant after the program is established.		Enrollment data is being collected. Data will be evaluated once the program is officially in place.	Increase the number of students in the Responsible Mining, Hydrogeology, General Geology, and other emphases
7		Develop new Responsible Mining program course structure.	Develop general course requirements for Responsible Mining program. If necessary, submit Intent to Plan a new major	Departmental discussions are ongoing. Curriculum retreat planned for August. Also obtaining input from industry.	Have working course sequence in place for the Responsible Mining program (ready for the new hires in the following two years).
8		Hire new faculty to staff the new Responsible Mining program.	Hire an economic geologist/structural geologist	Dr. Robert Lodge, Ph.D. from Laurentian University (Ontario), was hired. Starting date August 2014.	Hire one new faculty to teach classes in the Responsible Mining program (contaminant hydrogeologist). Restoration ecologist to be hired the following year.
9					
10	INTERNSHIPS: Establish a high-quality internship program with the mining, natural resource, and environmental consulting industries.	Document the number of companies contacted, as well as the number of companies potentially interested in implementing an internship program.	Create a spreadsheet to track industry contacts, potential interest in internships, etc.	Spreadsheet tracking industry networking is supplied in App. B.	Continue to track industry contacts in spreadsheet
11		Have 5+ new internship agreements in place by the end of the grant period.	Sign 1-2 MOUs with industry partners	Three MOUs signed with industry partners (Unimin Corp., n=2) and Smart Sand Inc. (n=1). Three students placed in these paid internships during summer 2014. See position descriptions in Appendices F, G, and H.	Sign at least 5 MOUs with industry partners
12		Conduct exit interviews with student interns and their employers.		This will be done at the end of the summer. Visits were conducted at each internship site the week of July 7, 2014.	Obtain suggestions for internship program improvement

UW System Incentive Grant Program **Required Program Goals/Outcomes Reporting Matrix** **2013-14**

Economic Development Goals and Results

Economic development program" means a program or activity having the primary purpose of encouraging the establishment and growth of business in this state, including the creation and retention of jobs, and that satisfies all of the following:

1. The program receives funding from the state or federal government that is allocated through an appropriation under ch. 20
2. The program provides financial assistance, tax benefits, or direct services to specific industries, businesses, local governments, or organizations.

Performance Categories	Goals		Actual Outcomes 2013-14	Accomplished Goal? Yes or No	Notes
	Projected 2013-14	2014-15			
# of Jobs Created					
# of Jobs Retained					
# of Businesses Assisted					

Additional Goals/Outcomes	Goals		Actual Outcomes 2013-14	Accomplished Goal? Yes or No	Notes
	Projected 2013-14	2014-15			

**UW System Incentive Grant Program
Required Program Goals/Outcomes Reporting Matrix
2013-14**

Development of a Skilled and Educated Workforce

Programs that have as their objective the development of an educated and skilled workforce, such as the following:

- a. Increasing the number of bachelor's, master's, and doctoral degrees awarded in fields for which occupational demand is high or in fields that the board and the department of workforce development jointly determine to be high-demand fields.

	Goals		Actual Outcomes 2013-14	Accomplished Goal? Yes or No	Notes
	Projected 2013-14	2014-15			
# of Bachelor's degrees awarded in high-demand fields					
# of Master's degrees awarded in high-demand fields					
# of Doctoral degrees awarded in high-demand fields					
# of internships created (paid)	2 MOUs	5 MOUs	3 MOUs signed	Yes	MOUs signed with Unimin Corp. (n=2, Tunnel City, WI, and Mankato, MN, pay \$4500/month) and Smart Sand Inc. (Tomah, WI, ~\$8000/summer). Three students are filling these internships during summer 2014. A fourth student is filling a paid metallic mining internship with Freeport McMoRan Copper and Gold in New Mexico, but this does not involve an MOU agreement with UW-Eau Claire.
# of internships created (unpaid)					
# of cooperative work experiences (paid)					
# of cooperative work experiences (unpaid)					

Increasing or Enhancing Research and Development Reporting

[illegible]

UW System Incentive Grant Program **Required Program Goals/Outcomes Reporting Matrix** **2013-14**

Improve the Affordability of Higher Education

Programs that Improve the Affordability of Higher Education for Resident Undergraduates, including:

- a. Reducing the time required to obtain a degree
- b. Increasing the opportunities available for high school pupils to earn credit toward a postsecondary degree; and
- c. Improving the transfer of credit between institutions of higher education.

Reducing the Time required to obtain a Degree

Goals	Anticipated Completion Dates	Actual Completion Dates	Accomplished Goal? Yes or No	Notes

Increasing the Opportunities available for High School Pupils to earn Credit toward a Postsecondary Degree

Goals	Anticipated Completion Dates	Actual Completion Dates	Accomplished Goal? Yes or No	Notes

Improving the transfer of Credit between Institutions of Higher Education

Goals	Anticipated Completion Dates	Actual Completion Dates	Accomplished Goal? Yes or No	Notes
			NA	