GRAHAM SUSTAINABILITY INSTITUTE
UNIVERSITY OF MICHIGAN

ANNUAL PROGRESS REPORT
September 2012 - August 2013

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A Message from Director Don Scavia

Welcome to our 2012-13 Annual Progress Report. As I complete this five-year term as director of the Graham Sustainability Institute, I could not be more proud of what we've accomplished – and I am excited by how much more the Institute will accomplish in the years ahead. This important work would not be possible without the tremendous financial support we receive from a broad range of individuals, foundations, corporations, government agencies, and the university. We are also indebted to our many advisors – within and outside the university – who provide us with wide-ranging perspectives and guidance that ensures our work is scholarly, productive, and relevant. And of course, our outstanding team of dedicated staff professionals deserves the lion's share of the credit for driving our progress forward year after year. I invite you to read the pages ahead to learn more about our work from the past year.

Graham Family Professor and Director

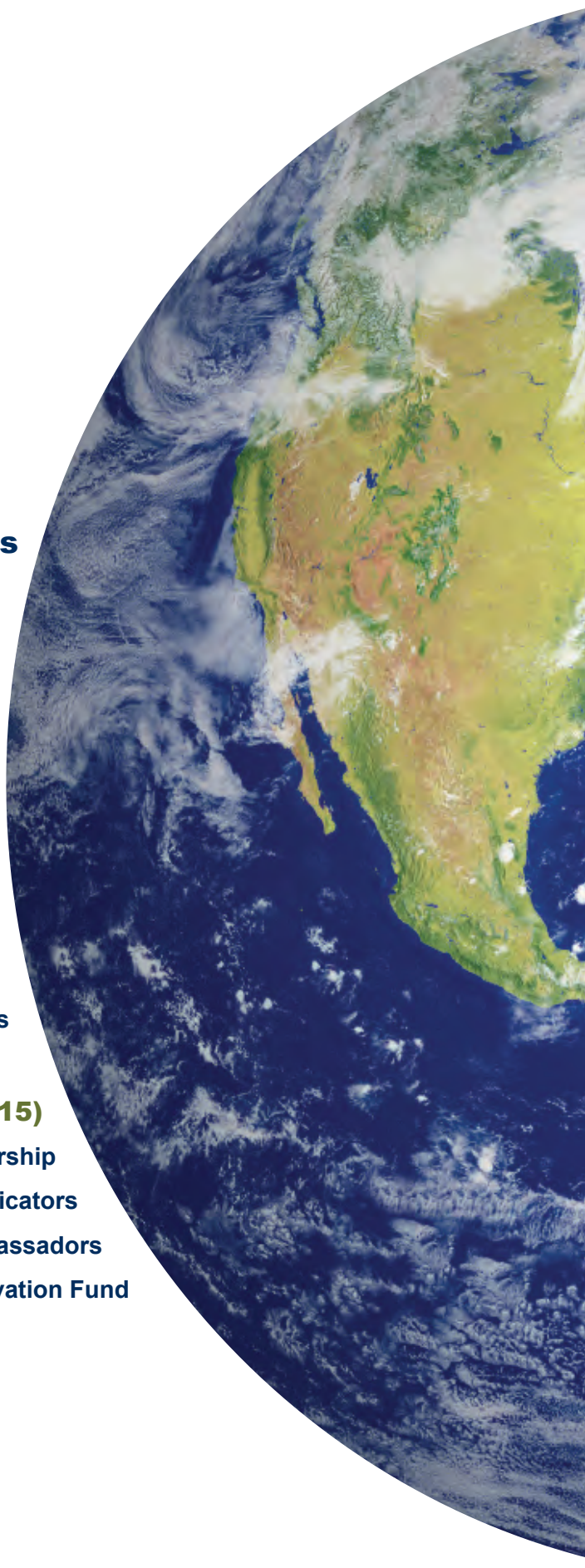
ABOUT THE INSTITUTE

The Graham Sustainability Institute is a University of Michigan (U-M) Provost's unit. We foster sustainability at all scales by leading stakeholder-centric activities that bring together and harness talents across all U-M schools, colleges, and units. Our work focuses on three key areas:

Translational Knowledge: We lead vibrant collaborations among academic, practitioner, and other stakeholder communities to advance sustainability scholarship and to influence decisions that protect the environment and enhance quality of life for present and future generations.

Transformative Learning: We cultivate sustainability leadership by helping students engage across disciplines, employ systems thinking, experience diverse stakeholder perspectives, and pursue action-based learning opportunities throughout the world.

Institutional Leadership: We advance the University of Michigan's presidential initiative – Planet Blue – by serving as the university's designated sustainability liaison, and by guiding institutional discussions, planning, and coordination for U-M sustainability activities.



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TRANSLATIONAL KNOWLEDGE

We lead vibrant collaborations among academic, practitioner, and other stakeholder communities to advance sustainability scholarship and to influence decisions that protect the environment and enhance quality of life for present and future generations. Here, we report on this year's accomplishments within key elements of our "Translational Knowledge" theme, including our Integrated Assessment Center; new Water Center; Climate Adaptation Center; and the Michigan Journal of Sustainability.

Integrated Assessment

We address real-world sustainability problems through an interdisciplinary and collaborative research methodology known as Integrated Assessment (IA), which actively engages subject matter experts, decision-makers, and key stakeholders to outline viable pathways toward sustainability solutions. This report covers the following IA projects: Hydraulic Fracturing in Michigan; Great Lakes Adaptation for Cities; Sustainability in Detroit; International Water & Health; and Advancing Livable Communities through Sustainable Transportation.

Hydraulic Fracturing in Michigan

There have been numerous scientific studies about hydraulic fracturing in the United States, but none with a focus on Michigan. In response to that gap, and in partnership with U-M's Risk Science Center, Energy Institute, and Erb Institute, we are engaging U-M faculty and students, and representatives from industry, environmental organizations, and state government, to examine multiple aspects of this gas extraction technique, with an emphasis on impacts and issues related to the State of Michigan. Using the IA approach, the project combines multidisciplinary technical analysis with active stakeholder engagement to identify potential policy options for Michigan.

Key Successes

- **COMPLETION & RELEASE OF TECHNICAL REPORTS:** Over the last year, faculty-led and student-staffed teams from multiple U-M units (Business, Engineering, Ecology & Evolutionary Biology, Law, Natural Resources & Environment, Public Health, and the Institute for Research on Labor, Employment, & the Economy) prepared technical reports focused on seven critical areas related to drilling for shale gas in Michigan. The reports were released in September 2013 following a peer-review process. Taken together, the reports form the most comprehensive Michigan-specific resource on hydraulic fracturing and will help inform the IA to be completed by mid-2014. The reports, which are available on our website, cover: technology; geology/hydrogeology; environment/ecology; human health; policy/law; economics; and social/public perceptions.

- **ENGAGEMENT:** In March 2013, we held a public meeting in Lansing to provide an overview of the IA approach, including a panel presentation and discussion with the technical report lead authors. In addition, state regulators, oil and gas industry representatives, staffers from environmental non-profits, and peer reviewers provided input to the technical reports, and more than 100 public comments were received and considered. We also held a public webinar to answer questions and kick off an official 30-day public comment period to gather additional input to help inform the IA. During that period, more than 1,200 technical reports were downloaded from our website, and we received more than 230 comments.

Future Plans

The focus of the project now turns to preparing the formal Integrated Assessment, which will identify and analyze key strategies and policy options for State of Michigan. The draft IA will receive both public and peer review; the final report is scheduled to be available by the second half of 2014.

Great Lakes Adaptation Assessment for Cities (GLAA-C)

Through additional support from the Kresge Foundation, and in collaboration with our Climate Adaptation Center's Great Lakes Integrated Sciences + Assessments (GLISA) project, GLAA-C brings together researchers and practitioners to develop actionable climate adaptation strategies for six cities in the Great Lakes region, and it provides a model and tools for other cities.

Key Successes

- **CITY SELECTION:** We are engaging six participant cities (Ann Arbor, MI; Flint, MI; Dayton, OH; Kingston, ON; Thunder Bay, ON; and Toledo, OH), selected based on project commitment and diversity in terms of both micro-climates and socioeconomic characteristics. We created joint work plans and key research initiatives targeting the needs and priorities of each city.

- **STUDENT RESEARCH:** We sponsored several student research projects on climate change adaptation in the Great Lakes region, including two master's projects and two doctoral dissertations. The latter are evaluating the health impacts of extreme heat events among vulnerable populations.

- **ENGAGEMENT:** We co-organized and participated in climate change adaptation workshops with four cities (Dayton, OH; Toledo, OH; Minneapolis, MN; and Saint Paul, MN), and participated in local and national dialogues with two primary objectives to: 1) build better methods for delivering case studies and resources to end-users and 2) develop shared communication tools and resources to more effectively communicate issues of climate change and adaptation throughout the region.

- **NEW INTERACTIVE ONLINE MAP:** In collaboration with Headwaters Economics (also funded by the Kresge Foundation), we developed and launched an innovative, interactive tool that gives Great Lakes policymakers and decision-makers easy access to the targeted data they need to plan for, and adapt to, the regional impacts of climate change. The free online tool—called the "Socioeconomics and Climate Change in the Great Lakes Region Map"— provides social, economic and demographic statistics on 225 individual counties in the region, overlaid with detailed data about municipal spending, land-use change and climate-change characteristics. The primary use of the map is to enhance assessment of social and infrastructure vulnerabilities.

Future Plans

As GLAA-C enters the third and final year of the project proposal, we will significantly increase the development, distribution, and application of the Socioeconomics and Climate Change in the Great Lakes Region Map, and support small projects in each of the six cities to move these cities from education and capacity-building toward strategy development and implementation.

Sustainability in Detroit

The Integrated Assessment program is supporting two related projects aimed at providing tools and analysis to help decision makers and stakeholders include sustainability in their planning efforts in Detroit. In both projects, we partnered with Data Driven Detroit (D3), a regional nonprofit organization that provides accessible, high-quality information and analysis to drive decision-making that strengthens communities in Southeast Michigan. Over the past year, we worked toward completing the "Detroit Sustainability Indicators" project, and we kicked off the "Driving

Detroit Forward with Data" project to: 1) build the capacity of decision makers and 2) provide a forum for data driven discussions of Detroit's sustainability challenges and opportunities.

Key Successes

- **NEW PARTNERSHIPS & OUTREACH:** The former U-M Center for Advancing Research and Solutions for Society (CARSS) provided funding for us to conduct workshops over the next three years focused on using the sustainability indicators and other data for interventions in community planning in Detroit.

- **ENGAGEMENT:** Over the summer, we participated in myriad workshops with neighborhood groups, environmental justice organizations, city government, foundations, and others to introduce participants to our indicators and D3's capabilities and receive input on the community's data needs.

- **RESEARCH PROJECTS:** Over the past year, we supported several related research projects investigating sustainability issues in Detroit: air pollution patterns; landscape care, commitment and investment in vacant residential areas; water quality and watershed management; economic disparity and federal investment trends; and development of a sustainability index. See faculty involved on the Graham website.

Future Plans

We will disseminate project data to the public and D3 by December 2013. Teams will deliver their spatial data to D3, who will develop online visualization tools that allow users to access and compare our data with other D3 data sets. Each project will also produce a report with recommendations for data use and policy considerations for decision makers using the data. Three more workshops will be held each summer in 2014 and 2015.

HOPE Village Initiative

We are partnering with Focus: HOPE, a nationally recognized civil and human rights organization in Detroit, on an IA to support their comprehensive place-based effort known as the HOPE Village Initiative. The goal of the initiative is to improve the education, economic self-sufficiency, and environment for all residents in a 100 square block area surrounding the Focus: HOPE campus. The IA recognizes that Focus: HOPE's success is tied to sustainability factors including the physical environment, economic development, community health, and education. Through collaboration with researchers, residents, and Focus: HOPE staff, the IA will help develop data, tools, and policies to advance the HOPE Village Initiative.

Key Successes

- **RESEARCH PROJECTS:** Several faculty-led teams conducted research for this 18-month IA over the past year, with all projects actively engaging community members. Objectives of these projects include:
  - Developing a framework for neighborhood improvement to attract investment
  - Developing a streetscape plan to make streets safer and more usable
  - Establishing interdisciplinary baseline measurements to track the short- and long-term effectiveness of the initiative
  - Helping mobilize a formal, fundable community based educational network
  - Developing an affordable housing cooperative
  - Putting HOPE Village at the forefront of plans for a 26-mile Greenway though Detroit, Highland Park, and Hamtramck
  - Building human capacity in the neighborhood while identifying community-based skills and assets
  - Developing a visioning plan and design strategies for open spaces

- **ENGAGEMENT:** We sponsored a block party in July 2013 to encourage further community involvement with the projects and to support the HOPE Village Initiative. The research teams shared their work and solicited community feedback through a six-week interactive poster display at the neighborhood branch of the Detroit Public Library.

Future Plans

After the IA concludes in December 2013, and research teams submit final project reports and proposal summaries, we will remain connected with Focus: HOPE as they begin applying for additional funding to continue the work started by the IA.

International Water & Health

In partnership with the former U-M Center for Global Health, we advanced two IAs where interdisciplinary faculty teams are exploring water quality issues and their impact on health inequities. Projects in Peru and Ghana are using the IA approach to analyze policy options and improve decision-making. The two projects are: Water Sustainability, Infrastructural Inequity, and Health in Small-Scale Gold Mining Communities in Ghana; and Gastric Cancer and Helicobacter pylori Infection in Lima Peru: the Role of Water Contamination.

Future Plans

As both projects enter their second phase, activities will include additional research, information sharing, and development of policy and response options. The Peru team will work with local decision makers in Lima to analyze selected household and community based water treatment technologies needed to improve the quality and the safety of drinking water. The Ghana project team will evaluate potential policy response strategies and develop an integrated set of options to be shared with Ghanaian officials.

Livable Communities through Sustainable Transportation

In 2012, we began the “Advancing Livable Communities through Sustainable Transportation” IA asking: What policies, interventions, innovations, and partnerships best enable urban areas to create more livable communities? Two U-M faculty teams are exploring how different transportation policies, technologies, and consumer travel choices can impact the sustainability and livability of communities.

Key Successes:

- **RESEARCH PROJECTS:** With a focus on Portland, OR; Santa Monica, CA; and Los Angeles, CA, researchers are developing a tool that policy-makers can use to simulate the effects of various policy strategies on transportation behavior and greenhouse gas (GHG) emissions. The team is investigating why people select only one mode of transportation, ways to encourage users to consider using more than one mode, and what the GHG emissions implications are for different multi-modal combinations.

  A second team is developing a roadmap for how a new generation of technology-rich electric vehicles, in combination with transportation policy changes, can contribute to urban livability. The project uses a participatory process with stakeholders representing both the scientific community and the policy communities. The findings will be used to create an interactive, online educational model about benefits, costs, and recommended public policy responses.

Future Plans

The projects will identify and analyze key policy options and make recommendations for integrating effective interventions to accelerate urban transformations. To share the findings broadly with representatives from local government agencies, planning organizations, regional organizations and federal agencies, the teams will present their work at the annual Transportation Research Board Conference in January 2014. Final project reports reflecting feedback from the conference are to be completed by February 2014. Work may also be presented at the 21st World Congress on Intelligent Transport Systems and SAE 2014 Convergence conference in Detroit.

U-M Water Center

With support from the Erb Family Foundation and U-M, the Water Center was established to bolster freshwater ecosystem restoration and protection efforts. The Center is focusing initial efforts on the Great Lakes, working closely with academic colleagues and practioners in the region to improve restoration outcomes. Our activities focus on three core areas: Convening; Rebuilding Freshwater Capacity; and Supporting Translational Research.

Convening

By coordinating partnerships and convening expertise across the Great Lakes region, we are connecting complimentary efforts, sharing lessons learned, understanding regional and cumulative efforts, and identifying and filling priority knowledge gaps.

Key Successes

- **DIALOGUE WITH OFFICE OF THE GREAT LAKES:** We are working with Michigan's Office of the Great Lakes (OGL) to integrate synthesis processes with our emerging series of analysis white papers to avoid duplication and address key issues, such as optimizing rural nutrient management effectiveness through the agricultural supply-chain.
- **GREAT LAKES RESTORATION INITIATIVE ACTION PLAN DIALOGUE:** In June 2013, we convened Directors of 20 U.S. and Canadian Great Lakes academic Centers/Institutes from New York to Minnesota to prepare comments on the next Federal Great Lakes Restoration Initiative action plan and their proposed Adaptive Science-Based Framework and submitted them on behalf of the directors to the EPA.
- **REGIONAL GREAT LAKES ENGAGEMENT:** Water Center expertise is being sought throughout the region. For example, Don Scavia played a leadership role in the International Joint Commission's Lake Erie Ecosystem Priority project; Tom Nalepa participated in planning two lake-wide surveys in Lakes Huron and Michigan; David Schwab is serving as chair of the Lake Michigan Ecological Modeling and Forecasting Working Group through the Great Lakes Observing System and as a member of the NOAA Integrated Ocean Observing System Program Modeling Task Force; and Nalepa, Allen Burton, and Jennifer Read all participated in the "Great Lakes Futures Project," (co-led by Scavia) through which talented U.S. and Canadian graduate students developed potential future scenarios for assessing Great Lakes policy direction.
- **BUILDING ADVISORY CAPACITY:** We established an Advisory Board composed of 21 members from the U.S. and Canadian science, policy, practitioner, and citizen stakeholder communities representing public (federal, state, tribal, local governments), private (industries and/or industry associations), academic, environmental, non-governmental, and other stakeholder organizations. Included are representatives of U.S. tribes and Canadian First Nations, and foundation representatives whose work engages traditionally underserved populations.
- **GREAT LAKES SEMINAR AT U-M:** We co-hosted an on-campus seminar in May 2013 on "Low Great Lakes Water Levels: Understanding the Causes and Potential Consequences." The seminar featured four speakers who discussed different aspects of low lake water levels, ranging from the causes of declining lake levels to the potential for economic impacts in the region. Eighty people attended in person and 175 people participated via webcast.
- **PRESENTATIONS:** Burton gave a keynote lecture to the Michigan Recycling Association in April on plastic and microplastic pollution of the Great Lakes. Read provided an overview of the Water Center to the Great Lakes Commission's annual Great Lakes Sedimentation Workshop in May. Nalepa gave invited presentations on invasive species at Michigan State University (March); Leelanau Nature Conservancy (May); and Buffalo State College (May).

Rebuilding U-M's Freshwater Capacity

The Water Center's mission includes rebuilding the once strong Great Lakes capabilities on our campus. By fostering cross-disciplinary collaborations, making new linkages to freshwater in research and courses, and providing more opportunities to study the Great Lakes and other large freshwater systems, we are working to increase the university's capacity to contribute solutions to the protection and restoration of the Great Lakes and beyond.

WATER CENTER
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Key Successes

- **GREAT LAKES CURRICULUM:** Five members of our team co-taught a Winter 2013 graduate-level course on Great Lakes science, policy, and management. Three team members also co-taught a spring/summer 2013 Great Lakes field course at the U-M Biological Station that included lake-based field studies aboard a NOAA research vessel. We received exceptionally positive evaluations for both classes, which will be expanded and offered again next year.
- **POSTDOCTORAL FELLOWS:** As part of our efforts to engage promising young researchers on topics related to the Great Lakes, we co-funded several postdoctoral fellows with partners from other units. These post-doctoral fellows regularly engage with each other to promote the kind of cross disciplinary research outcomes necessary for progress in Great Lakes restoration.

Supporting Translational Research

We support multidisciplinary, collaborative freshwater research that improves restoration and protection technologies, techniques, and approaches; integrates end-users (such as resource managers), has clear, practical applications; and contributes to the development of a collective framework for large-scale restoration and protection efforts.

Key Successes

- **LEVERAGING GRANTS:** In May 2013, we awarded 12 grants totaling nearly $570,000 to bolster Great Lakes restoration and protection efforts throughout the region. These two-year projects cover issues such as: contaminated areas across the Great Lakes region; fish community composition in the Rouge River watershed; indicators for tracking progress in the remediation of harmful algae blooms; and several others. (See Water Center website for details.)
- **LARGE GRANTS:** In September 2013, we awarded eight grants totaling nearly $2.9 million to bolster Great Lakes restoration and protection efforts throughout the region.

  These two-year projects include efforts to:
  - Update and enhance the Great Lakes Environmental Assessment and Mapping Project stressor maps
  - Evaluate the effectiveness of efforts to improve water quality in Lake Erie
  - Develop indicators to assess lake condition and diagnose causes of impairment
  - Develop an integrated framework to guide investments in nutrient management practices and restoration projects
  - Integrate existing models with down-scaled regional climate scenarios to assess strategies to mitigate hypoxia and restore beneficial uses
  - Determine key indicators and drivers of public-private partnership restoration success and identify ways to increase landowner participation in such programs
  - Refine Great Lakes barrier removal decision support tool and transfer to practitioners for improved tributary restoration outcomes
  - Develop cost effective assessment tools for detecting sewage contamination.

- **INCREASING FRESHWATER RESEARCH CAPACITY AT U-M:** With a rolling request for proposals, we are increasing the depth and breadth of U-M's freshwater research. We are soliciting exceptional projects that address critical ecological, health, and social issues related to freshwater ecosystems and resources, both in the Great Lakes region and globally.

Future Plans

Over the next year, we will continue to enhance U-M capacity to address the range of freshwater issues in the Great Lakes and globally. Focusing on ecosystem, social, economic, and human health issues, we will bring together internal and external faculty, students, and researchers to explore matters of common concern across our funded projects. We will also facilitate a watershed modeling workshop, enhance U-Ms' "water curriculum," and seek opportunities to share our experience with other programs in the Great Lakes region.

Great Lakes Integrated Sciences + Assessments

A collaboration between U-M and Michigan State University, the Great Lakes Integrated Sciences + Assessments (GLISA) center links science, people, and information to bridge the gap between producers and users of climate information. GLISA had a productive year serving as the core of our Climate Adaption Center.

Key Successes

- **SUPPORTING CLIMATE "BOUNDARY ORGANIZATIONS":** We are supporting a "chain of boundary organization" as a key innovation in ensuring climate information gets in the hands of the broadest range of decision makers. We provide funding and access to climate information to a series of organizations that sit closer to the decision making community than GLISA could ever do on its own. Based on input from advisory committees, we awarded six $50K climate assessment grants to the following boundary organizations:
  - Nature Conservancy
  - Illinois-Indiana Sea Grant College Program
  - Michigan State University Extension
  - Northwest Michigan Horticulture Research Station
  - Toronto and Region Conservation Authority
  - The Huron River Watershed Council

- **NATIONAL CLIMATE ASSESSMENT:** As input to the fourth U.S. National Climate Assessment (NCA), we collaborated with the USDA Agricultural Research Service in convening an expert team to prepare 11 synthesis papers that reviewed the current state of knowledge regarding the climate change and its impacts on sectors of critical importance to the Midwest region. In addition, GLISA co-PI Don Scavia was a lead author for the Midwestern Region chapter of the NCA, and GLISA hosted the NCA Midwest Town Hall on the U-M campus.

- **ANNUAL CONFERENCE:** We held the second annual climate adaptation conference that included a facilitated workshop for recipients of our boundary-organization grants and a symposium highlighting GLISA resources and the 11 NCA Midwest technical input reports.

- **CLIMATE OUTREACH:** We partnered with Michigan Sea Grant to support an outreach specialist who provided training events for outreach professionals, including: "Gearing up for Change: Climate Training for Outreach Professionals," a half-day train-the-trainer workshop at the Great Lakes Sea Grant Network Meeting and the National NEMO Conference in Duluth, MN; and "Climate Adaptation Planning: Increasing Community Resilience and Sustainability," a 75-minute training presentation for participants at the Michigan Association of Planning annual conference.

- **SOCIAL NETWORK ANALYSIS OF GREAT LAKES ADAPTATION COMMUNITY:** Building upon previous analyses by collaborating authors of assessment reports and scientific articles, GLISA team members are gathering additional data on participants in adaptation-focused meetings and workshops in the Great Lakes region. The goal is to map relationships among key players in the region's adaptation community and identify key individuals (nodes) that bridge across groups. Ultimately, these nodes will be the focus of our education and engagement efforts because they are most trusted information sources, and thus are the most efficient way to bring climate information to those who can use it.

GLISA

GREAT LAKES INTEGRATED SCIENCES + ASSESSMENTS

- **CLIMATE INFORMATION SUMMARIES:** In the past, we produced summaries of climate histories for over 22 weather stations in the Great Lakes basin. Although these summaries were well received, they are point-specific and do not cover all areas of the region. In response to requests from decision makers, we partnered with the Midwest Regional Climate Center and the Office of the Michigan State Climatologist to develop these summaries for the 25 broader Climatic Divisions within the basin.

- **RESEARCH FINDINGS:** Results of our first grant competition are now complete and their findings related to Extreme Heat Impacts; Lake Superior Evaporation Rates; Lake Whitefish Recruitment; Maize Yields; and Spatial Variability of Temperatures in Detroit are being disseminated.

Future Plans

GLISA will continue to provide climate information services to boundary organizations and learn from our social science programs to refine climate adaptation best practices in the region. As we enter the fourth year of a five-year commitment from NOAA, the coming year will be particularly important for us to evaluate our programs as we gear up for the grant renewal process.

Michigan Journal of Sustainability

A team of seven Graham Sustainability Doctoral Fellows planned, developed, and launched the new Michigan Journal of Sustainability (MJS) — an online, open-access journal designed to translate academic sustainability research into terms more accessible to practitioners.

The journal, which is hosted on Michigan Publishing's platform for scholarly journals, provides translated, peer-reviewed articles about a wide variety of sustainability subjects in the areas of sustainable freshwater systems, livable communities, and responses to climate variability and change.

Content includes descriptions of research, experiments, pilot projects, and reviews of relevant articles with high potential idea transfer or development across fields. All articles are peer-reviewed by experts in social science, natural science, and policy.

Key Success

- **PUBLICATION LAUNCH:** The first volume of the Michigan Journal of Sustainability was issued in the fall of 2013. It was a collaborative effort of 66 people from 10 different universities, non-profits, and governmental organizations.

Future Plans

Work is already underway for Volume 2, which will be published by fall of 2014. Dow Sustainability Fellows at multiple levels will take the lead on planning, development, and ongoing maintenance of the publication.

MJS is available online at graham.umich.edu/mjs

TRANSFORMATIVE LEARNING

Our education programs have an overarching goal to build the next generation of sustainability leaders. Our core methodologies include engaging across disciplines, employing systems thinking, catalyzing action-based learning opportunities, and providing skills-based leadership training. The programs span from first-year undergraduates through post-doctoral fellows and this section focuses on the Graham Undergraduate Sustainability Scholars Program, the Dow Sustainability Fellows Program, and efforts to integrate sustainability across the curriculum. .

Graham Undergraduate Sustainability Scholars

Bringing together top performing undergraduates from across the university, this innovative program now has 44 alumni and 55 students currently enrolled. Enhancement over the past year included expanding co-curricular options, improving existing classes, and developing the alumni network.

Key Successes

- **COURSE ENHANCEMENT:** We significantly revised and improved our junior seminar on interdisciplinary thinking for sustainability and the senior seminar on sustainability leadership development. Both courses now teach largely from a case-study methodology appropriate for Scholars with highly varying levels of sustainability knowledge. The junior seminar teaches specific systems tools while engaging in cohort formation activities. The senior seminar functions as a capstone, focusing on career development and leadership skills. Student reviews of both courses were very positive. Both courses were awarded permanent titles under the University Courses (UC) division of the College of Literature, Science, & the Arts.

- **SCHOLARS RETREAT:** As suggested by graduating Scholars, we added a three-day retreat at Sleeping Bear Dunes National Lakeshore for incoming Scholars during “Welcome Week” in August. The goals of the retreat are to: 1) Build the cohort of students via social bonding; 2) Apply concepts of systems thinking and leadership through a set of interactive activities; and 3) Develop a “sense of place” in Michigan. The retreat was a resounding success, with surveys indicating that our primary goals were met.

- **COFFEE WITH PRACTIONERS:** We expanded our informal networking with sustainability practitioners this year, with one-hour informal conversations with 11 different practitioners, including the executive director of Growing Hope, the City of Ann Arbor’s sustainability associate, the associate director of the Michigan League of Conservation Voters, and others.

- **CO-CURRICULAR PROGRAMMING:** We provided at least one co-curricular program each month through a wide range of engaging events, such as: the U-M Challenge Program in September to continue their leadership self-assessment and re-connect with their cohort after the summer; a series of “Dinner & Documentary” events; a Graham Scholars Holiday Party; and a self-organized Scholars Retreat at the U-M Biological Station in March.

- **BLOG & ELECTRONIC ALUMNI NEWSLETTER:** As part of an effort to help Scholars alumni engage with each other informally after leaving the university—as well as for us to stay abreast of what alumni are doing post-graduation—we launched a blog, an alumni newsletter, and an alumni Facebook page.

- **RECORD-BREAKING RECRUITMENT:** After significantly boosting our recruitment activities this past year, we received a record breaking 74 applications to the program this past year. We were very pleased with these numbers, considering a 3.25 grade point average is required to apply to the program.

Future Plans

As the program enter its fourth year, a near-term priority is to develop a vibrant Scholars alumni network that nurtures lifelong professional development and support.

Integrating Sustainability Across the Curriculum

We foster efforts to integrate sustainability across the curriculum and provide access to sustainability-related courses.

Key Successes

- **KENYA FIELD COURSE:** The third year of the Graham-sponsored course in Kenya was very successful, with 100 percent of students rating the class as “Excellent” overall in course evluations. The Center for Global Intercultural Studies agreed to make the course part of its annual Global Connections Courses and to administer the financial and logistical details of the course. The class, titled “Conservation and Development in Cultural Landscapes: Fieldwork in Kenya,” also received official approval from the Department of Afro-American and African Studies.

- **OTHER FIELD STUDY OPPORTUNITIES:** We continue to find new programs that meet the Graham Scholars’ field-study needs—and establish new relationships with institutions and programs, such as the Center for Ecological Living. As such, we now support transformative learning field experiences in Wyoming, Costa Rica, New Zealand, and China. (See Graham website for details.)

- **IMPROVED COURSE DATABASE & COURSE TAGS:** The College of Literature, Science, & the Arts (LSA) course “tags” for sustainability were fully implemented and the Graham Institute’s database was updated during FY 13, encouraging more students to take sustainability-related courses.

Future Plans

We will administer a survey to approximately 600 sustainability-related faculty experts at U-M to assess the current state of sustainability teaching, best practices, interests/needs, and barriers to integrating sustainability concepts. From these data, we will develop resources and programming to help faculty integrate sustainability into their courses using innovative approaches.

Dow Sustainability Fellows Program

On behalf of the University of Michigan, we administer this groundbreaking, university-wide program, which supports full-time graduate students and postdoctoral scholars who are committed to finding interdisciplinary, actionable, and meaningful sustainability solutions on local-to-global scales. This initial program year was a great success, with enthusiastic participation across many Schools and Colleges, including both units with significant sustainability activities and those traditionally less focused on sustainability.

Masters/Professional Fellows

This program component is open to full-time graduate students pursuing terminal masters and other professional degrees at U-M – Ann Arbor. In addition to receiving $20,000 to help support his/her studies, each Fellow is part of a "Community of Scholars" that regularly exchanges ideas and perspectives.

Key Successes

- **FIRST COHORT NOMINATION & SELECTION:** A call for nominations went to Deans and Associate Deans of all U-M Schools and Colleges soliciting up to 10 student nominations from each unit. After an extensive review process administered by the Graham Institute, 40 fellows were selected. The cohort represents eight different Schools and Colleges, as well as an equal balance between STEM (Science, Technology, Engineering, & Mathematics) and Social Science disciplines.
- **ENGAGED LEARNING:** The fellows have been participating in several collaborative engagement activities and interdisciplinary team projects. We conducted formal, mandatory fellows meetings and facilitated numerous optional, informal meetings and outings to accelerate team building. Programming included roundtable discussions on the sustainability aspects of a proposed open-pit, copper mine near Bristol Bay, Alaska; an informal discussion with Achim Steiner, Executive Director of the United Nations Environment Programme; a tour of the Dow headquarters; and small-team meetings with individual members of Graham's External Advisory Board.

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Doctoral Fellows

We used this past year to transition the Graham Sustainability Doctoral Fellows program into the Dow Doctoral Fellows program. Each fellow receives $50K from the program over two years to support his/her doctoral research and studies, with matching support provided by the student's home department.

Key Successes

- **COHORT NOMINATION & SELECTION:** We issued a December 2012 RFP and, after an extensive review process with the help of an interdisciplinary faculty panel,10 fellows were selected. The diverse array of doctoral fellows brings together many relevant interests related to water, energy, health, consumption, green chemistry, transportation, built environment, climate change, biodiversity, human behavior, environmental law, and public policy, among others.
- **THREE NEW SKILLS-BASED WORKSHOPS:** At the beginning of the academic year, the fellows identified skills-based workshops they wanted to pilot for the program, and we developed and offered three in response to their preferences: Getting an Academic Job; Dissertation Communications; and Navigating Interdisciplinary Research.
- **LAUNCHED MICHIGAN JOURNAL OF SUSTAINABILITY (MJS):** As described earlier in this report, a team of Graham Doctoral Fellows developed this online, open-access journal that translates sustainability research into actionable language. The editorial board is composed of fellow who solicit articles, lead the peer review process, and shape website presentation. See additional information under "Translational Research."
- **PROGRAM PLANNING:** We planned a full slate of programming for the academic year, including activities with fellows at all levels. All fellows engage in a collaborative project, with encouragement to work either on the MJS or participate in the Dow Distinguished Awards competition. We also planned several other activities for fellows, including interdisciplinary seminars; skills-based workshops; potluck discussions, and other community-building events.

Postdoctoral Fellows

This program component is designed to create a new generation of sustainability scholars who understand the necessity of collaborating across social, natural, and engineering science disciplines and sectors to address and solve complex sustainability challenges.

Key Successes

- **PROGRAM LAUNCH & RECRUITMENT:** The program was advertised through 25 national academic societies/organizations, as well as through the U-M Deans and approximately 750 U-M faculty members whose research relates to sustainability. After an extensive review process, offers were extended to the top eight candidates; six accepted. All selected fellows have a strong social science component or focus in their research proposals and interests, and they represent a broad range of disciplines including economics, public health, engineering, and sociology.
- **PROGRAM PLANNING:** We planned a wide range of engagement activities, including monthly dinner presentations with Distinguished Faculty Fellows, and lunch seminars specifically for the fellows. Seminars include a mix of research presentations and discussions led by the fellows, along with skills building workshops designed with input from the postdoctoral and doctoral fellows.
- **PROGRAM CHAIR HIRED:** Deborah Goldberg accepted our offer to become chairperson for the postdoc program. Deborah is the Elzada U. Clover Collegiate Professor of Ecology and Evolutionary Biology (EEB) and chaired the EEB department for the past 10 years. Deborah will lead program efforts, guiding the design and delivery of monthly seminars and serving as an additional mentor for postdoctoral fellows.

Future Plans

We are pleased both with the level of interest generated by the first request for proposals and by the overall quality of the applicant pool. The funding structure, whereby the Dow program provides 50 percent of the funding and requires matching funds from mentors/units, presented some challenges and thus we will implement a modified funding model for the next cohort. Our new model will allow us to attract more applicants from social science fields that traditionally lack funding to support postdoctoral fellows.

Distinguished Awards for Interdisciplinary Sustainability

To foster high-impact sustainability collaborations across U-M, the Dow Sustainability Fellows program includes a competition for applied sustainability projects that cut across disciplines and academic levels.

Key Successes

- **PROGRAM DEVELOPMENT:** Although the Distinguished Awards were initially envisaged to be restricted to Dow fellows, we opened up participation to all students, faculty and staff at U-M. The goal was to allow the program to benefit a wider range of U-M constituents, and increase the volume and quality of project proposals.
- **PROPOSAL SOLICITATION:** A request for pre-proposals was issued in early February 2013 and was sent to the Deans and Associate Deans of all U-M Schools and Colleges. Pre-proposals were due in June and six applicants were selected to submit full proposals. Final proposals were reviewed by an independent committee of U-M faculty and external practitioners from business, government, and civil society. Award winners will be announced in November 2013 and will present their projects to the Graham External Advisory Board in April 2014.

Distinguished Faculty Fellows

This is a new group, whose goal is to nourish and sustain interdisciplinary, intellectually rigorous conversations focused on sustainability challenges. Faculty Fellows will interact especially closely with the Dow Postdoctoral Fellows to form an intellectual community that expands the vision and breadth of all members.

Modeled after the interdisciplinary Michigan Society of Fellows program, the Distinguished Faculty Fellows and Dow Postdoctoral Fellows will meet monthly for a combination of dinner and rich conversation, along with a presentation by one of the fellows on their research. The other main responsibilities of the Faculty Fellows will be to help select new cohorts of Postdoctoral Fellows, as well as to select subsequent Faculty Fellows after a university-wide call for nominations.

INSTITUTIONAL LEADERSHIP

Sustainability is a presidential priority at Michigan—in student education, faculty research, and campus operations. As part of this initiative, known as Planet Blue, we are charged with guiding the discussion, planning, and coordination of sustainability activities across the university. We've made significant gains in this area over the past year, with key initiatives including: developing partnerships in Brazil; tracking Sustainability Cultural Indicators; the Planet Blue Ambassador program; and the Planet Blue Student Innovation Fund.

UM-Brazil Partnership

As a follow up to President Coleman's delegation trip to Brazil in 2012, we were asked to seek out meaningful partnerships and collaborative research opportunities with the University of Sao Paulo (USP) and other Brazilian academic institutions. In response, we requested proposals for small cooperative grants (up to $10,000) between U-M researchers and Brazilian counterparts interested in fostering scientific collaboration in the broad field of sustainability. This call for proposals targets both those looking to initiate a new collaboration as well as those seeking to advance existing collaborations.

Don Scavia serves on a university committee charged with investigating and initiating other potential partnerships, and the Graham Institute recently hosted a delegation from USP to discuss possibilities, such as a potential joint workshop and/or postdoc exchange. A Brazilian Fulbright Scholar also joined us for the Fall 2013 to develop joint campus sustainability projects between USP and U-M.

Sustainability Cultural Indicators

As an outcome of our two-year Campus Sustainability Integrated Assessment, we worked with the Institute for Social Research to launch the Sustainability Cultural Indicators Program (SCIP) as the primary vehicle for measuring progress toward building a multi-faceted "culture of sustainability" on campus. This comprehensive study is designed to assess sustainability knowledge, behaviors, and attitudes across U-M students, faculty, and staff over time.

Key Success

- **FIRST-YEAR SURVEY COMPLETED:** More than 4,000 students and 2,000 faculty and staff members responded to the first-year survey, which included questions on transportation, waste prevention and conservation, the natural environment, climate change, and various campus sustainability initiatives. Overall, the response rate was approximately 40% for all participant groups, with a slightly higher response rates from first-year students, graduate students, staff, and faculty. Reports of survey findings are being provided to relevant campus units so they may monitor trends and developments in sustainability awareness and behavior on campus, and adjust programs as appropriate. Reports from the survey are available on our website.

Future Plans

- **RE-EVALUATE:** Now that core indicators and their benchmarks have been established (via first-year data findings), we will administer the second annual survey this fall. These data will be compared to the prior year's, so we can measure progress in advancing the U-M community's sustainability knowledge, dispositions, and behavior over time.
- **MODEL FOR OTHER INSTITUTIONS:** We have presented SCIP at numerous conferences (in Brazil, India, Taiwan, Ireland, and at venues throughout the U.S.) and have also shared the survey instruments with more than a dozen institutions seeking to develop similar programs.

Planet Blue Ambassadors

The overarching goal of the Planet Blue Ambassador (PBA) program – available to all U-M faculty, staff and students - is to create a culture of sustainability on campus. The program brings together sustainability-related behavioral and cultural change efforts to provide a "boots-on-the-ground" network to advance the President's Sustainability Initiative through individual and collective actions. U-M faculty, staff, and students have shown remarkable enthusiasm for this program, as demonstrated by the popular launch of the online tools, successful initiatives by the Planet Blue Student Leaders, and the broad representation of U-M staff as certified PBAs.

Key Success

- **ONLINE TRAINING DEVELOPMENT:** We developed two online tools: the PBA Training Modules (for learning about sustainability) and PBA Personal Dashboard (for tracking personal progress toward sustainability pledges). These tools were developed using best practices for encouraging sustainable behaviors; drew upon successful models at peer institutions; were framed by leading research in environmental psychology and sociology; and used focus groups and content review by U-M faculty, students, and staff.

- **EARLY PBA PROGRAM IMPLEMENTATION:** The PBA program launched in January 2013 with a campus-wide email and embedded video. Within one week, 764 U-M community members had completed their certification – vastly exceeding our predictions and expectations. We consider it a sign of successful design that 80% of the people who started the training completed all five sections. The current 1,479 ambassadors represent a wide variety of U-M departments and buildings, including broad participation from U-M Health System staff.

- **SUSTAINABILITY PLEDGES ON CAMPUS:** In total, over 31,000 pledges for sustainable actions have been made through the PBA program, and nearly 50% of those pledges have been marked "completed" through the PBA dashboard. On average, each person made 21 pledges and, to date, completed 10.

- **POSITIVE REVIEWS:** In mid-February, 394 certified PBAs completed an online evaluation of the PBA Program. In the evaluations, 88% of respondents agreed or strongly agreed that the training motivated them to take environmentally responsible actions; 86% reported that the training increased their knowledge of sustainability challenges. More than 90% were very satisfied or satisfied with the training modules, with the energy module receiving the highest score.

- **PBA ENGAGEMENT (E-NEWSLETTERS & EVENTS):** In addition to engaging with the PBA program through their Personal Dashboard, ambassadors receive a monthly PBA e-newsletter, which spotlights ambassador efforts around campus, features new information or resources, and invites ambassadors to engage in PBA activities. Ambassadors are also offered monthly learning opportunities via luncheon training sessions, campus tours, special lectures, movies, and other activities.

Planet Blue Student Leaders

The Planet Blue Student Leaders (PBSL) are a special category of the PBA program. After a successful pilot, we launched a full-scale effort in 2012/13 focused on shaping values and experiences for undergraduates. through the residence hall experience. PBSLs devote 3-5 hours per week as peer sustainability leaders through class time, learning circles, program planning, and peer engagement.

Key Successes

- **OUTREACH & EDUCATION:** We developed and taught a one-credit leadership seminar during the fall and winter terms. During winter semester, PBSLs hosted a "Skill Share Festival" for learning effective sustainable living skills. Over the summer, PBSLs launched a website to help students in residence halls learn how to have more environmentally responsible living spaces—and certify their dorm room as a "Planet Blue Room."

- **POSITIVE FEEDBACK FROM STUDENTS:** Through entry and exit surveys, we learned that PBSLs are more confident in talking to peers about sustainability and sustainable behaviors. The exit survey also showed a general increase in the adoption of personal sustainable behaviors and encouraging those sustainable behaviors in friends and peers.

Future Plans

We will expand the PBA program and deepen our involvement of certified ambassadors to create a campus culture fully engaged in sustainability. We will work towards supporting communication between PBAs to share sustainability best practices and experiences at U-M, engaging them in other U-M sustainability initiatives, and providing them with tools and training to effectively encourage and support sustainable behaviors of themselves, friends, classmates, and co-workers.

Planet Blue Student Innovation Fund

This program offers grants of up to $50,000 for ambitious, student-initiated projects that reduce the university's environmental footprint and/or promote a culture of sustainability on campus. A PBSIF student board makes decisions about which projects are selected for funding.

Key Successes

- **FUNDED PROJECTS:** Several PBSIF projects have taken off, including offering reusable food containers on campus; campus bike air pumps and fix-it stations; on-campus produce stands; and a campus farm at U-M's Matthaei Botanical Gardens. This past year, a student team took the concept of a campus farm even further by creating permaculture gardens on North Campus.

Future Plans

We plan to oversee an extensive "call for proposals" for student-led projects this academic year. This marks the third year for this innovative program.

To learn more about all these programs and activities, please visit our website at graham.umich.edu.

Graham Sustainability Institute Team

Graham staff proudly display the platinum-level certification they recently received through U-M's Sustainable Office Program, which promotes environmental best practices in the workplace.

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GRAHAM SUSTAINABILITY INSTITUTE
625 E. LIBERTY ST., SUITE 300
ANN ARBOR, MI 48104
(734) 615-8230
GRAHAM.UMICH.EDU
GRAHAM-INSTITUTE@UMICH.EDU

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