

Proposal for Establishment of Michigan Tech Center for Water and Society

Submitted by

Alex Mayer, Department of Geological & Mining Engineering & Sciences

Peg Gale, School of Forest Resources & Environmental Sciences

Kathleen Halvorsen, Department of Social Sciences

Joan Schumaker-Chadde, Western Upper Peninsula Center for Science, Mathematics & Environmental Education

“Water systems...can act as a powerfully unifying resource, so it is ironic to the point of absurdity that water education, management, and discourse are so fragmented. To truly assess water resources in their most holistic sense, one needs to include the many aspects of the hydrologic cycle, from meteorology to surface hydrology to soil sciences to groundwater to limnology to aquatic ecosystems. And that is just the physical system. One should also have an integral sense of the human dimensions, from economics to law to ethics to aesthetics to sociology and anthropology. Universities and management institutions are simply not organized along these lines; often they are fragmented to the point where even surface water and groundwater, quality and quantity, are separated out as if they were not inextricably inter-related.”¹

Statement of Purpose. The purpose of the Michigan Tech Center for Water and Society (MTCWS) program is to provide the multidisciplinary perspectives and tools to manage water-related problems of local, regional, and international interest. The MTCWS will be formed as a center under the Sustainable Futures Institute (SFI).

Mission Statement. The mission of the MTCWS is to support research, education, and outreach in all disciplines at Michigan Tech related to water issues. The goal is to establish Michigan Tech as a state, regional, national and international leader in these disciplines and, in particular, in interdisciplinary approaches to solving water-related problems. The objectives of the MTCWS are

- to serve as a focal point for instructional and research activities in water-related fields and water-related outreach activities across the Michigan Tech campus;
- to provide an organizational structure that supports continuing growth in water-related fields and outreach activities and encourage interdisciplinary projects;

¹ Aaron Wolf, Associate Professor, Department of Geosciences, Oregon State University, http://www.transboundarywaters.orst.edu/publications/atlas/atlas_html/thematicmaps/thematicMaps.html.

- to support interdisciplinary graduate and undergraduate education and research in water related fields; and
- to pursue external funding opportunities to support these objectives and to facilitate MTCWS participating faculty to obtain external support.

Description of Proposed Activities. The MTCWS will be initially established as a “virtual” Research Center. By virtual, we mean that the MTCWS will not occupy physical space, but will be a consortium of people at Michigan Tech whose focal point is water-related activities. We anticipate the following activities as a focus for MTCWS efforts in the first five years.

- (1) Develop an identity for the MTCWS at Michigan Tech and beyond. We will establish a web page to showcase water-related research, educational and outreach efforts at Michigan Tech. We will establish a seminar series which will have two critical missions: external speakers will give the Michigan Tech community views from outside the university and will expose those from outside the university to our efforts; internal speakers will serve to educate ourselves as to the array of water related activities on campus.
- (2) Establish Michigan Tech as the "think tank" for resolving water issues in the state of Michigan. We anticipate that the first efforts will include holding workshops at Michigan Tech, involving individuals from Michigan Tech and invited experts. The focus of these workshops will be producing white papers on the critical water issues facing the state, including: continuing loss of wetlands in Michigan; ongoing challenges of creating viable new wetlands to mitigate wetland losses; effective ways to meet the economic needs of communities that enhance rather than impact local water resources; storm water runoff management; land use; watershed management; coastal zone management; development of monitoring techniques that can easily be utilized by citizens and local communities; and engaging the business community in promoting sustainable water use and protection.
- (3) Coalesce and expand international activities at Michigan Tech related to water issues, by capitalizing on ongoing research on international water issues, the Peace Corps/Master’s International programs, the Sustainable Futures Institute, our ongoing work with the University of Sonora on water problems in Sonora, Mexico, and other relevant educational, research and outreach activities. A recent step is the submission of a pre-proposal to establish an NSF IGERT program on international water and sanitation.
- (4) Support and expand current K-12 and community education/outreach water-related activities at Michigan Tech, especially activities of the Western UP Center for Science, Mathematics and Environmental Education and the Center for Science and Environmental Outreach. We will encourage research and educational activities with a local focus, but also projects that focus on the Upper Peninsula, the Lake Superior watershed, Michigan, and the entire Great Lakes region. Our goal is to tie academic research to meeting the needs of pressing resource management and land use issues, and to make research relevant to meet the needs of K-12 students and teachers, local residents, and local governmental agencies and NGOs concerned with water resources.

Our education and outreach efforts will include the production of curricula and informational materials and the delivery of workshops and institutes that will increase public understanding and involvement in water-related decision-making.

- (5) Develop new degree programs and coursework and emphasize existing, unique educational offerings related to water. The focus of these efforts is to enhance educational offerings related to water issues and to promote these offerings to recruit undergraduate and graduate students. We will seek to establish a new inter-departmental PhD program in water resources management that recognizes the interdisciplinary nature of water and requires students to take courses in at least two departments, such as biological sciences and engineering, or education and engineering. The program will encourage PhD dissertations that also address the multi-disciplinary aspects of water resource management. We believe that this PhD program could be developed as a program that is unique to the US and thus encourage applications from a diverse pool of prospective students. This program could include an international component that addresses the growing conflict over water availability, ownership, and impacts on water quality due to increasing industrial development in developing countries. We will also seek to establish a new concentration in environmental and water resource education that would focus on education communities, local decision-makers, teachers, and non-formal educators about the hydrologic function, management, and monitoring of groundwater, stream monitoring, wetlands, lake monitoring, drinking water, wastewater treatment, threats from air pollutants, and more. This year, we will introduce a perspectives course called "Water and Society." The intent of the course will be to encourage undergraduates to consider the multi-disciplinary aspects of water issues. The course also is intended to be established as a distribution course.

List of Participating Faculty and Staff. In Appendix I, we have listed faculty and staff who may have an interest in participating in the MTCWS.

Justification. By our estimation, the expertise of at least 10% of the faculty at Michigan Tech is either completely or at least significantly focused on water issues. This expertise on water translates into millions of dollars of research expenditures, more than 50 refereed journal articles, and more than 50 MS and PhD students graduated each year. Furthermore, several degree programs and a large number of courses consider aspects of water issues at Michigan Tech. Coincident with the emphasis at Michigan Tech on water is the rapidly growing concern with water issues in the state, region, nation and the world.

Relationship to Other Michigan Tech Institutes and Centers. The MTCWS will be a center associated with Sustainable Futures Institute (SFI). A considerable level of research, educational and outreach efforts concerning water issues are already ongoing under other institutes and centers at Michigan Tech, such as the Remote Sensing Institute. The formation of the MTCWS is not meant to compete with the efforts associated with these institutes or centers. Any efforts of the MTCWS that might overlap with other institutes or centers will be conducted in cooperation with those units.

Relationship to Michigan Tech Strategic Plan. The MTCWS supports the Michigan Tech Strategic Plan in several ways. We envision that the MTCWS will increase the size of both undergraduate and graduate student bodies. To achieve increases in undergraduate enrollment and retention, we need attractive degree programs and course offerings. An important goal of the MTCWS is to create new courses and degree programs and to generally increase the visibility of the hydrosphere as a critical area of study. To achieve increases in graduate student numbers, we need innovative degree programs and we need research support in order to provide attractive student stipends. We also need to enhance the scholarly productivity and national visibility of our faculty so that prospective doctoral students will choose Michigan Tech. The MTCWS will immediately help to address the first need through the increased research funding. It will also assist in the longer-term task of building more scholarly productivity/visibility.

Governance Structure. The MTCWS is to be administered as a Michigan Tech Research Center, under the Vice President for Research and the Procedures for Establishment and Review of MTU Research Centers and Institutes.

Membership in the MTCWS is open to any academic faculty, research faculty, research staff, or outreach staff member of the Michigan Tech who has an interest in water-related fields or outreach activities. Prospective members submit a simple statement of interest to the MTCWS Director. Once approved, membership is reevaluated every five years. Undergraduate and graduate students are offered student membership, which provides eligibility for MTCWS student grants and fellowships. Student membership is maintained until graduation or withdrawal from the university.

A MTCWS Advisory Committee will be formed. The responsibilities of the Advisory Committee will include (1) approval of any changes to the MTCWS priorities or governing structure, (2) evaluation and approval of reports and self studies related to the MTCWS, and (3) evaluation and approval of any changes to degree programs, minors, or certificates that are housed within the MTCWS.

The Advisory Committee consists of one designee from each participating department or administrative unit. A participating department or administrative unit is defined as a department or unit with at least one MTCWS member. MTCWS members in each department or unit are responsible for selecting a representative to the Advisory Committee once each academic year. The process of selecting representatives must include communications to all MTCWS members in the participating department or unit.

The MTCWS will have a Director. The Director's responsibility is to ensure that the MTCWS functions effectively in fulfilling its mission. Responsibilities also include (1) establishing the MTCWS priorities in manner consistent with the MTCWS Charter and the Advisory Committee's guidance, (2) directing the application and management of the MTCWS's resources, managing MTCWS programs and curricula, (3) directing MTCWS staff, and (4) overseeing MTCWS web pages, seminars, and other related functions, and (5) participating in SFI administration.

The Director will be selected by the Advisory Committee from members of the Advisory Committee or MTCWS members nominated by Advisory Committee members. The candidate Director selected by the Advisory Committee will be subject to approval by the Vice President for Research. The position of Director is meant to be rotated among Advisory Committee members or other particularly active MTCWS members. The Director’s term will be a minimum of one year and a maximum of four years. The new Director is to be determined at least a month before the end of the old Director’s term, to allow an orderly transition.

As the MTCWS activities’ expand, the Advisory Committee will consider adding a managing director to assist the Director with day-to-day activities.

Two external advisory boards will be considered. The purpose of the “local” advisory board would be to assist the MTCWS in prioritizing local issues that require the expertise of the MTCWS. The “local” advisory board would consist of local government officials, representative from relevant county and state agencies, representatives from NGOs with a local focus and interested community members. The “local” sphere would include Houghton-Hancock, the Keweenaw Peninsula, the UP, and the state of Michigan. The purpose of the “general” advisory board would be to advise the MTCWS in prioritizing regional, national, and international issues; to assist MTCWS in securing large-scale funding; and to promote MTCWS at the regional, national, and international level.

Space and Facilities Requirements. No space and facilities are required at this time. In the next few years, however, the MTCWS expects to see expansion in terms of administrative or research staff, visiting researchers, and graduate students. It is expected that space will be needed to facilitate this expansion. When the expansion occurs the MTCWS will seek to make use of currently under-used or unused space on the Michigan Tech campus.

It is also expected that the MTCWS, as a virtual center, will be affiliated with various, existing campus facilities in the next few years.

Funding. The MTCWS activities will be supported through return of the indirect cost recovered from MTCWS-affiliated grants, as shown in Table 1. Enhanced indirect cost return is also provided to the PI and the department to provide incentive for interdisciplinary research and MTCWS affiliation.

Table 1: Indirect Cost Return

Entity	Percent of Indirect Cost Returned
MTCWS	20.7
PI	10.0
SFI	10.0
Department (or Unit)	12.0
College	7.3

In the first year of MTCWS operation, we expect to incur expenses related to the MTCWS activities described in a previous section (*Description of Proposed Activities*) of this proposal, as indicated in Table 2.

Table 2: First Year Expenses

Item	Cost
Release time for Director *	30,000
Clerical support	5,000
Materials	1,000
Web page development	1,500
Travel	6,500
Seminar series	6,000
Total	\$50,000

*equivalent to approximately 1/3 of his/her time

The largest item in the budget is release time for the Director. We expect the Director will be spending a considerable amount of time promoting the MTCWS at Michigan Tech and at the state and national level. Clerical support will be needed to help to organize the Director’s activities. Funds are allocated for travel to support the Director’s promotional efforts outside of Michigan Tech. Funds are allocated to establish a MTCWS seminar series, which would include outside speakers. The other items in the budget, for materials and web page development, are meant to underwrite promotional efforts.

We note it is unlikely that the total expenses indicated in Table 2 will be generated from overhead return within the first year of MTCWS operation. To this end, we will seek funds from the Vice President for Research or other administrative units.

Review and Evaluation. The MTCWS will submit an annual report to the Vice President for Research at the end of each academic year, as described in the Procedures for Establishment and Review of MTU Research Centers and Institutes. It is expected that the MTCWS will be authorized for five-year terms. In the spring of the fifth year, the MTCWS will conduct an internal review. As long as the results of the review indicate the MTCWS is making progress toward meeting its objectives, the MTCWS Advisory Committee will develop a plan to renew and continue the MTCWS into the next five-year term.

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Approval Signatures

Alex Mayer, Director
Michigan Tech Center for Water and Society

Date

John Sutherland, Co-Director, Sustainable Futures Institute

Date

James Mihelcic, Co-Director, Sustainable Futures Institute

Date

Chair(s)

Wayne Pennington, Chair
Department of Geological & Mining Engineering & Sciences

Date

C. Robert Baillod, Chair
Department of Civil & Environmental Engineering

Date

Sarah Green, Chair, Department of Chemistry

Date

John Adler, Chair, Department of Biological Sciences

Date

Bruce Seely, Chair, Department of Social Sciences

Date

Michael Mullins, Chair, Department of Chemical Engineering

Date

Milton Olsson, Chair, Department of Fine Arts

Date

Robert Johnson, Chair, Department of Humanities

Date

Appendix I: List of Potential Participating Faculty

First Name	Last Name	Affiliation	Email
Christine	Anderson	Educ Opportunity	csanders@mtu.edu
Martin	Auer	Civil & Env Engg	mtauer@mtu.edu
Nancy	Auer	Bio Sciences	naauer@mtu.edu
Susan	Bagley	Bio Sciences	stbagley@mtu.edu
C. Robert	Baillod	Civil & Env Engg	baillod@mtu.edu
Brian	Barkdoll	Civil & Env Engg	barkdoll@mtu.edu
Bruce	Barna	Chem Engg	bbarna@mtu.edu
Mary Ann	Beckwith	Fine Arts	mabeckwi@mtu.edu
Gregg	Bluth	Geo & Mining Engg & Sciences	gbluth@mtu.edu
Kristine	Bradof	Civil & Env Engg	kbradof@mtu.edu
Judith	Budd	Geo & Mining Engg & Sciences	jrbudd@mtu.edu
Suzanne	Diehl	Geo & Mining Engg & Sciences	sbeske-d@mtu.edu
Mary	Durfee	Social Sci	mhdurfee@mtu.edu
David	Flaspohler	SFRES	djflaspo@mtu.edu
Margaret	Gale	SFRES	mrgale@mtu.edu
John	Gierke	Geo & Mining Engg & Sciences	jsgierke@mtu.edu
Mark	Gleason	SFRES	gleason@mtu.edu
Hugh	Gorman	Social Sci	hsgorman@mtu.edu
Sarah	Green	Chemistry	sgreen@mtu.edu
Kathleen	Halvorsen	Social Sci/SFRES	kehalvor@mtu.edu
David	Hand	Civil & Env Engg	dwhand@mtu.edu
David	Hokanson	Civil & Env Engg	drhokans@mtu.edu
Casey	Huckins	Bio Sciences	cjhuckin@mtu.edu
Neil	Hutzler	Civil & Env Engg	hutzler@mtu.edu
Michael	Hyslop	SFRES	mdhyslop@mtu.edu
Martin	Jurgensen	SFRES	mfjurgen@mtu.edu
W. Charles	Kerfoot	Bio Sciences	wkerfoot@mtu.edu
Ann	Maclean	SFRES	amaclean@mtu.edu
Carol	Maclennan	Social Sci	camac@mtu.edu
Patrick	Martin	Social Sci	pemartin@mtu.edu
Susan	Martin	Social Sci	srmartin@mtu.edu

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First Name	Last Name	Affiliation	Email
Alex	Mayer	Geo & Mining Engg & Sciences	asmayer@mtu.edu
James	Mihelcic	Civil & Env Engg	jm41@mtu.edu
Glenn	Mroz	Pres Office	gdmroz@mtu.edu
Linda	Nagel	SFRES	lmnagel@mtu.edu
Blair	Orr	SFRES	bdorr@mtu.edu
Wayne	Pennington	Geo & Mining Engg & Sciences	wayne@mtu.edu
Judith	Perlinger	Civil & Env Engg	jperl@mtu.edu
Kurt	Pregitzer	SFRES	kspregit@mtu.edu
David	Reed	Vice President for Research	ddreed@mtu.edu
Tony	Rogers	Chem Engg	tnrogers@mtu.edu
Timothy	Scarlett	Social Sci	scarlett@mtu.edu
James	Schmierer	SFRES	jmschmie@mtu.edu
Joan	Schumaker-Chadde	Civil & Env Engg	jchadde@mtu.edu
Bruce	Seely	Social Sci	bseely@mtu.edu
David	Shonnard	Chem Engg	drshonna@mtu.edu
Barry	Solomon	Social Sci	bdsolomo@mtu.edu
John	Sutherland	ME-EM	jwsuther@mtu.edu
Valorie	Troesch	Corp Services	vtroesch@mtu.edu
Noel	Urban	Civil & Env Engg	nurban@mtu.edu
R. Craig	Waddell	Humanities	cwaddell@mtu.edu
Christa	Walck	Sch Bus Econ	cwalck@mtu.edu
David	Watkins	Civil & Env Engg	dwatkins@mtu.edu
Christopher	Webster	SFRES	cwebster@mtu.edu