

Reed, Katie

From: Smith, Randy
Sent: Wednesday, March 02, 2016 4:39 PM
To: Kress, Martin P.; Langlois, Maureen; Sawyer, Audrey; Bisesi, Michael; Sivandran, Gaj; Shearer, Scott A.; Gorgas, Diane
Cc: Smith, Randy; Reed, Katie; Lilly, Blaine; McPheron, Bruce A.; Whitacre, Caroline; Wagner, Caroline S.; Begun, Audrey; Miriti, Maria; Gerber, Timothy; Wells, Thomas; Steward, Deborah; Givens, Bennet; Martin, Jay; Harris, Brad; Boehm, Mike; Cowley, Jennifer; Herness, Scott; Manderscheid, David C.; Hadad, Christopher; Steffensmeier, Janet; Williams, David B.; Hendrick, Ronald; Martin, William J.; Brown, Trevor; President Michael V. Drake; Weisenberger, Jan
Subject: Global Water Institute

Marty, Maureen, Audrey, Mike, Gaj, Scott and Diane:

The proposal to establish the Global Water Institute was approved by the Council on Academic Affairs at its meeting on March 2, 2016. Thank you for attending the meeting and responding so effectively to questions/comments.

The proposal will now be sent to the University Senate with a request for action at its meeting on March 24, 2016. The Chair of the Council, Professor Blaine Lilly, will present the proposal there, but we will need one or more of you in attendance to respond to questions should they arise. I will contact you about this when I have more details.

Senate action represents the last step in the approval process.

Please keep a copy of this message for your file on the proposal, and I will do the same for the file in the Office of Academic Affairs.

If you have any questions, please contact Professor Lilly (.2) or me.

I am well aware of the effort needed to develop this proposal, the involvement of many colleagues from across the University that make it so distinctive, and the very thorough manner in which you have worked to adhere to the approval process.

Congratulations of the successful completion of this important stage in the review/approval process! I have enjoyed working with you on it.

Randy



W. Randy Smith, Ph.D.

Vice Provost for Academic Programs

Office of Academic Affairs

203 Bricker Hall, 190 North Oval Mall, Columbus, OH 43210

614-292-5881 Office

smith.70@osu.edu



Vice Provost W. Randy Smith
Office of Academic Affairs
203 Bricker Hall
190 North Oval Mall
Columbus, OH 43210

November 13, 2015

Dear Randy,

Based on our discussion, we are pleased to resubmit our proposal to create a Global Water Institute at Ohio State. This proposal updates our October 2014 submission.

During the last year, the Global Water Initiative (GWI) that was approved by Provost Steinmetz in May 2014 has made significant progress in validating its model and expanding interdisciplinary research, teaching and outreach activities at Ohio State. Today, GWI has three active focus areas with activities underway in each: Field to Faucet, Wells to Wellness and Coastal Resilience. The list of accomplishments for the last year includes the formal establishment of partnerships with key external groups in the country of Tanzania as well as the launching of \$3 million in applied research for the Great Lakes.

These activities and achievements catalyzed the invitations for GWI to re-submit this proposal, which is updated from the October 6, 2014 version. Per your guidance, we have retained and added to the original letters of support. We also have augmented our list of engaged faculty and included the expanded membership list of our Faculty Advisory Committee.

Please let us know if you need any additional information or materials to support this proposal.

Sincerely,

Martin P. Kress
Interim Director, Global Water Initiative
Assistant Vice President
Office of Research

Jay F. Martin
Senior Faculty Lead, Global Water Initiative
Professor
Food, Agricultural and Biological Engineering

The Global Water Initiative at Ohio State
PROPOSAL TO ESTABLISH A UNIVERSITY-WIDE INSTITUTE

Submitted November 13, 2015

Executive Summary

Faculty, staff and leaders from eight colleges at Ohio State have collaborated to create a new university-wide Global Water Initiative (GWI) that embodies a new model for conducting university research and solving pressing global issues. This initiative has direct relevance to and a track record of engagement with the university's Discovery Themes. GWI integrates the assets of Ohio State and layers them with those of other key research universities, not-for-profits, non-governmental organizations, industries, and governmental entities to develop sustainable systems solutions for regional and global water issues.

This interdisciplinary model has the support of Provost Steinmetz, Vice President for Research Caroline Whitacre, and college and unit leaders from across the University. To sustain the enthusiasm that this model has garnered among internal and external partners and to secure external funding, the Global Water Initiative requests that the Council on Academic Affairs and the University Senate approve it to be designated a university-level institute.

Introduction:

The Global Water Initiative At Ohio State

“One of the issues that we think of as so important in the 21st century is the issue of water. As I have said before, the 20th century was to physics and oil as the 21st century will be to biology and water. Those will be the real places of growth and the real threats to our continuation.”

*President Michael V. Drake, M.D.
The Ohio State University
Comments to the Tanzanian Minister of Water
August 2015*

Globally, nearly one billion people lack safe drinking water, and nearly three billion people lack adequate sanitation. Here at home, water quality continues to be an issue, as contamination has jeopardized the water supply in Toledo and Columbus and algal blooms threaten the entire state of Ohio from Lake Erie to the Ohio River. Meanwhile, coastal communities across the globe, large and small, are dealing with sea level rise and the effects of global climate change. Agencies including the World Health Organization, the World Bank, the United Nations and the National Oceanic and Atmospheric Administration have declared that water quantity, quality and access issues will only increase as population rises and the climate changes.

Initially, GWI was framed as a model for emerging Discovery Themes at Ohio State. Today, GWI is a viable, stand-alone research entity as well as a partner of choice for several of the Discovery Themes. The project side of GWI lends itself to interdisciplinary engagement and many of the new faculty hires being pursued by Discovery Theme leads are aligned with the real-world applications that GWI supplies: drought-resistant crops, low-cost filtration systems, and sustainable provision of food, energy and water. The current portfolio of GWI activities and its focus on non-traditional funding provides Ohio State faculty and researchers with unique opportunities to work on pressing global issues. Having a pathway to non-traditional research funding opportunities for water-related issues is also important in a period when federal and state support for basic research is projected to decline and when foundations and firms are supporting more solutions/applications-focused research initiatives.

A NEW MODEL FOR RESEARCH AND PHILANTHROPY

The Global Water Initiative at Ohio State stimulates requirements-driven research by conveying to researchers the real-world technical, social and ecological conditions that underpin the water resource issues faced by its partners. GWI relies upon experts in the field (including government agencies, NGOs, not-for-profits, industry partners) to identify the requirements and constraints surrounding an issue—what tools, processes and knowledge they need to be able to meet their goals. GWI then gathers faculty and external experts to meet the customer needs, whether through research that generates new knowledge or interdisciplinary integration of novel and best practice tools and knowledge into new domains. As an integrating entity with a sustainable systems approach to complex issues, GWI also acts as a “one-stop shop” for philanthropic entities seeking to make maximum impact in an area of concern (e.g. lack of clean water access in rural Africa, watershed degradation in the Midwest U.S., recurring coastal refugee crises after storm events).

Some unique aspects of GWI include:

- Systems focus: GWI develops end-to-end (as opposed to component-oriented) systems solutions that are economically viable, environmentally sound, socially acceptable, and technically maintainable.
- Broad perspective: The three current focus areas (Fig. 1) demonstrate that a wide range of water resource issues can be successfully tackled with the same essential approach. This both leverages the breadth of Ohio State and partner expertise and allows GWI to retain its role as an innovation cell rather than a dedicated center focused on a single topic area.
- Globally relevant: GWI development priorities align with United Nations (UN) Sustainable Development Goals, UN Global Compact Principles, and World Business Council for Sustainable Development Action 2020 Priority Areas.
- A “Hub” for water experts: GWI links Ohio State’s water assets with other research institutes, government, NGOs and industry entities.
- Requirements-driven: GWI facilitates research motivated by the needs of water users and the philanthropic and/or technical requirements of funders.
- Lasting impact: GWI supports locally owned and operated projects (often women-owned) for lasting economic, social, and environmental impact.
- Technical support: GWI will provide virtual communications between user communities and the network of experts they need to contact.
- Training: GWI activities will develop the next generation of water innovators – both undergraduate and graduate students as well as young people in user communities – through distance education.
- Innovative Business Models: GWI integrates market-based solutions when feasible including framing business models to enable the deployment of sustainable solutions that will lead to long-term improvement in water resource issues. An example is the in-country franchising model being assessed for the Wells to Wellness focus area.

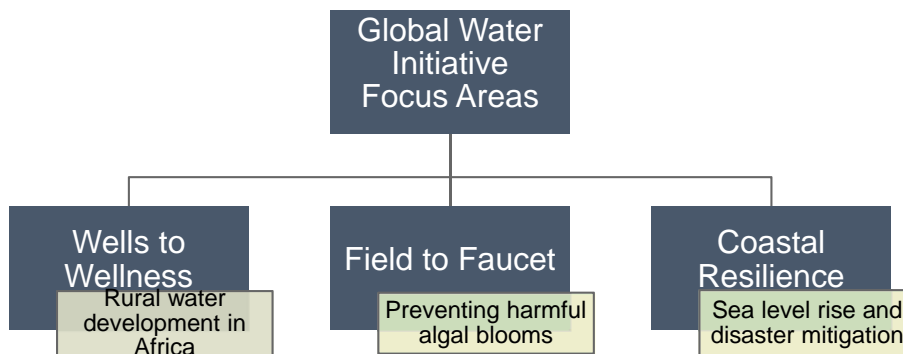


Figure 1. Overview of Global Water Initiative initial three focus areas

FORMATION OF GWI AND LEAD-UP TO THIS PROPOSAL

In late 2012, local industry partner Greif, Inc. approached Ohio State and asked what innovative capabilities the university could mount to address global water resource issues, in particular with respect to the rural regions of developing countries – the areas with the slowest progress toward the UN Millennium Development Goals. This conversation was the catalyst for various Ohio State units, centers, and research faculty to devise a way to more seamlessly integrate Ohio State’s recognized strengths in water research and development and to extend the university’s land- grant mission to a broader constituent base.

A year-long assessment of unmet needs, grand challenges, partner assets and alternative approaches included over 100 faculty members and university leaders and was led by the Office of Research, the Office of Energy and the Environment, and the Environmental Sciences Network in partnership with the faculty and leadership of eight colleges.

The result was the formation of the Global Water Initiative (GWI), an innovation engine dedicated to addressing global problems and to validating a new approach to university research. A core group of faculty from four colleges described the new initiative to Provost Joseph Steinmetz in a May 2014 meeting and received his approval to build on the idea. With core support from the Office of Research, the Office of Academic Affairs, and the College of Food, Agricultural and Environmental Sciences, GWI was established in summer 2014 with an interim director and one full-time staff member. A senior faculty lead was appointed in 2015.

GWI’s initial focus area responded to the original query for sustainable systems solutions for rural water access in developing countries and was eventually branded “Wells to Wellness”. Focusing on Tanzania as a pilot country, a core group of faculty and staff have developed a set of projects that have garnered national and international attention—leading to ongoing discussions about funding and new partnerships. These projects focus on sustainable systems solutions for village water services and a new suite of training and educational programs to develop the workforce to support these systems. Ohio State has signed agreements with the University of Dodoma and the Ministry of Water in Tanzania to frame and execute these activities. With the assistance of University Advancement, GWI has developed a major fundraising effort for this initiative, which is currently seeking major (>\$10 million) support from potential partners.

In late summer 2014, a second focus area for GWI emerged with the harmful algal bloom crisis that caused Toledo to issue a drinking water ban. The complexity of the harmful algal bloom issue and the need for solutions-oriented research, teaching and outreach made it a natural fit for the GWI end-to-end systems approach. Vice President for Research Caroline Whitacre and the [then-](#)Dean of the College of Food, Agricultural and Environmental Sciences Bruce McPheron, invited a group of 25 faculty and extension specialists to work with the GWI team and frame an integrated response plan of targeted activities to rapidly advance solutions in this area. The resulting end-to-end initiative (named “Field to Faucet”) was announced by Dean McPheron at the 2014 Farm Science Review with a commitment of \$1 million from CFAES and the intention to manage the initiative under the auspices of GWI. The concept guiding the development of the Field to Faucet research agenda was compelling enough that Ohio State was asked, with the University of Toledo, to co-lead a statewide initiative to produce near-term solutions and applications for the Lake Erie algal bloom issue. This effort, sponsored by the Ohio Department of Higher Education (ODHE; then called the Ohio Board of Regents) and with the participation of four key state agencies, involved eight universities in over \$4 million of

targeted research. As of fall 2015, the same partners are planning the next round of research with another \$2 million pledged by ODHE and CFAES Advancement has leveraged another \$1 million in industry-sponsored research for the Field to Faucet project line. Ohio State is also assessing a bid for an Engineering Research Center focused on nutrient management that would be a multi-state initiative and a significant augmentation to both Field to Faucet and the ODHE initiative. GWI is intimately engaged in all of these proposal and program development processes.

The third of three current focus areas for GWI emerged in spring 2015 when Ohio State was approached by the lead of a UNESCO collaborative that focuses on mitigating the risks of sea level rise by increasing resilience in coastal systems. This interest was an outgrowth of the UN lead being familiar with the GWI model based on an earlier development interaction. As a result, Ohio State is now part of the leadership team of the Coastal Resilience Collaborative, which is led by the Florida Earth Foundation, a non-profit research institute tied to the University of Florida. The leadership team includes representatives from leading US and international research universities, companies, and agencies. As the newest of the three focus areas, GWI is still convening faculty with expertise in the area of coastal resilience to determine a strategic vision for the focus area and for positioning the university and the collaborative for UN funding to support research and outreach in this area.

As of October 2015, GWI has been endorsed by [former](#) Provost Joseph Steinmetz, Vice President Carol Whitacre and [Interim Provost](#) ~~Dean~~ Bruce McPheron, with funding pledged from all three sources. The deans of the Colleges of Engineering, Public Health, Arts and Sciences and Veterinary Medicine also support GWI. Several potential industry, university and NGO partners have expressed strong interest in supporting the initiative and GWI currently has proposals pending with the Monsanto and Abbott Foundations. The team seeks designation as an official university institute in order to better position Ohio State to pursue these relationships, establish the GWI professional network, initiate new and innovative collaborative projects, recruit a nationally recognized executive director, and position GWI at the forefront of solving pressing global issues in collaboration with existing OSU centers, Discovery Themes, international projects, and faculty researchers.

Mission

The mission of the Global Water Initiative at Ohio State is to provide sustainable systems solutions for communities facing water resource challenges. Sustainable systems solutions are ones that are economically viable, environmentally sound, socially acceptable, user-driven, and technically maintainable.

VISION

The vision of GWI aligns directly with that of the university: to establish Ohio State as “the world’s preeminent public comprehensive university, solving problems of world-wide significance.” By approaching problems in the nexus of water, food, health and energy in a new and innovative way, GWI will help to position Ohio State as a global thought leader in this space. GWI’s emphasis on applied research and requirements-based design support President Drake’s Vision 2020 emphasis on solving “critical issues of our time,” and GWI’s commitment to integrating disparate assets at Ohio State reinforce his conviction that “our collective efforts can and will transform lives.”

OBJECTIVES

GWI embodies a new model of university-based innovation. Specific objectives include:

- solve challenges related to water quantity, quality and access at both regional and global levels with whole-system solutions
- foster an interdisciplinary, globe-spanning network of researchers
- couple university-based research and development with the needs of end users
- integrate research capabilities from an array of U.S. and global partner universities
- capitalize on the ingenuity of faculty and students doing meaningful work on pressing issues
- actualize the land-grant university of the future: a solutions-oriented, applications-focused global research university
- establish Ohio State as a recognized neutral technology integrator and site of nimble, practical, innovative, eminent scholarship
- educate and train the workforce of tomorrow in the technical, social and economic/business domains in which they can continue innovation for sustainability

ALIGNMENT WITH THE UNIVERSITY’S ACADEMIC PLAN

Table 1 below draws explicit connections between GWI activities that support stated priority areas in the Office of Academic Affairs.

Table 1. Alignment of GWI activities to university academic plan.

| OAA Priority Areas | Supporting GWI Principles and Activities |
|--|--|
| Developing Discovery Themes of Energy and Environment, Food Production and Security, and Health and Wellness | GWI's work solves a critical global challenge that supports both the intent and subject matter of the Discovery Themes (DT). GWI supports the overall DT endeavor by strengthening connections among researchers, research capabilities and external partners in the pursuit of sustainable solutions to complex problems. By providing an innovative business model for the integration of Ohio State research/technology assets with those of other highly recognized research universities and industry, GWI will amplify Ohio State's research impact and reputation in the global community. It will also create new project and research opportunities for Ohio State faculty engaged in the DTs. The initiative has been explicitly integrated into one of the most recently approved DT s (Materials and Manufacturing for Sustainability) and future collaborations under discussion with two other DT programs. |
| Discussing new models of faculty evaluation and rewards in an interdisciplinary climate | Since effective collaboration is essential to the GWI mission, the Institute can serve as a test case for new models of incentivizing and rewarding interdisciplinary, inter-unit and inter-university collaboration. GWI provides a fresh venue for faculty and unit leaders to set new norms and expectations for what modern scholarship looks like. For example, in summer 2015 GWI supported the development of a corporate foundation proposal for \$1.25 million with a junior faculty member as lead PI. The team worked with Advancement and the faculty member to cast the proposal both in terms that would lead to project/proposal success and be seen favorably in the tenure review process. Cooperating on new rewards models and funding opportunities will help enhance the energy and professional networks of early career scholars and allow for a more sustainable shift to a culture that rewards interdisciplinary work with nontraditional funding. |
| Enhancing the undergraduate and graduate student experience | <p>GWI educational efforts integrate areas of strengths at Ohio State and aim to meet increasing student demand for access to applied learning opportunities with global impact. Specific activities include:</p> <ul style="list-style-type: none"> • GWI deployed one capstone team from the College of Engineering and one Global Applied Projects team from Fisher College of Business to Tanzania to gather data, interface with key GWI partners, and secure information that will help frame the Wells to Wellness program. These trips were sponsored with cost-share from both colleges as well as funding from the Office of Energy and Environment. • GWI has facilitated linkages among service learning entities at Ohio State (e.g., Humanitarian Engineering, Engineers Without Borders, Peace Corps, capstone projects) as well as professional connections between student participants and GWI's business, NGO and academic partners. • GWI is developing an "open innovation" challenge to be launched during spring semester 2016. The challenge will be based on the successful models of Google, Apple, Battelle and others in which natural mentorship and student enrichment occurs amid a hierarchy-free creative exchange of ideas. |
| Developing eLearning | <p>GWI aspires to be a leader in applying next-generation communication tools to solving problems, educating students, and delivering outreach services. A central component of the GWI model is a future virtual communications network for:</p> <ul style="list-style-type: none"> • Distance Learning. GWI would create opportunities for faculty to connect with user communities to bring real-world perspective into research and coursework. GWI will also use this linkage to offer training and education to remote communities, from tutorials to certificates to coursework. • Technical Support. GWI researchers and outreach specialists will be available to end user communities for rapid technical support relating directly to GWI-deployed water technologies or related systems for which Ohio State and partner universities can offer expertise (e.g., crop management practices, public health, business development). |

INTERDISCIPLINARY NATURE OF THE INSTITUTE

Ohio State is a recognized leader in water resource research and outreach. According to a 2012 survey by the Environmental Sciences Network at Ohio State, the university boasts over 200 faculty researchers funded on water-related projects as well as various centers and facilities that focus centrally on water-related issues, including the Byrd Polar and Climate Research Center, the Olentangy River Wetland Research Park, the Ohio Water Resources Center, the Ohio Sea Grant and Stone Laboratory, and the Ohio State University Aquatic Ecology Laboratory. Water resource issues are important from the student perspective as well, with nine graduate science and engineering programs, a dozen undergraduate programs, and hundreds of courses touching water issues each year.

Despite the abundance of expertise, there is not one organizing entity that coordinates water research at Ohio State or that builds institutional capacity for tackling the real-world water issues that are central both to the university Discovery Themes and to emerging global priorities. The interdisciplinary and applied nature of water resource challenges – which touch food/agriculture, health/wellness and energy/environment across technical, ecological and social dimensions – necessitates integrated scholarship among diverse fields of expertise. Faculty who are engaged with each of the three GWI focus areas reside in 23 schools, departments and centers across 7 Ohio State colleges (discussed in the following section). GWI models and supports an increasingly seamless collaboration between research entities both within Ohio State and between universities and industry, which is essential to advancing knowledge and solutions about global challenges.

Case Study: Field to Faucet

An example of the interdisciplinarity of the GWI model is the Field to Faucet focus area. The 2014 harmful algal bloom crisis in Toledo in 2014 galvanized the formation of an ad-hoc multi-college team of 25 faculty members, research scientists and outreach specialists from four colleges, Ohio Sea Grant Stone Laboratory and Ohio State Extension under the leadership of GWI's interim director and senior faculty lead. Due to the urgency of the algal bloom issue, the team designated faculty leads for the core focus areas of the initiative and rapidly connected with other leading universities and agencies to create complementary and highly integrated research and outreach plans. These faculty leads were then asked to create working teams and submit high-risk, high-reward proposals that both responded to the highest-priority needs of state agencies as well as reflected the most current research frameworks and advances in their respective fields.

The resulting projects, announced in September 2014 under the name Field to Faucet by a \$1 million seed fund from CFAES, include development of a new handheld sensor, testing of a new manure stabilization process, and establishment of a new data cooperative to allow farmers to reap both the environmental and economic benefits of owning and mining their own field data (Fig. 2). These seed funds were disbursed to eleven faculty in three colleges (Public Health; Engineering; and Food, Agricultural and Environmental Sciences), including funding for several students and new shared analytical equipment. This process explicitly allowed GWI to act as an effective central organizing entity for water research, including related functions such as the creation of a central portal for water testing facilities at the university (heretofore uncatalogued and difficult to find easily) and acting as representative for the interdisciplinary group of faculty researchers in discussions with key state agencies such as the Ohio Environmental Protection Agency, Department of Natural Resources, Department of Health and Department of

Agriculture. State leaders then asked Ohio State to frame a similar initiative at the state level in partnership with Ohio Sea Grant and the University of Toledo, ultimately resulting in a \$2 million of research funding from the Ohio Department of Higher Education, collaborations with seven other Ohio universities, and an additional ten Ohio State faculty engaged. Integration of Field to Faucet projects with research with this state-funded effort, called the Ohio Department of Higher Education Harmful Algal Bloom (HAB) Research Initiative, is illustrated in Figure 2.

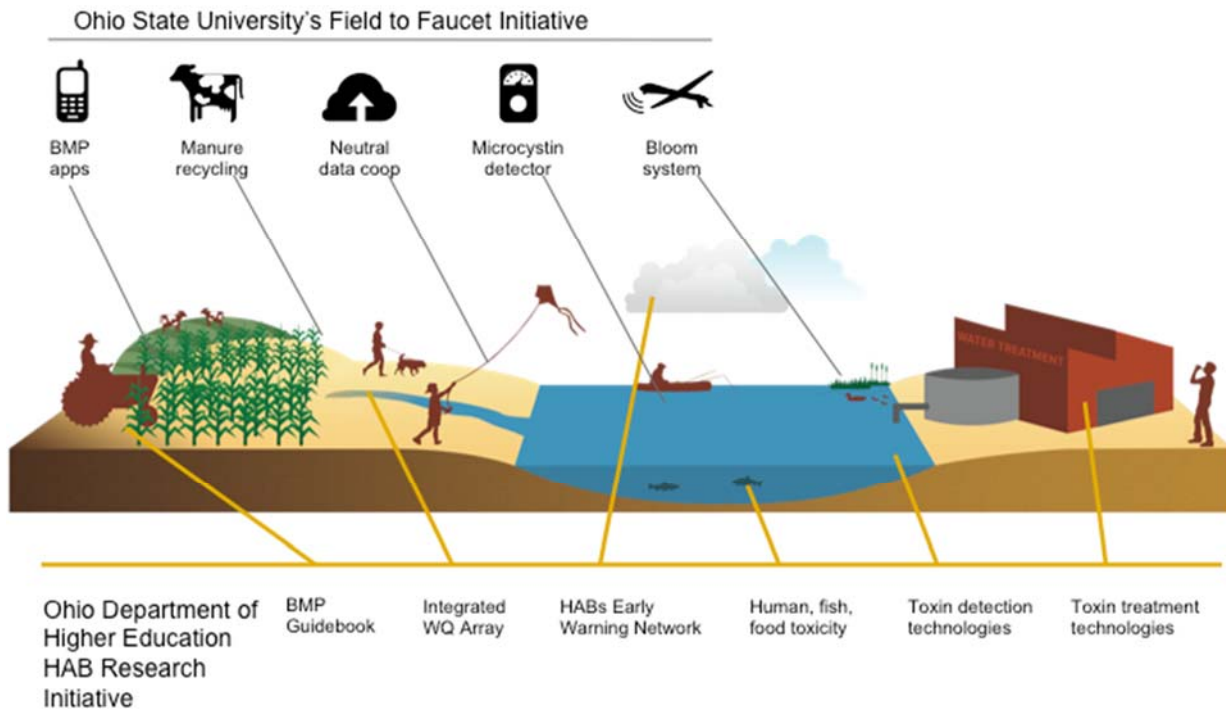


Figure 2. Conceptual overview of Field to Faucet initiative (Ohio State and industry funding) and the Ohio Dept. of Higher Education initiative intentionally designed in consultation with GWI to overlay for maximum complementarity.










GWI GOALS NOT MET WITHIN EXISTING ACADEMIC UNITS

Providing large-scale, end-to-end systems solutions to water issues

The types of large-scale solutions that Ohio State is in a position to deliver inherently demand a range of truly integrated disciplinary perspectives. This breadth of expertise does not currently exist in any one college within the university. However, with coordination at a whole-university level, Ohio State's range of experts in both fields with evident linkages to water (e.g. hydrology, agriculture) and with less evident water linkages (e.g. microbial pathology, developmental economics) becomes a differentiating strength rather than a source of duplicated or diffuse effort.

Not only does the equivalent to a GWI not exist already at Ohio State, it is clear that there is no one organization currently in existence – anywhere – that offers sustainable, end-to-end, systems-based solutions to water resource challenges. As part of its initial gap analysis, GWI surveyed the major university-based, governmental and non-profit entities with global-reaching water initiatives. The complete matrix comparison is provided in Appendix 1. In addition, Ohio State contracted with PricewaterhouseCoopers (PwC) to assess and validate its model through comparison to water initiatives with similar missions and scope. The results (Table 2) show that organizations either have a technical or an outreach/development focus but often not both; or that technical solutions are confined to a single dimension of a water issue (e.g. a better pump) rather than end-to-end, systems-oriented solutions. These confirm that a niche exists for integrated scholarship and outreach in this space.

Table 2: Mapping selected water initiatives to the solutions sets needed to address end-to-end rural water systems. Analysis conducted by PricewaterhouseCoopers.

| Organization | | Focus | | |
|---|---|---------------------|------------------------------|-----------------------|
| | | Technical solutions | Local stakeholder engagement | Research and advocacy |
|  | International NGO | | | |
|  | Global action network linked with UN-Water | | | |
|  | International NGO | | | |
|  | Global professional network | | | |
|  | US government developmental agency | | | |
|  | International NGO | | | |
|  | UN-backed membership organization | | | |
|  | Christian humanitarian organization | | | |
|  | University-affiliated technology integrator | ★ | ★ | ★ |

Being An Independent Technology Integrator

GWI would act as an independent technology integrator: layering the assets and capabilities of Ohio State with a network of partner organizations to create sustainable, end-to-end systems solutions to water quality, quantity and access issues. However, Ohio State cannot effectively engage with external partners without a central point of contact, a reality that was reinforced during the development of GWI's Field to Faucet focus area described in the previous section. These partners include universities, non-governmental organizations and foundations, government agencies and industry partners. Select partners from each of these groups will help to steer GWI project development under the auspices of the soon-to-be-formed GWI Executive Committee.

University Partners

The following universities have expressed an intention to participate in GWI. The point of contact is listed for each university.

Cornell University, New York State Water Resources Institute
Massachusetts Institute of Technology, Center for Clean Water and Clean Energy
Michigan State University, Center for Water Sciences
Nelson Mandela African Institute of Science and Technology (Tanzania)
Pennsylvania State University, Penn State Institutes of Energy and the Environment
Purdue University, Purdue Water Community
University of Dodoma (Tanzania)
University of Nebraska, Daugherty Water for Food Institute

Non-Governmental Organization / Foundation Partners

The following NGOs and Foundations have been briefed about GWI and support the end-to-end sustainable systems concept.

| | | |
|---------------------------|-----------------------|--------------------------|
| Charity:Water | U21 Network | World Bank |
| Clinton Global Initiative | UNESCO | World Vision |
| NRECA | UN PRME | WorldServe International |
| The Nature Conservancy | WASH Advocates | |
| | Winrock International | |

Corporate / Industry Partners

The following companies have been briefed one-on-one about GWI and have endorsed the concept. In addition, the GWI team presented the idea at the United States national meeting of the World Business Council for Sustainable Development, an organization of CEOs dedicated to integrating sustainability and business practice.

| | | |
|------------------|------------------|------------|
| Abbott Nutrition | Monsanto | Scotts |
| The Andersons | Nestle | Tata Solar |
| Greif | Procter & Gamble | |
| Hecate Energy | Rabobank | |

Several other companies are being scheduled for briefings in collaboration with Ohio State Advancement. In addition to the firms listed above, active prospects include Coca Cola Foundation, Coca Cola Africa Foundation, Unilever Foundation, Cargill, CM2Hill, Dupont, Heineken, Gates Foundation and the Peter Buffet Foundation.

Governmental Entities

Whereas the focus of GWI is on non-traditional funding and collaborations with other

universities, NGOs and industry, when government support represents the best path forward, GWI also capitalizes on these relationships.

State and Regional Level

To date, the Field to Faucet focus area has been framed based on requirements that exist in key State of Ohio agencies. These are now being expanded in light of the State of Ohio entering into a new agreement with the Government of Canada and the State of Michigan to reduce nutrient runoff into Lake Erie.

National and International Level

The Wells to Wellness focus area is engaged with key private and corporation foundations, but is also actively seeking support from U.S. federal governmental entities. Most recently, supported by the Tanzanian minister of water, the chancellor of the University of Dodoma (Tanzania) and a key industry partner (Hecate Energy), GWI briefed a cluster of critical federal agencies: State Department, US Agency for International Development (USAID), US Trade and Development Agency (USTDA), Department of Energy, Department of Commerce, Overseas Private Investment Corporation (OPIC), and Power Africa. GWI has been advised to consider three USAID funding opportunities and supported the development of a proposal by an Ohio State faculty member to be a Fulbright Scholar for one year at the University of Dodoma. The Coastal Resilience focus area activities will require close working relationships with international organizations, in particular UNESCO as well as key countries across the globe. Funding will likely come from both local and international sources and, where possible, these investments will be leveraged with business and foundation investments. GWI also continues to work with groups at the UN, the World Bank and other multi-governmental entities.

Faculty

Ohio State faculty and researchers have been engaged with GWI since the initial conversation with Greif, Inc. in October 2012. Early conversations, convened by the Office of Energy and the Environment, the Office of Research, and the Environmental Sciences Network, gathered ideas from leading water researchers across the university. As the GWI concept developed, a central steering group emerged, comprising both faculty and executive staff. This team has recruited other faculty, staff and administrators from Ohio State as well as contacts from other institutions for specific preliminary functions, including: securing advance funding to launch the institute, building trans-institutional research and development teams, and establishing relationships with regional players. Time and energy were also spent trying to identify faculty and researchers engaged in comparable research activities in the region and across the globe. This exercise provided a key pathway to candidate faculty and a better appreciation for the overall Ohio State portfolio of international activities.

CRITERIA FOR FACULTY MEMBERSHIP

Based on its assessment of existing Ohio State institutes and centers, GWI has decided to make affiliation with the proposed Global Water Institute open to all faculty and researchers who have:

- An interest in issues that relate to water quantity, quality and access, which include interconnected issues of food production, health, land use sustainability, energy, and economic development, among others
- A drive to engage in solutions-oriented research motivated by the requirements of end users and fueled by partnerships with industry, NGO and academic partners
- A commitment to systems-based problem solving
- A desire to participate in a collaborative, multidisciplinary intellectual community that requires close cooperation, data sharing and trans-disciplinary communication to achieve goals
- An interest in providing students with outstanding experiences both in the classroom and in the field

In coordinating research and project development activities, GWI's interim director, senior faculty lead and Faculty Advisory Board members reach out to faculty with expertise in relevant areas at Ohio State as well as at partner universities. Faculty who have expressed an interest in participating in GWI activities will be identified as GWI Affiliates for the purposes of strengthening connections among participants through events, lectures, seminars and digital communications (e.g. website, email list-serve, social media).

When needed, GWI may also utilize a Request for Information or Request for Proposals as the mechanism for building research and project teams. GWI has thus far used the existing Ohio Sea Grant Program proposal process to handle the evaluation of faculty research concepts and to conduct project management for work focused on algal blooms. The Sea Grant process is user-friendly, streamlined, available to users from multiple organizations (not just Ohio State), transparent and flows easily into project monitoring and reporting.

FACULTY AND RESEARCHER ENGAGEMENT TO DATE

The initial activities of the Global Water Initiative have generated broad interest across the research community at Ohio State. Tables 3, 4 and 5 below list the faculty engaged with each of the three focus areas of GWI: Field to Faucet, Wells to Wellness and Coastal Resilience. Members of the Faculty Advisory Committee are listed in the following section (Administration). Letters of support contained in the appendices demonstrate the breadth of support from departmental chairs and academic directors for the involvement of these faculty and researchers.

Field to Faucet

The Field to Faucet initiative at Ohio State and its sister initiative the Ohio Department of Higher Education (ODHE) Harmful Algal Bloom Research Initiative (HABRI) focus on both basic and applied research activities. As depicted in Fig. 2 above, research and development efforts range from new technology to new monitoring arrays with the greatest possible integration of efforts to achieve system-wide advances. The objectives of the initiatives are to frame an overview of the Western Lake Erie Basin as a distributed system and to develop solutions/applications that address the problems at their source rather than at the more conspicuous endpoint as algal blooms impairing Lake Erie. Currently, eight Ohio State researchers are funded by Field to Faucet, ten are funded by the ODHE HABRI, and three are funded on projects in each initiative (Table 3). This number is expected to increase based on upcoming funding opportunities at the state, federal, and international levels.

In addition to the research integration role discussed above, GWI also works with faculty to facilitate the development of formal and informal proposals for external funding. A current example is an offshoot of one of the Field to Faucet projects, an agricultural data cooperative that enhances both agricultural output/profitability and environmental management by leveraging the data streams from “smart” agricultural equipment. Ohio State is now in negotiations with a national team to create a new not-for-profit entity, incorporated in the state of Ohio, to run the new cooperative. The effort also served as the foundation for an NSF Engineering Research Center pre-proposal submitted by Ohio State in October 2015. Similarly, GWI facilitated an earlier OSU-led effort to secure a NSF Science and Technology Center focused on the Western Lake Erie Basin. Although that proposal was not funded, the process laid the groundwork for future attempts at major research awards to augment university- and state-funded activities.

Based on its leadership in formulation of proposals for a Science and Technology Center (STC) and an Engineering Research Center (ERC) funded by NSF, GWI is committed to framing an OSU strategy for securing one, if not both, types of centers within five years. As was the case with the STC and ERC proposals, projects would be linked to one of the three GWI focus areas and would engage a broad cross section of OSU faculty and external partners.

Table 3. Ohio State University faculty and research staff who are principal or co-investigators on funded Field to Faucet (F2F) or related Ohio Department of Higher Education (ODHE) funded research projects. Four Ohio State colleges are represented. Co-investigators on funded projects also include faculty from six other Ohio universities as well as USDA. **Abbreviations:** College of Arts and Sciences (CAS); College of Food, Agricultural and Environmental Sciences (CFAES); College of Engineering (COE); College of Public Health (CPH)

| Name | Dept./School/Division/Center | College | Role | ODHE or F2F |
|----------------------|--|------------|-------------------------|-------------|
| Stuart Ludsin | Evolution, Ecology and Organismal Biology | CAS | PI | ODHE |
| C. K. Shum | Earth Sciences | CAS | Co-I | F2F |
| Yebo Li | Food, Agricultural and Biological Engineering | CFAES | PI | F2F |
| John Fulton | Food, Agricultural and Biological Engineering | CFAES | PI, Co-I (two projects) | F2F |
| Scott Shearer | Food, Agricultural and Biological Engineering | CFAES | PI, Co-I (two projects) | F2F |
| Greg Labarge | OSU Extension | CFAES | PI (two projects) | ODHE |
| Timothy Haab | Agricultural, Environmental and Developmental Economics | CFAES | PI | ODHE |
| Fuqing Xu | Food, Agricultural and Biological Engineering | CFAES | Co-I | F2F |
| Jay Martin | Food, Agricultural and Biological Engineering | CFAES | Co-I (two projects) | Both |
| Elizabeth Dayton | Environment and Natural Resources | CFAES | Co-I | ODHE |
| Justin Chaffin | Stone Laboratory | CFAES | Co-I (two projects) | ODHE |
| Steve Schwartz | Food Science and Technology | CFAES | Co-I | ODHE |
| Kenneth Riedl | Food Science and Technology | CFAES | Co-I | ODHE |
| Jon Witter | Food, Agricultural and Biological Engineering | CFAES | Co-I | ODHE |
| Andrew Ward | Food, Agricultural and Biological Engineering | CFAES | Co-I | ODHE |
| Wu Lu | Electrical and Computer Engineering | COE | PI | F2F |
| James Gregory | Mechanical and Aerospace Engineering | COE | Co-I | F2F |
| Paula Mouser | Civil, Environmental and Geodetic Engineering | COE | Co-I | F2F |
| John Lenhart | Civil, Environmental and Geodetic Engineering | COE | Co-I (three projects) | Both |
| Christopher Weghorst | Environmental Health Sciences | CPH | PI | ODHE |
| Jiyoung Lee | Environmental Health Sciences; Food Science and Technology | CPH, CFAES | PI, Co-I (two projects) | Both |

Wells to Wellness

Nearly 1 billion people lack access to improved drinking water globally, and 90% of those live outside of urban areas. The GWI has framed its Wells to Wellness focus area to develop new models of development that create sustainable solutions with long-term economic, health, and environmental benefits. The initiative has the potential to improve water quality for over 5 million people, create a new generation of women entrepreneurs, train and prepare the workforce of the future for the advent of renewable energy in Tanzania, and conduct critical research activities that will protect and optimize precious Tanzanian resources.

Wells to Wellness has now been incorporated into a larger public private partnership labeled “The WE³ Program (Water, Energy and Economic Development)” that includes two interrelated pilot activities in Tanzania in addition to a large-scale solar energy project not led by Ohio State.

1. An educational capacity-building initiative with the University of Dodoma (Tanzania) to provide new undergraduate and vocational programming in the areas of sustainable food production, renewable energy, water services and health care to give students the skills to improve the quality of life in Tanzania and to deal with systems-level issues. This effort relies on an initial Memorandum of Understanding (MOU) led by GWI senior

faculty lead Jay Martin for collaborative hydrology and water services research and education. A second MOU is in development focused on renewable energy. This MOU was signed with University of Dodoma leadership at Ohio State in August 2015.

2. A new national water point rehabilitation initiative whereby Ohio State and its key partners, WorldServe International and Hecate Energy, will finance and retrofit 125 broken water points using a new model that focuses on sustainable systems development. In addition to providing water for basic needs, health and sanitation, this initiative is also focused on enhancing local economic development and stimulating the growth of women-owned businesses. Key to this initiative is the commitment of the Tanzanian government to retrofit 5000 wells if the GWI model proves viable. This effort relies on a Letter of Intent signed with the Tanzanian Ministry of Water at Ohio State in August 2015 and a teaming agreement signed with Hecate Energy and WorldServe International at the same time.

Wells to Wellness engages faculty through various activities: research and innovation, teaching and learning, outreach and engagement. The water point rehabilitation project will enable a comprehensive research and development program and broad range of collaborative research activities between Ohio State and the University of Dodoma as well as other universities. An example of this is a faculty-led research proposal for a combined water-irrigation initiative submitted to the Monsanto Foundation in August 2015 with support by GWI and University Advancement. Other projects in development include a hydrologic mapping collaboration between a faculty member in the School of Earth Sciences at Ohio State and counterparts at the University of Dodoma. Researchers at OSU are also consulting with experts at other key organizations (including industry, non-profits and agencies) to create a new business model for this initiative to use market mechanisms to keep water flowing.

The focus area also has large educational and outreach components anchored at the University of Dodoma but extensively augmented by Ohio State. Discussions are still underway as to potential linkages that support teaching, led by Jay Martin. To facilitate exchange of ideas and enhanced communication, GWI supported the Fulbright scholar application of a researcher in CFAES in July 2015 including direct advocacy with the U.S. State Department. As a first concrete step, the Greif Neonatal Survivor Program based at the Ohio State College of Medicine will soon establish a training course in Tanzania based at the University of Dodoma and facilitated by GWI. The GWI team is seeking ways to leverage and augment the success of other Ohio State efforts in Tanzania and East Africa, including the iAGRI program (CFAES) and One Health (multi-college).

Table 4. Ohio State faculty and research staff who are engaged in current Wells to Wellness activities or who are working with GWI on the development of future projects and proposals. Six Ohio State colleges are represented. **Abbreviations:** College of Arts and Sciences (CAS); College of Food, Agricultural and Environmental Sciences (CFAES); College of Engineering (COE); College of Medicine (COM); College of Veterinary Medicine (CVM); Fisher College of Business (FCOB)

| Name | Dept./School/Division/Center | College | Role |
|---------------------|---|---------|---|
| Audrey Sawyer | Earth Sciences | CAS | PI—preliminary data hydrology project |
| Robert Agunga | Agricultural Communication, Education, and Leadership | CFAES | Consultation, exploring collaboration |
| Joseph Campbell | Environment and Natural Resources | CFAES | Fulbright applicant |
| Mark Erbaugh | International Programs in Agriculture | CFAES | Consultation, student trip co-sponsor |
| Casey Hoy | Entomology | CFAES | Exploring collaboration |
| Jay Martin | Food, Agricultural and Biological Engineering | CFAES | Water Services MOU faculty lead |
| Elena Irwin | Agricultural, Environmental and Developmental Economics | CFAES | Consultation, exploring collaboration |
| Scott Shearer | Food, Agricultural and Biological Engineering | CFAES | Consultation, exploring collaboration |
| Greg Bixler | Engineering Education Innovation Center | COE | Technical consultant |
| Michael Hagenberger | Civil, Environmental and Geodetic Engineering | COE | Capstone advisor, trip leader to Tanzania |
| Steve Ringel | Dept. of Electrical and Computer Engineering | COE | Consultation, exploring collaboration |
| Gajan Sivandran | Civil, Environmental and Geodetic Engineering | COE | PI—pending corporate foundation grant; capstone advisor |
| Diane Gorgas | Emergency Medicine | COM | Lead for new neonatal center in Dodoma |
| Wondwossen Gebreyes | College of Veterinary Medicine | CVM | Consultation, exploring collaboration |
| Keely Croxton | Marketing and Logistics | FCOB | Consultation, exploring collaboration |

Coastal Resilience

The Coastal Resilience focus area is the most recent addition to the GWI portfolio and currently the least mature. Faculty are engaged in helping to develop a research program for a UNESCO Coastal Resilience Collaborative for which GWI has been afforded a leadership seat. Senior faculty lead Jay Martin, along with up to two of the faculty listed below (currently determining availability) will attend the Collaborative's first event in December that aligns well with both the GWI approach and the Ohio State Translational Data Analytics Discovery Theme.

Table 5. Ohio State faculty who are engaged in the development of research themes for the Coastal Resilience focus area. Senior faculty lead Jay Martin is coordinating this effort. **Abbreviations:** College of Arts and Sciences (CAS); College of Food, Agricultural and Environmental Sciences (CFAES); College of Engineering (COE)

| Name | Title | Dept./School/Division/Center | College |
|-----------------------|---------------------|---|---------|
| Andrea Grottoli | Professor | School of Earth Sciences | CAS |
| Craig Jenkins | Professor | Department of Sociology | CAS |
| Mark Moritz | Associate Professor | Department of Anthropology | CAS |
| CK Shum | Professor | School of Earth Sciences | CAS |
| Sathya Gopalakrishnan | Assistant Professor | Agricultural, Environmental and Developmental Economics | CFAES |
| Chris Winslow | Interim Director | Ohio Sea Grant and Stone Laboratory | CFAES |
| Tijs van Maasackers | Assistant Professor | Knowlton School of Architecture | COE |

STAFF INVOLVEMENT

The initial GWI organizational model (Fig. 5 in the following section) includes several key staff positions to establish partnerships, frame projects in the three focus areas, secure external funding streams, vet potential partners and collaborators and build strong in-country relationships with not-for-profits and NGOs. The executive director, lead systems engineer (both of which may also have faculty appointments), senior faculty lead, communications and networking director, and the current interim director have been funded or cost-shared with support from the provost, the vice president for research and the College of Food, Agricultural and Environmental Sciences. In the near future, GWI intends to fill the executive director and lead systems engineer positions (final position descriptions have been approved).

A second phase of staff hiring, including project manager and administrative assistant, will be triggered at the discretion of the executive director when a) a sufficient volume of projects and outreach activities necessitates additional staffing, and b) external partners have been engaged that either provide funding or justify additional internal investment. The GWI organizational model allows for core staff to be intimately engaged in project execution, enabling them to bill their costs as both direct and indirect expenditures.

To help augment the capabilities of GWI to match its expanding project portfolio, GWI is also funding a faculty member in the College of Engineering to support its Wells to Wellness focus area.

GWI is indebted to the Office of Energy and Environment, the Industry Liaison Office, University Advancement, and the Office of Research for ongoing staff support from procurement and contracting to human resources and external engagement.

STUDENT INVOLVEMENT

One of the areas where GWI has greatest potential to advance the Ohio State core mission is in providing opportunities for enhancing the undergraduate and graduate experience. The nature of GWI's interdisciplinary work lends itself well to the types of applied, meaningful, interdisciplinary, skills-enhancing, globally oriented, world-changing experiences that students seek and employers reward.

2014-2015 Academic Year

The Global Water Initiative engaged with students in a number of ways during its first year.

- GWI sent six MBA students to Tanzania on a three-week intensive mini-consulting project in collaboration with Fisher College of Business, the International Programs in Agriculture office, and the Office of Energy and Environment (Figure 3). These students provided valuable insight into the rural water situation in Tanzania that materially advanced GWI project development. They have also remained engaged with GWI. Two students subsequently made a presentation to a ten-person ministerial delegation that visited Columbus, and one of the Fisher students was selected through an interview process to be one of two GWI graduate administrative associates for 2015-2016.
- GWI commissioned a capstone project in the Department of Civil, Environmental and Geodetic Engineering that involved ten students in 2014-2015 and will involve an additional ten students in 2015-2016. The students developed designs for several rural village water systems in Tanzania and along with advising faculty Michael Hagenberger and two graduate students traveled to Tanzania in August 2015 (Figure 4). Funding for

the trip was provided by GWI, the Department of Civil, Environmental and Geodetic Engineering and the Office of Energy and Environment. The outcomes of this trip include a new capstone project for 2015-2016 based on a relationship developed in country and funding sought from U.S. NGOs rather than the university.

- Field to Faucet and the Ohio Department of Higher Education HAB Research Initiative support the research of several graduate students.
- GWI has two graduate administrative associates per academic year from the Fisher College of Business working on the Wells to Wellness focus area.



Figure 3. MBA students from the Global Applied Projects program at Fisher College of Business traveled to Tanzania on a GWI-sponsored project in spring 2015.



Figure 4. Capstone students from the Department of Civil, Environmental and Geodetic Engineering traveled to Tanzania on a GWI-sponsored project in summer 2015.

Proposed and Future Activities

Enhanced experiential learning

Informally, GWI receives many requests (~1/month) from students eager to participate in the Wells to Wellness program. And the feedback from undergraduates on the capstone trip in summer 2015 was striking (full text is available on the trip blog at <https://u.osu.edu/tzsu2015/>).

"It blew my mind and broke my heart."

"I've received a new outlook and a new fire to add to my life."

"I leave here wanting to help."

These anecdotes support what the Office of International Affairs confirms: there is a large demand among students for access to international sites where they can apply their technical knowledge in ways that feel meaningful. As an institute, GWI would have a stronger position from which both to coordinate and connect existing opportunities as well as to integrate new faculty-led student programming into GWI projects and focus areas.

Examples of ways that GWI could add value to the student experience include:

- providing real-world challenges from project sites as part of course curricula
- connecting Ohio State faculty with faculty at international institutions to develop concurrent projects that connect student teams across a variety of environments
- providing summer internships and travel opportunities to field sites

- building relationships between Ohio State faculty and students and NGOs, government agencies and private companies in other countries to provide social, political and environmental context to business and engineering problems.

These opportunities offer a range of benefits beyond personal enrichment for the student. They strengthen learning by providing students an opportunity to apply classroom lessons to real-world examples. They provide practical work experiences that will enhance post-graduation employment options. They develop a sense of humanitarian service that can stimulate entire careers with meaningful purpose. They progress the land-grant mission of Ohio State to apply academic knowledge in service of the public good. And all these opportunities will, in turn, advance GWI's goals.

Distance education and e-Learning

As a land-grant initiative that works in both domestic and international settings, GWI is an ideal testing ground for new applications of the university's distance education and e-learning strategies. In exploring this space, GWI will follow the lead of other interdisciplinary global initiatives such as One Health, which won a Digital First Impact grant with app development and iPads integrated into their successful summer institute program. For GWI, all three focus areas have current applications where both distance education and enhanced video conferencing capabilities would enhance project and program effectiveness. This will be an area of strategic focus in the coming year. Of particular interest is the development of distance learning opportunities that enhance the teaching capacity of institutions in Tanzania in the critically important fields of water, energy and sustainable agriculture. These areas also dovetail with high-priority Discovery Theme topics and provide an opportunity to engage more faculty in increasing Ohio State's online learning capacity.

Administration

OVERVIEW

The initial organizational chart for the Global Water Institute is shown below (Figure 5).

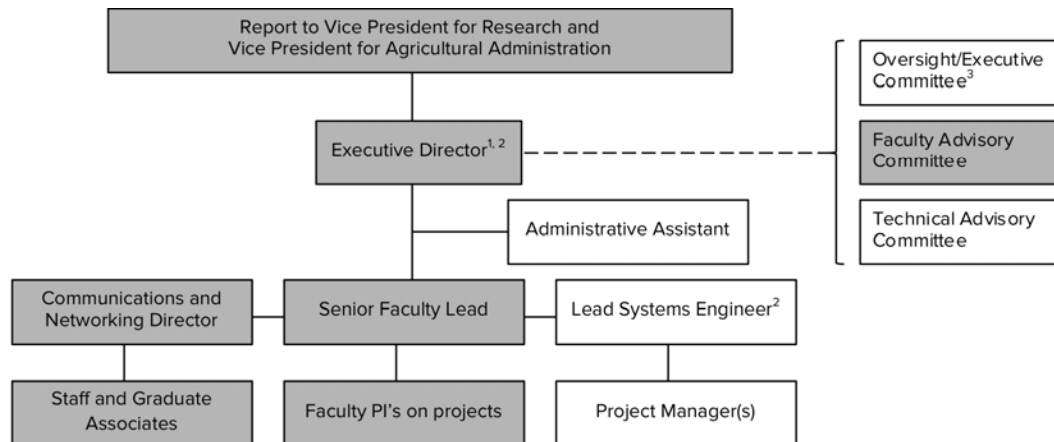


Figure 5. Initial organizational chart for GWI. Highlighted boxes indicate roles that are currently active.

¹ The executive director role is currently filled by an interim director.

² Position descriptions have been finalized and a search will begin in the near future.

³ An Oversight Committee convened in the short term by the vice president for research will transition in the first three years to an Executive Committee, both described below.

EXECUTIVE DIRECTOR

The primary responsibilities of the executive director for GWI are:

- Provide coordination and leadership for the water-related research and outreach community at Ohio State
- Build and strengthen collaborations with university, industry and NGO partners
- Lead business development activities to secure external funding (\$5-10 million per year)
- Recruit a high-quality team of staff, faculty and non-faculty affiliates
- Oversee project development for the three GWI focus areas
- Develop and implement a strategic plan for GWI activities
- Manage daily operations including establishing operating procedures and budgets
- Establish qualified and visionary advisory and oversight committees
- Interface with and capitalize on Discovery Theme initiatives
- Collaborate with existing Ohio State centers to integrate their assets and capabilities
- Frame the necessary agreements to fully engage GWI partner organizations
- Establish the necessary procurement and contracting mechanisms to execute projects
- Develop educational and outreach activities to fully integrate Ohio State students

Martin Kress, Assistant Vice President of Research Development, has been appointed interim director of GWI by the vice president for research and the dean of the College of Food, Agricultural and Environmental Sciences. His current role is a 0.5 FTE commitment. A candidate search for the GWI Executive Director will be launched in the fall of 2015.

OTHER CORE LEADERSHIP POSITIONS

Senior Faculty Lead

The senior faculty lead is an Ohio State faculty member who:

- Oversees the scientific and technical aspects of GWI activities
- Assists the executive director in coordinating the water research community at Ohio State and in building fruitful technical collaborations with external entities
- Serves as principal investigator for the purpose of proposals to extramural funders

Jay Martin, a professor of Food, Agricultural and Biological Engineering, has been appointed to this 0.5 FTE role by the vice president for research and the dean of the College of Food, Agricultural and Environmental Sciences. The position is funded through cost-share by CFAES and support by the Office of Research.

Lead Systems Engineer

The lead systems engineer will:

- Design and develop the end-to-end sustainable system prototypes as part of early GWI establishment activities
- Oversee problem characterization and dissemination of design parameters to partners and fully engage local communities in GWI technical activities
- Conduct technology validation activities for key component parts and ensure access to necessary supply chains
- Develop viable solutions in partnership with the Technical Advisory Committee
- Lead initial implementation efforts and oversee the establishment of technical support

As noted above, the lead systems engineer job announcement is near completion.

Communication and Networking Director

The communication and networking director will:

- Create and execute an internal and external marketing and communications strategy
- Develop and provide critical support to briefings, presentations and proposals
- Supervise the calendar of GWI-sponsored, supported and attended events
- Establish and grow functional teams of collaborators, supporters and consulting partners that support the business development of GWI

Maureen Langlois was hired in September 2014 with funding by the Office of Research to fill this position.

Project Manager(s)

It is envisaged that each GWI project will have a project manager, consistent with Ohio State's new Discovery Theme strategy. The project manager will be supported through project funding and recruited and hired through Ohio State Human Resources.

Project managers are responsible for the day-to-day activities associated with projects, including schedules, milestones, deliverables, budgets, systems engineering and technical activities, integration, hardware and software procurement and integration, project team building, relationship management with the end customers and users, interaction with the

sponsors and local NGOs, system deployment and technical sustainability. Project managers will report to the lead systems engineer and work with the assigned principal investigator or faculty lead to develop and execute the approved project portfolio.

GWI is also assessing the suitability of a junior systems engineer(s) for substantial field operations at remote international sites.

Other Core Staff

GWI currently has one core staff member dedicated to research, technology assessments and in-country collaborations in Africa. The initiative has also engaged a faculty member in the College of Engineering for technical consulting with 15% supplemental compensation. This person, who brings considerable experience in Africa to GWI, is currently working on developing and deploying water pumps. GWI is also assessing cost-sharing a business development/grant writer with another interdisciplinary Ohio State organization. This would give GWI a much-needed asset to execute its aggressive business development plan.

In addition, GWI has two graduate assistants from Fisher College of Business. They are focused on three key tasks: (1) framing an in-country franchising model for Tanzania with support of Fisher faculty, (2) framing an OSU open innovation activity to be kicked off this spring, and (3) securing data on key funding targets regarding their strategic investment priorities and unique collaborative projects.

OVERSIGHT

The GWI Executive Committee will be formed in consultation with the vice president for research and the deans of colleges with faculty participating in GWI activities. As a preliminary measure in fall 2015, the vice president for research will convene an Oversight Committee with direct participation by all or some of these deans.

The permanent Executive Committee will develop out of this Oversight Committee by layering internal representatives with those from industry, not for profit organizations, foundations, and other research institutes and universities. GWI will seek six to ten distinguished thought leaders in water sustainability, systems science, rural development, coastal resilience, and the water-food-energy-health nexus to expand the depth and reach of the Oversight Committee and to give GWI the ability to work at the regional, national, or international level. Ultimately, the GWI Executive Committee will work with the Executive Director to:

- Develop and strengthen relationships with partners
- Consult about the composition of project teams and the allocation of funding
- Play a key role in formation of a project portfolio and regions of focus
- Frame the GWI internal research and development plan
- Interface with key national and international organizations
- Oversee the transition of technologies and systems to other applications
- Ensure alignment of GWI activities with key external groups (e.g. UN Sustainable Development Goals for rural water projects; Lake Erie Phosphorus Task Force for harmful algal blooms)
- Identify additional funding and collaborative research opportunities
- Evaluate institute progress in achieving strategic goals
- Provide guidance and recommendations to the executive director and Executive Committee for strategic planning, global regions of interest and areas of opportunity in

the science and technology of water sustainability

The vice president for research will co-chair the Executive Committee along with one external co-chair. The Committee will be limited to 13 members:

- 5 Ohio State representatives, including diverse faculty and college research leadership
- 5 Representatives from industry and non-profit organizations with which GWI has partnered
- 3 representatives from partner universities listed above

ADVISORY COMMITTEES

Ohio State Faculty Advisory Committee

The Ohio State Faculty Advisory Committee (FAC) is GWI's core team of Ohio State faculty who assist GWI leadership in engaging with, coordinating, and serving the water research and outreach community at Ohio State. The FAC will be appointed by the executive director in consultation with the senior faculty lead and the Executive Committee.

In particular, FAC members:

- Advise on institutional and extramural relationships based on existing areas of strength and established national and international ties among Ohio State faculty
- Help develop the internal strategy for faculty and researcher engagement
- Provide two-way communications with college faculty and other university initiatives
- Support proposal and business development
- Act as internal and external champions and advocates
- Connect GWI with Discovery Theme Initiatives and existing university centers

To ensure its linkage with key assets across Ohio State, the Faculty Advisory Committee was intentionally built to include tenured and non-tenured faculty, unit leaders, and staff and faculty leadership. Seven colleges are represented on the FAC. Current members are:

- Kate Bartter, Director, Office of Energy and Environment
- Mike Bisesi, Professor, Interim Chair and Senior Associate Dean of Academic Affairs, Division of Environmental Health Sciences, College of Public Health
- Michael Camp, Executive Director, Technology Entrepreneurship and Commercialization Institute, Fisher College of Business
- Wondwossen Gebreyes, Professor, Director of Global Health Programs, College of Veterinary Medicine
- Sathya Gopalakrishnan, Assistant Professor, Dept. of Agricultural, Environmental and Development Economics, College of Food, Agricultural and Environmental Sciences
- Diane Gorgas, Associate Professor and Executive of the Office of Global Health, Dept. of Emergency Medicine, College of Medicine
- Elena Irwin, Professor and Faculty Director, Sustainable and Resilient Economy Discovery Theme, Dept. of Agricultural, Environmental and Development Economics, College of Food, Agricultural and Environmental Sciences
- Jiyoung Lee, Associate Professor, Division of Environmental Health Sciences, College of Public Health and Dept. of Food Science and Technology, College of Food, Agricultural and Environmental Sciences
- Berry Lyons, Chair and Professor, School of Earth Sciences, College of Arts and Sciences

- Mark Moritz, Associate Professor, Dept. of Anthropology, College of Arts and Sciences
- Steven Ringel, Professor and Director of Institute of Materials Research, Faculty Director of Materials and Manufacturing for Sustainability Discovery Theme, Dept. of Electrical and Computer Engineering, College of Engineering
- Audrey Sawyer, Assistant Professor, School of Earth Sciences, College of Arts and Sciences
- Scott Shearer, Chair and Professor, Dept. of Food, Agricultural and Biological Engineering, College of Food, Agricultural and Environmental Sciences
- Gajan Sivandran, Assistant Professor, Dept. of Civil, Environmental and Geodetic Engineering, College of Engineering
- Linda Weavers, Professor and Co-Director of the Ohio Water Resources Center, Dept. of Civil, Environmental and Geodetic Engineering, College of Engineering
- Chris Winslow, Interim Director, Ohio Sea Grant and Stone Laboratory

Technical Advisory Committee

The Technical Advisory Committee (TAC) will comprise technical experts in critical subject areas from Ohio State, partner universities, industry partners, and (as needed) other external entities with needed expertise. This committee has not yet been formed. GWI will appoint members to the TAC when the full-time executive director and lead systems engineer are recruited. The TAC will support the lead systems engineer with identifying and integrating component capabilities for water project areas. In cases when a more substantial outlay of time is necessary, GWI will cost share TAC members' time with their home colleges or through a Memorandum of Understanding with their home organization (for external members). TAC members will be appointed by the executive director in consultation with the senior faculty lead and lead systems engineer.

REPORTING LINE

The GWI executive director will be appointed by and report to the vice president for research and the vice president for agricultural administration (dean of the College of Food, Agricultural and Environmental Sciences). These two will integrate leadership from other colleges and VP units into governance of GWI, including the oversight committee (precursor to the Executive Committee) mentioned above. This reporting configuration responds to the imperative that the Institute be a "whole university" entity and should not reside in or give the impression of being "owned" by one college. The dynamic research and outreach of the Institute simply cannot occur without participation from Ohio State faculty and staff from across the university, regardless of college affiliation.

PATTERN OF ADMINISTRATION

The primary elements of the Pattern of Administration (POA) for GWI have been described above. The formal POA will be developed and submitted for approval during calendar year 2016.

Budget and Funding

BUDGET: STAFF AND OPERATIONS

Fiscal Year 2016

As shown in Table 6, GWI has investments from the provost, vice president for research, and dean of the College of Food, Agricultural and Environmental Sciences (CFAES) to support staff, key faculty and student activities, operating and administrative expenses, and other critical investments that enable GWI to secure project/research activities and/or reduce the risk associated with implementation. All personnel expenses listed include salary and benefits. It should be noted that although the final position descriptions for both the executive director and lead systems engineer positions have been approved, these positions will likely not be filled until the second half of fiscal year 2016. The Office of Research currently funds the interim director.

Table 6. Institute first-year staff and operating budget with funding sources (staff lines include benefits).

| Expense | Amount | Source | Status |
|--|------------------|------------------------|----------------|
| Personnel (Salary and Benefits) | | | |
| Interim Director | \$180,000 | Office of Research | Staff in place |
| Sr. Faculty Lead/PI (50%) | \$100,000 | CFAES | Staff in place |
| Lead Systems Engineer | \$120,000 | Office of the Provost | Searching |
| Communications / Networking Mgr | \$110,000 | Office of Research | Staff in place |
| Technical Lead/Researcher | \$91,000 | Office of the Provost | Staff in place |
| Engineering Support (15%) | \$12,000 | Office of the Provost | Staff in place |
| Business Development/Grants (50%) | \$36,000 | Office of the Provost | Future search |
| Graduate Admin Associates (2) | \$61,000 | Office of Research | Staff in place |
| Personnel Subtotal | \$710,000 | | |
| Operations | | | |
| Office Operations, Travel | \$50,000 | Prior Year Unobligated | |
| Consulting | \$100,000 | Office of the Provost | |
| Faculty Grants | \$75,000 | Office of the Provost | |
| Student/Campus Engagement | \$20,000 | Office of the Provost | |
| Operations Subtotal | \$245,000 | | |
| OVERALL STAFF AND OPERATIONS BUDGET | \$955,000 | | |

For key project and research activities, GWI will secure and fund the required PIs, Co-PIs and Project Managers as part of the overall proposal budget. The direct engagement of the executive director, lead systems engineer and technical lead/researcher can be billed against project dollars when appropriate. As such the cost of these positions will decline over time.

GWI will use a matrix model to run the organization and to secure and execute projects. The core team is a blend of full- and part-time personnel who give GWI the suite of capabilities required to frame and oversee execution of projects and research activities, attract external funding and build highly collaborative interdisciplinary teams. GWI will also use cost share with

other organizations to help control cost while securing key capabilities.

Fiscal Years 2017 and 2018

Based on the planned use of resources provided by the Office of the Provost (\$1.25 million over three years, 2015-2017), and the sustained commitment of the Vice President for Research and the Dean of the College of Food, Agricultural and Environmental Sciences (CFAES), GWI will have a level of financial support in 2017 comparable to the level in 2016—approximately \$750,000-\$850,000—with lower budget needs due to elimination of one-time costs incurred in FY 2016 (e.g., consulting). Billable staff and administrative costs (Executive Director, Lead Systems Engineer, and Technical Lead/Researcher) will be partially defrayed due to the influx of project dollars secured through business development activities. For FY 2017, GWI is assuming that 10% of the cost of these three positions will be directly supported by project dollars, rising to 20% in 2018.

Starting in fiscal year 2018, GWI will no longer have financial support from the Provost’s Office, but financial commitments from the Office of Research and CFAES will remain in place. The working assumption is that the gap in central funding will partially dovetail with support by the colleges that most benefit from GWI’s activities. As discussed above, the Vice President for Research will convene an Oversight Committee for GWI in late 2015. This committee will consist of deans or delegates from key colleges (including but not limited to Engineering, Arts and Sciences, FAES, Public Health, Veterinary Medicine) and will assist with securing institutional support for GWI.

In addition to seeking research and project dollars that offer administrative support, GWI is working with Advancement to secure principal-level philanthropic gifts for project areas and/or for the initiative/institute as a whole. To this end, the university’s up-front investment in GWI is seen by potential investors as a firm commitment to the institute. While it would be imprudent to rely on these sources for sole support in the institute’s first five years of operation, these efforts speak to the GWI’s commitment to resilience and sustainability by creating multiple layers of financial support.

BUILDING A FOUNDATION FOR MAJOR FUNDRAISING

In 2015, GWI had investments/research funding from the College of Food, Agricultural and Environmental Sciences (CFAES), the Ohio Department of Higher Education, and the Office of Energy and Environment to support initial project expenses (Table 7).

Table 7. 2015 GWI project funding sources.

| Project Focus Area | Amount | Source |
|---|--------------------|----------------------------------|
| Field to Faucet initiative | \$1,000,000 | CFAES |
| ODHE Harmful Algal Blooms Research Initiative | \$2,000,000 | Ohio Dept. of Higher Education |
| Campus and Student Engagement | \$50,000 | Office of Energy and Environment |
| Projects Total | \$3,050,000 | |

For 2016, GWI has a commitment from ODHE for a second round of funding for the State’s Harmful Algal Bloom Research Initiative for \$2,000,000. GWI has a proposal pending with Monsanto Foundation and a pre-proposal pending with the Abbott Foundation. It also teamed with CFAES and the College of Engineering to submit a pre-proposal for an NSF Engineering

Research Center focused on nutrient management.

Based on the recent approval of the GWI proposed WE³ Program (Water, Energy, Education and Economic Development) with the minister of water for Tanzania, the GWI team has begun to frame proposals for key foundations and US agencies. GWI anticipates revenues of at least \$5 million in 2016 and at least \$10 million in 2017 for WE³. Key to securing this level of funding are strategic alliances and teaming agreements with highly respected foundations and firms that GWI is putting in place. These proposals emphasize the innovative management concepts, project management and execution, education and training, and a broad set of interdisciplinary research activities that Ohio State can bring to bear through GWI.

GWI is also hopeful that in 2016 its participation on the Leadership Tier of the UNESCO-sponsored Coastal Resilience Collaborative will result in additional research and project activities.

FUNDING SOURCES, ONE-TIME COSTS, RECURRING COSTS

GWI will seek to capitalize on existing Ohio State assets and to layer and augment them with the assets and capabilities of partner organizations. Initial funding to establish GWI and to support the initial staffing plan has been secured from the provost, the Office of Research, and the College of Food, Agricultural and Environmental Sciences. The provost invested \$1.25 million in GWI over three years, which provides support for the initial staffing plan. Funding from the Office of Energy and Environment was a one-time investment. Additional staff will be covered by project dollars and billed directly in support of projects when feasible. Faculty and researchers will be covered by project dollars and internal research and development dollars that will be set aside from project funding.

Upon establishment as an institute, GWI anticipates one-time costs associated with establishing a physical headquarters on main campus. At a future point, GWI would like to establish a systems engineering prototype and a virtual communications facility at a central Ohio State campus location. Although GWI is working with potential external partners to have these future assets donated to GWI, the institute will need to cover the cost of the associated staff and operations. In the current model, these costs would be offset with project funds, donations or industry sponsors.

FACILITIES AND EQUIPMENT

For the first phase of GWI, the institute will operate out of space provided in Bricker Hall by the Office of Research. Since the mission of GWI is to connect and capitalize on existing university assets, no additional equipment will be required to begin institute operations.

FUNDING MODEL

When projects and funding streams have been established, GWI will operate using a low-overhead funding model in order to maximize investment in outcomes.

With concurrence from the Office of Research, for every non-federal dollar that is acquired, GWI proposes that:

- \$0.80 is spent on projects;
- \$0.10 is spent on related research and development; and
- \$0.10 supports administrative costs.

It should be noted that core to GWI projects are proposed research and educational activities. So the proposed augmentation of 10% for related research is in addition to the core project research. As the institute grows and project-linked extramural funding increases, GWI would provide key faculty/researchers with research funding to be dedicated members of the Institute.

Crediting of external gifts

For the purposes of development accounting, any charitable gifts that are designated for GWI activities will be credited to the advancement entities at the college(s) that secured the gift. In these cases, GWI is the executing entity for the designated funds.

SUSTAINABILITY OF THE INSTITUTE

GWI aspires to be a 'one-stop shop' for companies, foundations, NGOs and agencies seeking to invest funds in helping to solve global water challenges. As such, external funding should provide the majority of project and project-specific research and development costs, with the university contribution limited to administrative support. GWI is working closely with University Advancement to identify potential companies or individuals whose philanthropic interests may indicate a principal-level gift. In addition, GWI faculty affiliates prepared a submission to the NSF Engineering Research Center Program in October 2015 that is linked to precision agriculture.

Key to the GWI model is aggressive business development and the pursuit of funding from a diverse set of organizations, including private foundations, industry, government agencies and not-for-profit organizations. GWI will rely heavily upon the Business Development and Proposal Center assets of the Office of Research as well as the Business Development assets of the key colleges at Ohio State and partner universities. The vice president for research has approved the interim director's commitment of time and resources in for 2015-2016 to secure funding for GWI. The current interim director is the assistant vice president of research for business development.

GWI is currently developing initial budget requests for a set of key organizations to support the Wells to Wellness focus area and the proposed WE³ Program in Tanzania under GWI. The organizations include Coca Cola Foundation, Nestle, Abbott, and Unilever. GWI is also in discussions with USAID regarding the creation of a Global Development Alliance and/or a Higher Education Partnership for Innovation and Impact partnerships that would leverage external investments.

Evaluative Criteria and Benchmarks

The evaluation measures for GWI in its initial phase of operation are as follows. These criteria and benchmarks will be assessed and updated by GWI's various oversight and advisory committees. At that time, an action plan will be formulated to enable tracking of these metrics.

- 1) **Project completion.** GWI needs to demonstrate the capacity for successful project execution.
Benchmark: By year three, one major project will be completed in each of the three focus areas.
- 2) **Affiliate researcher base.** GWI needs to attract and retain an interdisciplinary cohort of faculty participants in the research and outreach components of projects.
Benchmark: By year three, 100 faculty members from Ohio State and partner universities will be engaged in GWI projects.
- 3) **Strategic partnerships.** GWI needs to increase the quality of active collaborations with industry and NGO partners.
Benchmark: By year three, GWI will have strategic relationships with at least five industry partners and five not-for-profit or government agencies such as the Peace Corps or USAID.
- 4) **Ohio State/Discovery Theme connectivity.** GWI needs to support and link with existing Discovery Theme interdisciplinary activities.
Benchmark: By year three, at least one GWI project per year will be directly linked to a Discovery Theme Initiative, and GWI will help secure at least one new partner/collaborator for an approved Discovery Theme project each year.
- 5) **External funding.** GWI needs to secure external funding for projects from a diverse set of funders including governmental entities, NGOs, private foundations and industry.
Benchmark: GWI will secure at least \$5 million per year for its project portfolio by the end of year two, and \$10 million per year by the end of year five.
- 6) **Key events, lectures and seminars.** GWI needs to create a forum for the discussion of interdisciplinary research activities and attract key people in the field to Ohio State to share their ideas and knowledge with students and faculty.
Benchmark: GWI will sponsor at least three events per year.
- 7) **Student engagement.** GWI needs to work with existing student service and academic programs to expand student opportunities for service learning relating to water issues.
Benchmark: By year two, GWI will work with Humanitarian Engineering, capstone and Global Applied Projects programs to facilitate student trips to GWI field sites.
- 8) **External recognition.** GWI must garner recognition among peer universities and organizations for its ability to design, develop, deploy and sustain end-to-end systems.
Benchmark: By year three, members of the GWI team will be invited to present at key meetings of professional and international organizations about GWI activities.

Appendices

APPENDIX 1

Assessment of the missions and capabilities of other interdisciplinary and philanthropic water entities

APPENDIX 2

Letters of support: Ohio State university and college leadership

APPENDIX 3

Letters of support: Ohio State schools, departments, centers

APPENDIX 4

Letters of support: External interested parties (academic)

APPENDIX 5

Letters of support: External interested parties (companies and NGOs)

Appendix 1

ASSESSMENT OF THE MISSIONS AND CAPABILITIES OF OTHER INTERDISCIPLINARY AND PHILANTHROPIC WATER ENTITIES

Assessment of Global Water Goals and Capabilities

| Funding, Expertise and/or Technology that helps people to... | GROW FOOD | DEVELOP ECONOMICALLY | GET ENERGY | PLAN FOR DECADES AHEAD | MANAGE LAND FOR WATER | GET WATER | RECLAIM WATER | TRANSLATE NEEDS/IMPLEMENT SOLUTIONS | FIGHT DISEASE | Key Projects (*) |
|--|-------------------------|-------------------------|--------------------------|-----------------------------------|-----------------------|-------------------------------|--------------------------|-------------------------------------|-----------------------------------|--|
| | Sustainable Agriculture | Sustainable Development | Renewable Energy Systems | Coastal/Climate/Econ. Forecasting | Watersheds | Wells, Desal., Infrastructure | Sewage, Reuse, Treatment | Cultural, Political Interfacing | Sanitation, Education, Medication | |
| UNIVERSITIES | | | | | | | | | | |
| Ohio State University | ++++* | ++ | +++ | +++ | ++++* | +++ | ++++ | ++++* | ++++ | *Watershed-based food and water optimization |
| Purdue University | ++++ | ++ | +++ | +++ | ++++ | +++ | ++++* | ++++ | ++++ | *Wastewater technologies |
| Harvard University | ++ | ++++ | ++++* | ++++* | +++ | +++ | ++++ | ++++* | ++++ | *Energy Policy & Planning |
| University of North Carolina-Chapel Hill | +++ | +++ | +++ | ++++ | +++ | ++++ | ++++ | ++++ | ++++* | *Hygiene and Sanitation |
| Cornell University | ++++ | +++ | ++ | +++ | ++++ | ++++* | ++++ | ++++ | ++++ | *Aqua Clara Access Project |
| Michigan State University | ++++ | ++ | ++ | +++ | ++++ | ++++ | ++++ | ++++ | +++ | *Wastewater Reclamation Strategies |
| Pennsylvania State University | ++++ | ++ | ++++* | +++ | ++++ | +++ | ++++ | ++++ | +++ | *Shale energy water issues |
| University of Nebraska | ++++* | +++ | +++ | +++ | ++++* | +++ | ++++ | ++++ | +++ | *Water for Food |
| Massachusetts Institute of Technology | ++ | +++ | ++++ | ++++ | ++ | ++++* | ++++ | ++++ | +++ | *Desalination |
| Texas A&M University | ++++ | +++ | +++ | +++ | ++++ | +++ | ++++ | ++++ | ++++* | *Sanitation for health |
| University of Florida | ++++* | ++ | ++ | +++ | ++++* | +++ | +++ | ++++* | ++++ | *Nutrient management, fresh and coastal waters |
| Florida International University | ++++ | ++ | ++ | ++++* | ++++ | ++++ | ++++ | ++++ | +++ | *International Hurricane Center |
| NATIONAL & INTERNATIONAL AGENCIES | | | | | | | | | | |
| UN Water Program | ++ | ++ | ++ | ++++* | +++* | +++ | +++ | ++++* | ++++ | *Transboundary Waters |
| Institute for Water Education, UNESCO | ++ | ++ | + | +++ | ++++ | +++ | ++++* | ++++ | +++* | *Disaster Sanitation System |
| World Bank | +++ | ++++* | ++++* | ++++ | ++++ | ++++* | +++ | +++ | +++ | *"Nexus Approach" |
| World Health Organization (WHO) | ++ | ++ | + | +++ | ++ | ++++ | ++++ | ++++* | ++++* | *Infectious Diseases |
| US Agency for International Development (USAID) | ++++* | ++++* | ++ | +++ | ++++ | +++ | +++ | +++ | ++++* | *2013's Water & Development Strategy |
| Global Council on Water Security, World Economic Forum | ++ | ++++* | ++ | ++++ | ++++ | ++ | ++ | ++++* | ++ | *Pilot Governance Projects |
| FOUNDATIONS | | | | | | | | | | |
| Bill and Melinda Gates Foundation | + | ++ | + | + | ++ | +++ | ++++ | ++++ | ++++* | *Toilet Challenge |
| Warren Buffett Foundation | ++++* | +++ | + | + | ++++* | +++ | ++ | ++++* | ++ | *Water for Sustainable Agriculture |
| Clinton Global Initiative | ++++ | ++++ | ++ | ++ | +++ | +++ | +++ | ++++* | ++++ | *Save 1 life/hour |
| Rotary International | ++ | + | + | + | ++ | ++++ | +++ | ++++* | ++++* | *Global Soap Project |
| Coca Cola Foundation | ++ | ++ | + | + | +++ | ++++ | +++ | ++ | ++++ | *Replenish Africa Initiative (RAIN) |
| NGOs and Consortia | | | | | | | | | | |
| U.S. Water Alliance | + | ++++* | +++ | +++ | ++++* | ++ | + | ++++* | ++ | *Advocacy: One Water |
| International Water Management Institute | +++ | +++ | ++ | ++ | ++++ | ++++ | ++++ | ++++ | ++++ | *Water for Sustainable Agriculture |
| World Business Council on Sustainable Development (WBCSD) | +++ | ++++* | +++ | +++ | +++ | ++++ | ++++ | +++ | +++ | *Vision 2050, Water Project |

Appendix 2

**LETTERS OF SUPPORT:
OHIO STATE UNIVERSITY AND COLLEGE LEADERSHIP**

Appendix 3

LETTERS OF SUPPORT:

OHIO STATE SCHOOL, DEPARTMENT AND CENTER LEADERSHIP

Appendix 4

LETTERS OF SUPPORT:

EXTERNAL INTERESTED PARTIES: ACADEMIC INSTITUTIONS

Appendix 5

LETTERS OF SUPPORT:

EXTERNAL INTERESTED PARTIES: COMPANIES AND NGOS

Questions from University Research Subcommittee

MEMORANDUM

February 22, 2016

To: Vice Provost W. Randy Smith

RE: Proposal for University Center status for the Global Water Initiative

From: University Research Subcommittee

Thank you for asking the University Research Committee to review the proposal to establish the current Global Water Initiative (GWI) as a university center. The proposal has many worthwhile aspects. This note does not address the worthy aspects of the proposal, but instead discusses the areas where additional details would better meet the University rules as well as serve to clarify the goals and impacts of the initiative. The Committee has three areas of concern where more details would strengthen the proposal: 1) inclusion and scope; 2) administration/student focus; and 3) metrics.

1. Inclusion and scope

- 1.1 The current proposal says that GWI is a stand-alone research entity. This committee understood the GWI to be a coordinating entity across existing university research activities. What additional research capacity is being added through GWI, and is it redundant with existing activities? How will redundancy be resolved between the university center and existing university capabilities?
- 1.2 The proposal has 'global' in its name, and a point is made that the initiative will be globally relevant. It is not clear that the proposal is well aligned with Ohio's state priorities, which must remain a priority. We are concerned that the initiative will lose state support if it is seen as overly focused on far away locations that already have international resources focused on them..
- 1.3 Where the proposal does address regional water problems, there is no mention of partnership with other Ohio universities. Would the initiative take the lead within the state to coordinate research and implementation approaches, similar to the proposal for African solutions?
- 1.4 Other partnerships that could be pursued include ones with Battelle Memorial Institute and the national laboratories that it manages. We recognize that the proposal cannot cover all possibilities, but Ohio State's close relationship with Battelle is worth mentioning as a possible partner.
- 1.5 No mention is made of partnership with commissions that govern the Great Lakes. Nor is there mention of entities with significant interests, such as the Ohio Department of Natural Resources (and other states neighboring the Great Lakes) or the University of Wisconsin-Milwaukee Great Lakes Water Institute/School of Freshwater Sciences. Should they be included in planning?

1.6 The proposal does not seem sufficiently inclusive of interests across OSU and its regional campuses—(for example, one of us having lived through the Milwaukee cryptosporidium outbreak wonders where is public health in this initiative; in light of what happened in Flint, Michigan, can social work and other units with a social justice mission be included; and, how might a greater campus presence reflect the initiative's international interests; and, since so much of this proposal involves policy, will partnership with the Glenn College be pursued?

2. Administration/student involvement

2.1 On page 6, the proposal needs to be updated since it still includes earlier roles for Provost Steinmetz and Acting Provost McPheron. It strikes us that it is acceptable to mention Provost Steinmetz as part of the history but not as a current administrative leader. The proposal should note that it is not possible to commit a future Provost to this kind of venture when we do not know who that person will be.

2.2 The section on student involvement is thin, and appears to mention only historical activities. Plans for future student involvement are critical to moving this proposal forward, in our view. The proposal lacks the integration of student learning in the mission. Although a center does not need to create curriculum, to what extent can this center serve students? This GWI presents an opportunity that is not discussed to propose minors (interdisciplinary), majors or certificate programs mentioned; integrative courses; integrative PhD opportunities outlined; or post-docs mentioned in the plan. Can you speak to this deficit?

3. Evaluation metrics

3.1 The proposal lacks specific goals and measureable outcomes by which the initiative can report back to the Committee on Academic Affairs (CAA) on its progress. It is difficult to determine from the proposal what the metrics would be for evaluating the initiative once it becomes a University Center. Clearly, under the rules, the Center would be reviewed on a regular basis in the future but the proposal needs clear metrics of success that will be included (besides, perhaps, having developed some funding) and what funding autonomy might look like.

3.2 The proposal is not clear on the sources of funding. Can a budget be added that shows existing funds, promised funds, and plans for fund raising?

Responses to Questions

1.1 The current proposal says that GWI is a stand-alone research entity. This committee understood the GWI to be a coordinating entity across existing university research activities. What additional research capacity is being added through GWI, and is it redundant with existing activities? How will redundancy be resolved between the university center and existing university capabilities?

The question refers to a sentence from the Introduction to the proposal.

Initially, GWI was framed as a model for emerging Discovery Themes at Ohio State. Today, GWI is a viable, stand-alone research entity as well as a partner of choice for several of the Discovery Themes.

—GWI Institute Proposal, page 3

The Committee's understanding is correct: rather than attempting to accumulate research assets, the GWI is an integrative entity, capitalizing on existing assets and capabilities at the university and with its partners to allow the university to pursue larger aims (funding, projects, research, scholarship) than would be possible with these disparate entities acting alone.

The term “stand-alone” was intended to note that GWI was recognized as an initiative in May 2014; i.e., funds have been provided to support GWI activities by FAES, OR, and OAA; job descriptions have been approved by HR for each key staff position at GWI; and a dean/VP-level Oversight Committee is being established to guide and direct GWI.

The adjective “stand-alone” was not intended to mean that GWI will create its own research teams and not interact with others at Ohio State. GWI is a matrix organization and collaborating with other university organizations and capitalizing on Ohio State faculty and researchers—as well as others—is a key component of its interdisciplinary model.

For example, the Faculty Advisory Committee for GWI is the product of a conscious effort to engage faculty members aligned to the three GWI focus areas, as well as leaders of existing institutes/centers and Discovery Themes focused on water and the key nexus themes that intersect with it: food, energy and health.

It should be noted that GWI was framed by combining the best features of the widely commended Institute for Materials Research (IMR) at Ohio State and the Discovery Themes. On the one hand, GWI acts as a loose “umbrella” entity coordinating large-scale collaborative activities with autonomous but related centers across campus – similar to what IMR does with the Center for Automotive Research, Nanotech West, and the Center for Electron Microscopy and Analysis. On the other hand, it acts as an aggressive business development agent for the university and its collaborative partners with staff on board that can manage complex cross-university, multiple-institution projects.

Similar to the Discovery Themes, GWI realizes that having a core cadre of dedicated staff working with Ohio State faculty and center leads can extend our reach and permit the university to take on challenges/proposals/projects that require greater project management, a broader network of collaborators, access to non-traditional funding, and more complex proposals. GWI hopes to be the catalyst for bringing partners together as needed to pursue larger opportunities that benefit all involved and that would be impossible for any of the disparate entities to achieve without coordination and integration.

In the case of research capacity, the GWI team does not intend to build in-house research capabilities. Rather, the GWI team helps identify and frame collaborative research activities in conjunction with our proposed partners. An illustrative case in point is the integrated research plan between Ohio State and the University of Dodoma (UDOM) faculty that will serve as the foundation for a GWI USAID Higher Education Partnerships for Impact and Innovation (HEPII) proposal that will be submitted this summer. The initial research concepts were reviewed with UDOM during an August 2015 delegation to Columbus, after which each university assigned lead points of contact, with the VP for Research at UDOM as counterpart for the GWI interim director. Discussions and faculty reviews have been conducted to develop collaborative research and education plans in each of the nexus areas of energy, water and health with food to be scheduled.

As of today, the water research and education plan is the most mature of the four nexus areas. Ohio State and UDOM faculty with this broad area of expertise have agreed upon a research agenda and have identified key laboratory assets and test capabilities to pursue (mostly at UDOM) to execute it. In addition to the proposed USAID HEPII proposal, the GWI research and technology lead is now convening a meeting of 27 hydrology-oriented researchers at Ohio State to stimulate complementary research and education related to an integrated water resource plan for Tanzania. In this case, GWI is the catalyst, facilitator, convener to help frame and identify new and innovative research projects, with the execution and funding/scholarly attribution resting in the hands of Ohio State and UDOM faculty, researchers and students.

1.2 *The proposal has ‘global’ in its name, and a point is made that the initiative will be globally relevant. It is not clear that the proposal is well aligned with Ohio’s state priorities, which must remain a priority. We are concerned that the initiative will lose state support if it is seen as overly focused on far away locations that already have international resources focused on them.*

Global relevance of GWI focus areas

As discussed in the proposal, the challenges on which GWI elected to focus its initial efforts were chosen for global applicability. These challenges (listed below) were selected based on many criteria, including resonance with Ohio State strengths and stated institutional priorities, interdisciplinary nature of the problem and solution space, perceived urgency as pressing issues by expert advisors and external organizations including UN, USAID, WHO, UNESCO, WBC, and availability of non-traditional funding sources.

Accordingly, “global” is in the GWI name because GWI intends to deal with issues that have widespread applicability around the world. The word “global” does not signify “international”—we mean it simply to encompass problems that many different regions face. A strong example is harmful algal blooms, which is a problem faced on every inhabited continent. The same Ohio State researchers who are funded through GWI to tackle harmful algal blooms in Lake Erie or Grand Lake St. Marys are also collaborating with colleagues in China, Brazil, Botswana and other countries to tackle these same issues, compare strategies, and ultimately participate in a global-level scholarly dialogue that translates directly to local solutions. The benefit of GWI in such a situation is that we help to raise Ohio State’s profile as a global thought leader in these scholarly dialogues through coordinated proposals and communications.

The GWI focus areas are listed below with an indication of both global and local (Ohio) applicability. At present, the Field to Faucet (harmful algal blooms) focus area has the most direct applicability in the state of Ohio, as noted in the proposal. But all of the GWI focus areas capitalize on Ohio assets and capabilities, brand the university and the state as having innovation solutions, provide for access to new funding sources, and resonate directly with the Ohio State University mission and vision.

| Focus Area | Main Challenge | Geographic Scope of Applicability | |
|--------------------|---|--|--|
| | | Global | Local (Ohio) |
| Field to Faucet | Prevent/mitigate harmful algal blooms (HABs) | Blooms are becoming a public health concern on all inhabited continents. Solutions and BMPs are highly portable. | Local, state and federal legislators are highly concerned about freshwater HABs that affect Lake Erie, many Ohio reservoirs and a wide stretch of the Ohio River. |
| Wells to Wellness | Improve rural water and sanitation access in developing countries | Problem affects over 1 billion people. Key UN Focus Area, key area of industry and foundation interest. | Smarter solutions to rural water management can potentially impact Ohio's rural water quality. Distributed systems solutions can apply to sections of Ohio. Opens portal to world for OSU researchers. |
| Coastal Resilience | Predict/prepare for climate change effects on coastal communities | Sea level rise and severe weather from climate change affect all parts of the world. | Better predictive tools stand to benefit Ohio cities and industries both on Lake Erie and elsewhere. Ohio Sea Grant Program focuses on coastal resilience. |

Issue of GWI's support at the state level

Through its Field to Faucet suite of activities, GWI has the active support of several State of Ohio agencies and has delivered over \$1 million in new funding to Ohio State faculty over the past year directly from the State. These activities are described on p. 9-10 and p. 15-16 of the GWI Institute proposal. The following bullets recapitulate these activities with updated information on events since the proposal was submitted:

- GWI was the architect of the Ohio Department of Higher Education's Harmful Algal Bloom Research Initiative (HABRI), with funding by ODHE and implementation led by Ohio State and the University of Toledo. Compared to previous state-funded research efforts, HABRI is a requirements-focused, solutions-oriented research endeavor that is based on the stated needs of four state agencies (Ohio Environmental Protection Agency, Ohio Department of Natural Resources, Ohio Department of Agriculture, Ohio Department of Health). These agencies have been engaged with HABRI from the beginning—from conception of the initiative to formulation of research requirements to proposal review to project oversight—so that research outcomes reflect their highest priority needs.
- Ohio Sea Grant (part of Ohio State University) was chosen to manage the proposal review and project administration processes due to their reputation as a well-known, well-respected neutral agent by researchers and state agency partners.
- The first round of HABRI funding (\$2 million with 1:1 cost-share by universities) was launched in 2015 with 18 projects from eight Ohio universities. Thirteen Ohio State investigators were funded.
- The second round of HABRI funding (\$2 million with 1:1 cost-share by universities) was announced Feb. 24, 2016. GWI, in partnership with Ohio Sea Grant, was again a driving force in this initiative, from the development of research requirements with OEPA, ODNR, ODA and ODH to proposal review to drafting the press release on behalf of ODHE. Thirteen projects were funded with researchers participating from eight Ohio universities (slightly different from first round, with a total of ten Ohio universities and colleges engaged over both years). Eleven Ohio State researchers were funded on five projects in the second round of funding.
- GWI is already leading discussions with state agencies about how to leverage even greater funding and regional (not just state of Ohio) collaboration for the third round of HABRI to launch in 2017. Early conversations with the directors of state agencies (e.g., a two-hour ideation session with the director of OEPA in January 2016) have identified areas where State of Ohio agency needs align with the priorities and compliance requirements of regional agencies and agreements such as the Western Basin of Lake Erie Collaborative Agreement, Annex IV of the Great Lakes Water Quality Agreement, the Great Lakes Commission, the Alliance for the Great Lakes, the Nature Conservancy, and the USDA Natural Resources Conservation Service.

In summary, GWI has strong relationships with state entities, both in government as well as with nine other academic institutions with which it is collaborating to execute HABRI research and outreach and engagement.

Rather than see GWI's interest in global challenges as a negative, the contacts we are interacting with at the state level see it as positive, since it will help position Ohio in the global marketplace and it will help attract funding for research and educational activities from key international groups and firms. The GWI team is supporting several initiatives intended to attract foreign investment and new research and educational opportunities to Ohio State, and we are

getting great support from key regional organizations.

Question of whether “Ohio’s state priorities” must take precedence in institute creation

We interpret this concern as stemming from the land-grant charter of the university, which has historically been interpreted as applying primarily to the citizens of Ohio. We are confident that we have demonstrated the relevance of GWI activities to the state of Ohio with our discussion above.

In addition, it should be noted that in recent years, both the Office of Academic Affairs (Discovery Themes initiatives; university mission, vision) and the Office of the President have explicitly expanded Ohio State’s purview beyond the borders of the state and the nation to a global context and to solving pressing global concerns. By focusing on issues that have relevance both at home and abroad, the GWI seeks to help create the land-grant university of the future, where the solutions to seemingly distant problems create knowledge that can translate to problems at home—and vice versa.

The Ohio State University will be the world’s preeminent public comprehensive university, solving problems of world-wide significance.

—Ohio State Vision

We exist to advance the well-being of the people of Ohio and the global community through the creation and dissemination of knowledge.

—Ohio State Mission

The capacity of The Ohio State University to address compelling problems that we face in the world is unmatched. It really is a national university—its size and scope are such that it’s relevant across this country and around the world in so many ways.... Our test bed has been Ohio, and we’ve done wonderful things to raise the level of productivity and the level of the economy and the standard of living in Ohio in the 145 years that we’ve been here. It’s been incredible, and we enjoy very much having partnerships in other parts of the world that allow us to extend that reach a little more.

—President Michael Drake, M.D., Comments to Tanzania Delegation 2015

1.3 Where the proposal does address regional water problems, there is no mention of partnership with other Ohio universities. Would the initiative take the lead within the state to coordinate research and implementation approaches, similar to the proposal for African solutions?

Partnerships with other Ohio universities that are part of the current Field to Faucet suite of activities are described on p. 9-10 and p. 15-16 of the proposal and in the response to question 1.2 above. Collaborating universities are listed below. GWI's coordinating role in the ODHE Harmful Algal Bloom Research Initiative is described above and on those pages.

Ten Ohio universities have participated over two annual funding rounds of HABRI, and all of the funded research projects represent collaborations between at least two Ohio universities.

1. Ohio State University (initiative co-chair)
2. University of Toledo (initiative co-chair)
3. University of Akron
4. Heidelberg University
5. University of Cincinnati
6. Bowling Green State University
7. Central State University
8. Sinclair Community College
9. Kent State University
10. Defiance College

Attached is a copy of the press release the Chancellor of ODHE released last week announcing the Round 2 HABRI proposals. As you can see, collaborative research is a critical element of HABRI. In addition to enabling collaborations between faculty at the Ohio research universities, this initiative is also providing critical hands-on training for graduate students at the participating universities, which is highly valued by the Chancellor.

Not surprisingly, the GWI Ohio State-University of Toledo team hopes to expand HABs collaboration in Lake Erie with research universities in Quebec, Michigan and Indiana – all located on the Lake and all active in research and outreach at many levels of the problem. Federal funding options are now being assessed towards this end.

It should also be noted that the NSF Lake Erie Science and Technology Center and the NSF Engineering Research Center pre-proposals spearheaded by GWI and led respectively by Linda Weavers (COE) and Scott Shearer (FAES), integrated key researchers from not only across the midwest but also Canada, Ireland and the Southeast.

So the answer to the question is – whether the focus is Field to Faucet, Wells to Wellness or Coastal Resilience, GWI will foster and promote collaboration across the colleges, centers and Discovery Themes at Ohio State and with external parties for the projects that it is spearheading or leading.

1.4 Other partnerships that could be pursued include ones with Battelle Memorial Institute and the national laboratories that it manages. We recognize that the proposal cannot cover all possibilities, but Ohio State's close relationship with Battelle is worth mentioning as a possible partner.

As a former Vice President/General Manager of Battelle, GWI interim director Marty Kress still has strong ties with Battelle and he shares the Committee's view that Battelle is a key asset in the portfolio of GWI activities. Several key collaborators at Battelle have been briefed about the GWI concept and potential opportunities to collaborate. Marty has also been working closely with the OSU-Battelle Senior Researcher on this initiative, who has contributed key inputs to the proposed construct and to the core systems being considered for use in the Wells to Wellness program in Tanzania. In particular, he helped convene a meeting with key experts from ARPA-E, DOE and Battelle on energy storage solutions applicable to water systems. Based on that interaction, GWI is now assessing the feasibility of using refurbished car batteries for energy storage in remote areas.

As GWI further assesses options for distributed energy systems in Tanzania, it is confident that its relationship with Battelle will be strengthened and some of their key capabilities will be integrated into future projects.

At the same time, GWI is in discussions with other national labs and federal agencies regarding assets and capabilities that might be brought to bear to its Tanzania, Coastal and Lake Erie initiatives. For example, discussions about innovative applications of unmanned aerial systems (UAS) for communications, remote sensing, disaster relief, and sustainable agriculture have been initiated with NASA GRC, AFRL and NOAA and further discussions are anticipated.

In addition, GWI has also engaged with DOD and the Africa Command about a new United Nations initiative regarding the transition of DOD technologies for water purification, communications, power systems and health to Africa. GWI has been notified that it will be invited to the first meeting of the groups in March. Based on the quality of these interactions, DOD was one of the key sponsors of Ohio State/GWI in its recent application for membership in the US Water Partnership.

Lastly, we would be remiss if we did not note the key role that the USEPA water quality research center in Cincinnati played in helping to frame both Field to Faucet and the Harmful Algal Bloom Research Initiative (HABRI). EPA staff provided great insight regarding research gaps and critical needs.

In framing the proposal, the team erred on the side of not trying to list everyone it has interacted with. While GWI can say it has staff support at Battelle, it is premature to say it has Battelle support. As the concept evolves, GWI will assess collaborations with Battelle and other key research groups depending on the nature of the project, the end user requirements, and the available funding.

1.5 No mention is made of partnership with commissions that govern the Great Lakes. Nor is there mention of entities with significant interests, such as the Ohio Department of Natural Resources (and other states neighboring the Great Lakes) or the University of Wisconsin-Milwaukee Great Lakes Water Institute/School of Freshwater Sciences. Should they be included in planning?

GWI has intentionally aligned its Field to Faucet (F2F) suite of research activities with state, regional, national, and international agreements and priorities. While not explicitly stated in GWI's institute proposal, these criteria played a key role in the interactions with the State of Ohio that have resulted in the development of the Harmful Algal Blooms Research Initiative (HABRI). The basic goal of F2F and HABRI—to support research to reduce nutrient runoff in Lake Erie—is based on Annex IV of the Great Lakes Water Quality Agreement. The core team for the Field to Faucet initiative—Marty Kress, Jeff Reutter, Chris Winslow, Jay Martin, Kate Barter—all have key interfaces with the commissions for the Great Lakes Region as well as several of the key nonprofit organizations in the region. Included in this list are the International Joint Commission, the Lake Erie Protection Fund, the Great Lakes Sea Grant Network, Annex 4 Objectives and Targets Task Team, etc. In addition, as noted in the response to question 1.2 above, the Ohio Department of Higher Education, Ohio Environmental Protection Agency, Ohio Department of Natural Resources, Ohio Department of Agriculture and Ohio Department of Health are all involved in the Lake Erie programs.

This issue is discussed in the response to question 1.2 above and on p. 9-10 of the proposal. Expansion of the statewide harmful algal bloom collaboration to include other Great Lakes states and provinces is also discussed above in responses to questions 1.2 and 1.3.

To date, the consortium has focused on Lake Erie as a starting point because its algal issues are the most severe and because the state of Ohio is the most affected by Lake Erie harmful algal blooms (both as a source of nutrients and as a recipient of consequences). In the context of Lake Erie, GWI is actively pursuing regional collaborations. For example, an Ohio State research team integrated the Universities of Michigan and Toledo into an ensemble modeling project for the second round of HABRI funding.

The interim director of GWI met with the Great Lakes Water Institute at the Water Council Meeting in Milwaukee, and it is likely that GWI will have a representative at this meeting again this year. But as of today, there are no active discussions for collaborating on a targeted project with the University of Wisconsin-Milwaukee. Based on GWI's assessment of the new Moonshot for Water initiative and its possible collaboration to frame a new National Network for Manufacturing Innovation (NNMI) proposal based on water research, new collaborations could be framed and key groups on Lake Michigan would be great partners.

1.6 *The proposal does not seem sufficiently inclusive of interests across OSU and its regional campuses—(for example, one of us having lived through the Milwaukee cryptosporidium outbreak wonders where is public health in this initiative; in light of what happened in Flint, Michigan, can social work and other units with a social justice mission be included; and, how might a greater campus presence reflect the initiative’s international interests; and, since so much of this proposal involves policy, will partnership with the Glenn College be pursued?*

Role of public health in GWI

- Faculty in the College of Public Health have been engaged since the beginning of the Global Water Initiative, including two faculty investigators under the Field to Faucet focus area (proposal p. 16), a collaboration under discussion for the Wells to Wellness focus area (not discussed in the proposal as it is not yet formalized), and the service of two CPH faculty on the GWI Faculty Advisory Committee (proposal p. 25-26).
- Other involved faculty who do not reside in the College of Public Health but deal centrally with issues of public health include the head of the College of Medicine’s Global Health Program and the head of the multi-college One Health Program spearheaded by the College of Veterinary Medicine. Both of these faculty serve on the Faculty Advisory Committee (proposal p. 25-26).
- Perhaps a useful parallel example to the cryptosporidium outbreak is the 2014 drinking water crisis in Toledo caused by harmful algal blooms, which was the impetus for both Field to Faucet (F2F) and the state-funded Harmful Algal Bloom Research Initiative (HABRI) discussed above. Not only were Ohio State faculty called upon for expert consultation in the height of the crisis, F2F and HABRI created a solutions-oriented, near-term set of research opportunities inspired by state agencies at the front lines of the crisis. A number of critical unknowns regarding the best way to configure water treatment plants to remove algal toxins—directly analogous to the cryptosporidium issue—are now both better understood and results have already been incorporated by treatment plant operators in 2015. GWI played a coordinating, integrating role throughout this process, and the same faculty that were called upon during the Toledo crisis are (by virtue of their expertise and stature in the region) now investigators under Field to Faucet and, in some cases, GWI Faculty Advisors (proposal pages 16 and 25-26 respectively). GWI will take the same role with respect to issues of lead contamination in municipal water.

Engagement with regional campuses

- GWI regularly engages with faculty at the OARDC and ATI. Three examples include Yebo Li, a funded Field to Faucet investigator; Casey Hoy, the lead for the Initiative for Food and Agricultural Transformation (InFACT) Discovery Theme with which GWI is exploring collaboration; and Victor Ujor, the new lead for renewable energy who has a keen interest in the Tanzanian initiative.
- Interim Director Marty Kress has met with Dean Gavazzi at Mansfield to explore potential collaboration there, particularly in the area of sustainable forestry as it impacts land and water (relevant both in Ohio and in Africa). Dean Gavazzi has also asked Marty to help with his EcoLab Vision.

Response to Flint

- In light of the ongoing crisis in Flint, GWI has initiated conversations with state officials and has conducted a survey of capabilities at Ohio State among its faculty affiliates.

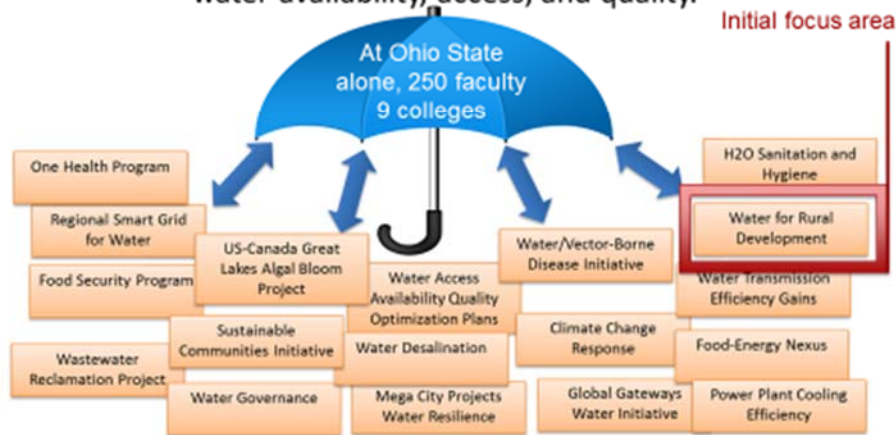
These actions are preparatory to either 1) receiving a request from state or local governments to provide service or expertise as a university, and/or 2) proactively organizing an initiative from Ohio State. In the latter case, we would certainly be open to collaboration with the College of Social Work.

Role of policy and potential for future collaboration with Glenn College

- GWI is most interested in collaborating with faculty and centers across the university. As a new entity, we know that we have to carefully focus our resources and staff if we are to succeed. GWI frames proposal and project teams based on the requirements of the opportunity/challenge. At present, there has been a limited need for policy analysis, since the State of Ohio was not interested in funding this focus area for the HABRI. There is a role for the social sciences in the Tanzanian initiative, and discussions are underway with many faculty across the university.



GWI would be an umbrella that would support various specific, targeted, interdisciplinary projects focused on water availability, access, and quality.



- As for collaboration with the Glenn College, the above chart was part of the May 2014 briefing to then Provost Steinmetz. As it shows, in addition to Water for Rural Development, the initial focus of GWI, there are many other emerging water issues that could be candidates for collaboration between GWI and the Glenn College or new Glenn-based initiatives. Included in this list are transboundary water issues, water pricing, infectious disease, water waste, market-based incentives, innovative policies and technologies to optimize water use, contamination of public water distribution systems, the impact of climate change on water treatment facilities, dumping in Lake Erie, a water trust fund in Ohio, etc. The UN's recognition of sanitation and access to clean water as fundamental rights was a key catalyst for policy discussions and project definition in the developing world. But policy issues abound at the local, state, regional, national and global levels. There is no shortage of opportunities – just a shortage of resources.

How a greater campus presence would align with GWI's international focus

- As discussed in the Student Involvement section of the proposal (p. 19-20), GWI receives overwhelmingly more interest from students in engaging with our international projects than with any of the more domestically oriented activities. We anticipate that greater prominence for GWI (both in the form of formal institute recognition and in stronger collaborations with academic units) will only increase the level of interest we experience from both students and faculty in international development work. We also hope it will enable us to support more student engagement both in and out of the classroom.
- GWI's capstone and applied projects activities with the College of Engineering (COE) and Fisher College of Business—funded by the Office of Energy and Environment—are one key reason for this interest. But the emergence of the Humanitarian Engineering Program; the new COE course Appropriate Technology for Developing Countries; the service learning initiatives at COE, FAES and other colleges; the new Pure Water Access Project non-profit started by Ohio State medical students; the Hydropolitics lecture series at Mershon; the One Health initiatives; and the new Ohio State Global Gateways have also had a profound impact on OSU students and their interest in food, energy, water and health issues in the developing world.
- When GWI was initially assessing its options for thematic focus areas, a key factor for selecting rural water development was the stature of Ohio State in producing Peace Corp volunteers and the suite of international projects the university already had underway including iAGRI in Tanzania, the university's largest international activity. GWI is pleased to note that several of those Peace Corps volunteers have returned and they now support our capstone projects. Indeed, that initial assessment underestimated the level of student interest in projects that address critical global needs.

2.1 On page 6, the proposal needs to be updated since it still includes earlier roles for Provost Steinmetz and Acting Provost McPheron. It strikes us that it is acceptable to mention Provost Steinmetz as part of the history but not as a current administrative leader. The proposal should note that it is not possible to commit a future Provost to this kind of venture when we do not know who that person will be.

The proposal has been updated on pages 5 and 6 to update the current roles for Drs. Steinmetz and McPheron.

The proposal does not presume to speak for any future provost. The statements in the final paragraph on p. 6 simply indicate that a large number of current and past university leaders—as well as others inside and outside the university—have expressed support for the promotion of GWI from “initiative” to “institute” status.

As you already know, the proposal was submitted on November 13, 2015 for a second time. The October 2014 submission was put on hold due to the restriction on the creation of any new institutes until the leadership team had resolved some core issues. It was in late August 2015 that then Provost Steinmetz gave GWI the green light to resubmit and we immediately began working towards that goal with Vice Provost Randy Smith.

At the time of submission we did know that Dr. Steinmetz was leaving, but we did not yet know who the interim provost would be.

2.2 The section on student involvement is thin, and appears to mention only historical activities. Plans for future student involvement are critical to moving this proposal forward, in our view. The proposal lacks the integration of student learning in the mission. Although a center does not need to create curriculum, to what extent can this center serve students? This GWI presents an opportunity that is not discussed to propose minors (interdisciplinary), majors or certificate programs mentioned; integrative courses; integrative PhD opportunities outlined; or post-docs mentioned in the plan. Can you speak to this deficit?

Education and student engagement in research are a key part of GWI's vision for the role it can serve as a university institute. We are happy to elaborate on that here. The descriptions of past student involvement activities were included in the proposal to show that despite its recent launch (May 2014), GWI already has a track record of student engagement.

GWI will and does enthusiastically support genuine grass-roots efforts by its faculty collaborators to enhance the student experience through institutional processes such as the proposing of new majors, minors or other programs. This support may include networking, coordination, advocacy, proposal development and other services. However, on its own, GWI has made a strategic decision to limit its own forays into these time- and energy-intensive processes separate from a coalition. (For example, the campus dialogue surrounding an undergraduate Water major are at least 15 years old, predating the tenure of GWI and any of its staff at Ohio State.) We feel that within our leaner working model, we can have much greater impact on the student experience by concentrating on providing opportunities that students cannot easily find elsewhere at Ohio State. Specific areas of focus include:

- Distance and e-learning (discussed in the proposal)
- Sponsored interdisciplinary capstone experiences (discussed in the proposal)
- Undergraduate, graduate and post-doctoral research
 - Supporting major center proposals (in the last year have coordinated NSF Science and Technology Center and Engineering Research Center proposals) that offer innovative, interdisciplinary opportunities for trainees at all levels
 - Integrating students into funded research (already underway in Field to Faucet and Wells to Wellness focus areas)
- Supporting initiatives by collaborating faculty, e.g., Humanitarian Engineering Center and Minor

An illustrative example of the role GWI envisions for itself with respect to student programs is a proposed Tanzanian study abroad program in development between the Colleges of Food, Agricultural and Environmental Sciences and the College of Engineering. The program concept is the result of two faculty members meeting at a GWI event. One of the faculty led a GWI-sponsored capstone engineering project and trip to Tanzania and the other applied for a pending Fulbright application as a direct result of GWI support and facilitation. Naturally, GWI was delighted at the unforeseen collaboration between these two colleagues to meet a mutual need—for their undergraduate students to have access to a set of rural villages in a (stable, accessible) developing country where Ohio State has a long-term relationship with the community and where mutual trust has been established for Ohio State faculty and students to offer technical and other types of support as learning and research experiences. Since the collaboration between these two faculty began in November 2015, their respective chairs and college representatives have been engaged with positive results such that the program is

expected to launch in the 2017-2018 academic year. In addition, the team has submitted four proposals—with GWI support—for seed funding to launch the program with matching funds from the participating units.

3.1 The proposal lacks specific goals and measureable outcomes by which the initiative can report back to the Committee on Academic Affairs (CAA) on its progress. It is difficult to determine from the proposal what the metrics would be for evaluating the initiative once it becomes a University Center. Clearly, under the rules, the Center would be reviewed on a regular basis in the future but the proposal needs clear metrics of success that will be included (besides, perhaps, having developed some funding) and what funding autonomy might look like.

Metrics for success

Quantifiable metrics for success/criteria for evaluation are outlined on p. 31 of the proposal. As noted in the proposal, these metrics will be assessed and updated by GWI's various oversight and advisory committees. A key goal for the first meeting of the GWI Oversight Committee, chaired by the university Vice President for Research, is to secure approval of these overall metrics for GWI. GWI would be happy to answer specific questions from the Subcommittee about any of these metrics.

Note: In addition to the overarching metrics for GWI, GWI will also frame metrics for the key research and programmatic activities it engages in.

A vision for funding autonomy

Please see response to question 3.2 below.

3.2 The proposal is not clear on the sources of funding. Can a budget be added that shows existing funds, promised funds, and plans for fund raising?

Existing, promised and targeted funds are described on p. 28-29 of the proposal, but we are happy to elaborate here. The numbers that are included in the tables below have been checked and approved by the business manager for the Office of Research.

| Operating Expenses | FY 2016 | FY 2017 | FY 2018 |
|---------------------------------------|------------------|------------------|------------------|
| Personnel ¹ | 741,000 | 832,000 | 749,000 |
| Faculty Grants ² | 100,000 | 100,000 | 100,000 |
| Student Activities/Capstones/Projects | 20,000 | 20,000 | 20,000 |
| Consulting Agreements/Subcontracts | 125,000 | 75,000 | 50,000 |
| Conference/Forum -- Annual Event | 25,000 | 25,000 | 25,000 |
| Travel ³ * | 50,000 | 50,000 | 50,000 |
| Office Operations * | 10,000 | 10,000 | 10,000 |
| Space | 0 | 0 | 0 |
| Projected Budget | 1,071,000 | 1,112,000 | 1,004,000 |

¹ Executive Director, Lead Systems Engineer, and Senior Research Associate will partially bill to projects as they come online.

² For externally funded grants, GWI is including funding for faculty grants and student activities above.

³ Travel assumes at least 6 international trips, 15 to US cities, and 15 to Ohio venues per year.

* Project travel and operations costs associated with projects will be billed as a project expense.

| Existing and Promised Internal Funds | FY 2016 | FY 2017 | FY 2018 |
|---|------------------|------------------|----------------|
| Existing Central (OAA) Funding | 500,000 | 250,000 | |
| Existing CFAES Funding | 100,000 | 100,000 | 100,000 |
| Existing OR Funding | 347,000 | 347,000 | 347,000 |
| COE Commitment | | 150,000 | 150,000 |
| FCOB Commitment--TBD | | | |
| CAS Commitment | | 150,000 | 150,000 |
| Prior Year Unobligated Funds | 225,000 | 100,000 | 0 |
| Internal Funding | 1,172,000 | 1,097,000 | 747,000 |

It should be noted that the out-year funds listed (FY 2017 and 2018) are still projections. GWI is engaged with OAA in a new process to frame MOUs with its supporting organizations. The initial meeting on this new process was held on February 26. The expectation is that GWI will have MOUs with its key internal sponsors and investors by the end of May 2016. As such, a current projection could go up or down, and there are a lot of meetings and negotiations still to take place on behalf of GWI.

| Existing, Targeted External Funds | FY 2016 | FY 2017 | FY 2018 | Notes |
|---|-----------------------------|---------------------|-----------------------------|---|
| 1. Field to Faucet | | | | |
| Existing | | | | |
| ODHE Funding -- HABRI | 2,000,000 | 2,000,000 | 2,000,000 | Funding in hand for '16 Discussions Underway |
| Project Matching Fund | 1,000,000 | 1,000,000 | 1,000,000 | |
| Baseline GWI Funding | 3,000,000 | 3,000,000 | 3,000,000 | |
| Targeted | | | | |
| Federal | | | | |
| NSF Food, Energy, Water | 1,000,000 | 1,000,000 | 1,000,000 | Proposal Due March 22 Target in 2018 |
| NSF S&T Center | | | | |
| 2. Coastal Resilience | | | | |
| UNESCO Coastal Resilience Funding | | 1,000,000 | 2,500,000 | Discussions Initiated |
| Long Term Monitoring of Bangladesh Coastal Zone | 3,200,000 | 3,200,000 | 3,200,000 | Pending Proposal |
| Downstream Water Resources Management in Bangladesh | 150,000 | 150,000 | 150,000 | Pending Proposal |
| 3. Wells to Wellness | | | | |
| Grant Funding -- GWI-WE³ Program | | | | |
| Monsanto Foundation | 1,000,000 | 1,000,000 | 1,000,000 | Proposal Due Feb 29 |
| Abbott Foundation | 250,000 | 250,000 | 250,000 | Proposal Submitted |
| Coca Cola Foundation | 2,000,000 | 5,000,000 | 5,000,000 | Proposal being assessed |
| Nestle Foundation | 1,000,000 | 1,000,000 | 1,000,000 | Concept paper submitted |
| Gates Foundation | | | | Being Developed with Advancement/Ohio State Foundation |
| USAID Funding -- GWI-WE³ Program | | | | |
| HEPII | 1,000,000 | 2,000,000 | 2,000,000 | Proposal Due Last Summer 2017 |
| WADA | 2,000,000 | 5,000,000 | 5,000,000 | Open Task Order -- GETF |
| American Schools/Hospitals Abroad Program | 1,500,000 | | | Proposal Due May 2 -- Assessing Eligibility |
| Global Development Alliance | | | | Discussions Underway with Partners |
| Power Africa Funding | 250,000 | 250,000 | 250,000 | Discussions Initiated |
| DOE Funding | 250,000 | 250,000 | 250,000 | Discussions Initiated |
| Best Case Scenario (100% win rate) | 13,600,000 | 20,100,000 | 21,600,000 | |
| <i>25% capture rate</i> | <i>3,400,000</i> | <i>5,025,000</i> | <i>5,400,000</i> | |
| <i>50% capture rate</i> | <i>6,800,000</i> | <i>10,050,000</i> | <i>10,800,000</i> | |
| <i>75% capture rate</i> | <i>10,200,000</i> | <i>15,075,000</i> | <i>16,200,000</i> | |
| Revenue Forecast | \$3.4M - \$10.2M | \$5M - \$15M | \$5.4M - \$16.2M | These are in addition to State Baseline Funding for HABRI |

Note: There are other proposal opportunities that were not included in this list. For example, the GWI Team is still assessing the White House Moonshot for Water initiative, which is funded by multiple federal agencies and could provide opportunities in all three focus areas. The team is also working to gain more insight into the Great Lakes initiative being led by the U.S. State

Department.

Our goal in this discussion is to highlight the fact there are emerging opportunities in this domain and a well-established institute at Ohio State can be capturing them on behalf of faculty, researchers and students to our mutual benefit. Many of the proposals on the GWI list require a full-time team layered with faculty, key external collaborations, the integration of assets from several colleges, as well as a combination of business and organizational innovation.

It also should be noted that GWI is intimately engaged in many of the highlighted procurement activities but only peripherally engaged in others. For example, the GWI Senior Faculty Lead is engaged in the NSF INFEWs proposal, but the core team for GWI has focused their time and attention recently on a proposal to the Monsanto Foundation, the pending USAID HEPII proposal, and preparations for meetings with Coca Cola and Nestle.