ANNUAL REPORT

September 1, 2009 – August 30, 2010
About Us
With joint sponsorship from the Donald C. Graham Family and the University of Michigan (U-M), the Graham Institute is a collaborative partnership of schools, colleges, and units across U-M. We serve as a boundary organization to connect academics, policy-makers, and practitioners by facilitating sustained and vibrant interactions to solve “wicked” sustainability problems. We actively engage the campus community and external collaborators in novel, highly adaptive partnerships to better define complex problems, support participatory research, co-create knowledge and policy for practical application, develop innovative learning opportunities, and cultivate future environmental sustainability leaders.

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Greetings!

It’s been an exciting year at the Graham Institute and throughout the University of Michigan (U-M). We got off to a tremendous start last fall when President Coleman launched an enhanced sustainability commitment that included the formation of a U-M Sustainability Executive Council, a new Office of Campus Sustainability (OCS), and my appointment as Special Counsel to the President. President Coleman’s commitment has been critical to our success and has greatly accelerated the pace of sustainability efforts across campus. This report is our attempt to share the role we have played during the past year. In short, we’ve made outstanding progress on multiple fronts.

Since adopting Integrated Assessment (IA) as our primary research methodology, we’ve launched several IA projects to address “wicked problems” on local-to-global scales. At home, we partnered with OCS to lead an IA on the sustainability of campus operations. This project brings together faculty, staff, and students to establish a set of stretch goals that will drive the sustainability of campus operations for many years to come. Beyond the campus, we developed high-impact IA projects focused on developing sustainability indicators to assist Detroit’s urban renewal efforts, climate change adaptation strategies for cities in the Great Lakes region, national policy options for sustainable transportation, and the health impacts of climate and water issues in the developing world. As these projects progress over the next few years, we are confident that the IA process will help solve complex sustainability challenges by leveraging U-M’s cross-disciplinary research expertise, while actively involving decision makers and community stakeholders in developing these solutions.

In education, our Doctoral Fellows program reached new heights with enhanced interactions among the Fellows and engaged project work across multiple disciplines. We took a modified version of this interdisciplinary model to the undergraduate level by launching our Sustainability Scholars certificate program, which is now open to high-performing students from all corners of the campus. To help our Scholars meet their program requirements, we continued efforts to spearhead innovative field-based courses, such as our 3-week intensive offering in Kenya focused on human-environment challenges in the region. On the co-curricular front, what started as a project deliverable from our Sustainability and the Campus course became a comprehensive U-M Student Sustainability Guide that was distributed to all incoming freshmen upon their arrival on campus. And in an effort to strengthen sustainability offerings throughout the U-M curriculum, we co-led a Provost’s Seminar on Teaching that attracted nearly 200 faculty members from across campus to generate ideas that will be further developed in the year to come.

These are only a few examples of what we’ve been up to in the past year. We hope this report provides you with fresh insight into our efforts to advance sustainability work throughout the University of Michigan, where we are committed to making a lasting difference in the world through the knowledge and leaders we develop.

Sincerely,

Donald Scavia, Ph.D.
Professor and Director, Graham Institute
Special Counsel to the President on Sustainability
In October 2009, President Mary Sue Coleman introduced the U-M Sustainability Initiative to elevate the university’s commitment to sustainability in education, research, and operations. Through this effort, U-M is enhancing curricula and research opportunities, strengthening efforts to reduce its environmental footprint, connecting academic and operational activities to make the campus a living laboratory for sustainability, and engaging external partners to define and solve complex sustainability challenges on local-to-global scales.

The Sustainability Initiative is overseen by the Sustainability Executive Council, which is chaired by President Coleman and comprises senior executives of the university. Staffing support is provided by the Graham Institute and the Office of Campus Sustainability. As Special Counsel to the U-M President on Sustainability, Don Scavia serves as the point person for sustainability at Michigan, advising the executive officers and the president; serving as the primary contact for students; and guiding the discussion, planning, and coordination of the full range of sustainability activities across campus.

Through engagement with more than 100 faculty, staff, and administrators, we helped lead development of the university-level strategy for sustainability in education, research, and operations over the past year. As illustrated below, we also made wide ranging contributions to the initiative across these three focal areas.

**In Education, we:**

◊ Partnered with the Center for Research on Learning and Teaching to convene the Provost’s Seminar on Teaching. This event focused on sustainability throughout the U-M curriculum and attracted 179 faculty members from 18 Schools & Colleges. Working groups are now taking this work forward to recommend strategies for innovations in sustainability education throughout the University.

◊ Worked with Schools and Colleges across campus to launch a Sustainability Scholars Program, which engages a select group of undergraduate students in an intensive interdisciplinary learning program.

◊ Increased our Sustainability and the Campus course to two offerings annually, so nearly 100 students can work on applied sustainability projects in units across campus each year.

◊ Partnered with the Division of Student Affairs and the Student Sustainability Initiative to train orientation leaders to discuss U-M’s sustainability efforts with incoming freshmen, and produced the “U-M Student Sustainability Guide: How to Be a Green Wolverine,” a 17-page handbook for sustainable living that was placed in all residence hall rooms on campus.
In Research, we:

◊ Helped develop three overarching research themes—Freshwater, Livable Communities, and Climate—where the University can make substantial contributions toward solving complex sustainability challenges. These themes leverage U-M’s disciplinary strengths, build upon our institutional capabilities, and have high potential for significant impact.

◊ Responded to RFPs from the National Oceanic and Atmospheric Administration and National Science Foundation, and partnered to develop three successful sustainability grant proposals totaling $10.2 million.

◊ Developed multiple Integrated Assessments that will leverage multi-disciplinary faculty expertise and engage stakeholders in solutions-oriented research.

In Operations, we:

◊ Worked with university leadership across academics and operations to establish a commitment to LEED Silver certification and ASHRAE 90.1 +30% for new U-M construction projects over $10 million.

◊ Partnered with the Office of Campus Sustainability to complete the first phase of an Integrated Assessment focused on sustainable campus operations that will shape and guide environmental impact reductions on campus for the next several years.

Beyond our efforts in education, research, and operations, we led a successful effort to obtain “Observer Status” for the University of Michigan with the United Nations Framework Convention on Climate Change (UNFCCC). With strong support from President Coleman, this effort culminated with a 43-member U-M delegation traveling to Copenhagen, Denmark in December 2009 to participate in the 15th UNFCCC Climate Change Conference (COP15).
Building on past successes, we continued stimulating and coordinating interdisciplinary education programs that leverage the vast resources across U-M’s large and diversified academic landscape. Great strides have been made on this front over the past year, as highlighted below.

**Doctoral Fellowship Program**

The goal of our Doctoral Fellowship Program is to create a cohort of doctoral students who will ultimately become leaders in academia, industry, non-profit organizations, and government. The program provides exceptional Ph.D. students with $50,000 over two years to pursue interdisciplinary research related to sustainability and to engage across disciplines. Fellows participate in monthly seminars to discuss their research goals and how they relate to broader sustainability challenges. Between meetings, Fellows engage in a variety of forums that are reflected upon at the beginning of the following monthly seminar.

The following outstanding doctoral students were accepted into the program in 2010:

◊ Krista Badiane, School of Natural Resources & the Environment
  *Beyond Myth and Ceremony: The Role of Professional Networks in Corporate Response to Climate Change*

◊ Sherri Cook, College of Engineering (Environmental and Water Resources)
  *Waste Resource Recovery System Sustainability: Performance & Reliability of Codigestion*

◊ Paul Coseo, Taubman College of Architecture & Urban Planning (Planning)
  *Green Alleys: The Design of Sustainable Infrastructure, its Usefulness in Urban Heat Island Mitigation, and the Adaptation of Urban Landscapes in Chicago*

◊ Darshan Karwat, College of Engineering (Aerospace)
  *Jet Fuel and Biofuel Emissions: Combustion, Atmospheric Chemistry and Environmental Policy*

◊ Michelle Price, College of Literature, Science, and the Arts (Chemistry)
  *Microwave Photoconductivity Measurements of Organic Semiconductor Single Crystals and Polycrystalline Films via Subdiffraction Focusing with Near Field Plates*

◊ Laura Sherman, College of Literature, Science, and the Arts (Geological Sciences)
  *Use of Mercury Isotopes to Trace Anthropogenic Mercury Emissions from Coal Combustion into Ecosystems*

◊ Laura Smith, Taubman College of Architecture & Urban Planning (Architecture/Design)
  *Buildings as Environmental Educators: A Question of Engagement*
Undergraduate Scholars Program

Building on several years of successful course development at the undergraduate level, last year we launched the campus-wide Undergraduate Sustainability Scholars Program. This interdisciplinary program admits 25 top performing U-M undergraduate students (3.3 minimum GPA) each year to engage in a 10-credit series of sustainability-focused courses that earns them a special transcript notation upon completion of the program. Throughout the experience, Scholars also participate in cohort-building activities to develop bonds and strengthen opportunities to learn from peers across multiple disciplines.
Undergraduate Curriculum

As a central component of our educational mission, we regularly support development and execution of innovative, hands-on sustainability courses for undergraduate students. Examples of experiential offerings that we fostered during the past year include:

◊ **Sustainability Challenges & Opportunities in East Africa**  
Mpała Research Centre and Wildlife Foundation, Laikipia, Kenya  
This course focused on sustainability challenges in East Africa through exploring interrelationships among climate, demographics, economics, and human-wildlife interactions. Using social-history, natural-science, and field-ecology research methodologies, students participated in a multidisciplinary field experience in one of the world’s most biologically and ecologically diverse areas.

◊ **Sustainable & Fossil Energy: Options & Consequences**  
Camp Davis Rocky Mountain Field Station, Jackson Hole, Wyoming  
Through this course, students explored the environmental consequences of sustainable and fossil energy sources through site visits to power-generation facilities and hands-on alternative-energy experiments. Students gained first-hand experience with a wide variety of power-generation methods, including nuclear, hydroelectric, wind, solar, gas and coal.

◊ **Sustainability & the Campus**  
U-M Campus, Ann Arbor, Michigan  
This interdisciplinary, project-based course explored the ecological, social, and economic dimensions of sustainability in higher education. Using U-M as a living-learning laboratory, student teams conducted hands-on group projects with U-M operating units as sponsors. Some of the project topics for this year’s course included: *Bike Sharing, Trayless Dining, Single-Stream Recycling,* and a *Student Sustainability Guide.*
Internships and Awards

We believe it is important for students to pursue a wide range of sustainability-oriented learning opportunities and to be recognized for their accomplishments. To this end, we support a variety of scholarships, grants, and award programs. Examples from the past year include:

◊ **Field Study Scholarships:** We awarded a total of $30,000 in merit-based scholarships to seven Program in the Environment undergraduate students, providing them with the support needed to take on challenging, field-based projects related to environmental sustainability.

◊ **Dow Sustainability Innovation Student Challenge:** We administered U-M’s involvement in the Dow Sustainability Innovation Student Challenge—an international program that recognizes graduate students for their innovative sustainability ideas. The U-M winners were Colm Fay, Cynthia Koenig, and Christopher Mueller, whose team won a $10,000 cash prize. Their start-up social venture employs an innovative business model to distribute water rollers—a proven collection and transport technology—to facilitate clean water access in the developing world.

**Student Sustainability Initiative**

This was our second full year sponsoring the Student Sustainability Initiative (SSI), which coordinates activities across several dozen sustainability-oriented student groups on campus. Upon formation, the SSI’s top priorities were to help the university: 1) establish an Office of Campus Sustainability and 2) adopt LEED Silver certification as the green building standard for new construction projects. Last year, both of these goals were accomplished and President Coleman specifically thanked the SSI for their efforts and “pushing us to do more.” For their outstanding work, the SSI won the 2009-10 Student Entrepreneurship Award from Oikos International—a global student organization focused on sustainable economics and management.
With the ultimate goal of helping solve complex sustainability challenges, we established Integrated Assessment (IA) as the cornerstone of our research activity. Through this methodology, we engage researchers, policy makers, and other stakeholders to identify key policy questions around which assessments are developed. We then support efforts to gather and assess the natural, social, and technological information needed to help policy makers evaluate options. Thus far, we have allocated $2.5 million to support IA projects on local-to-global scales. Through consultation with our External Advisory Board, Executive Committee, and other advisors we initiated the following projects:

**Campus Sustainability**

In partnership with the U-M Office of Campus Sustainability, we have been leading an IA to develop stretch goals that will solidify U-M as a global leader for sustainable campus operations. Completed in the summer of 2010, the first phase of this project focused on seven topic areas: Buildings, Energy, Land & Water, Food, Transportation, Purchasing & Recycling, and Culture. Led by faculty and staffed by students, the seven analysis teams conducted literature reviews, benchmarked peer institutions, and evaluated U-M practices—working with operations personnel to gain institutional perspectives.
Following Phase 1, we reviewed analysis team reports and conducted multiple meetings to identify areas of intersection across proposed ideas. In looking across the reports, we classified ideas with benefits in five key sustainability theme areas: Climate; Human Health; Ecosystem Health; Materials Footprint; and Community Awareness. During the second phase of the project, the analysis teams will pursue more detailed analyses in priority areas that support the broader themes.

Phase 2 reports will be completed in December 2010, with integration of those analyses into a final IA report being delivered to the Executive Council in March 2011. The final report will include a suite of recommendations and stretch goals to help define a 10-year roadmap for University of Michigan campus sustainability efforts.

Global Health Equity and Sustainability

In partnership with the U-M Center for Global Health, we called for proposals for pilot studies focused on the impacts of climate and water issues on health inequities in international settings. Following the completion of the pilot studies, selected grantees will be encouraged to submit fully developed proposals, from which we will select a limited number to support at approximately $100,000–$150,000 per year over two to three years.

In 2004, 58% of the world’s rural population did not have access to clean water.
(Source: United Nations Millennium Development Goals)
Great Lakes Cities Climate Adaptation

Working in coordination with the recently funded Great Lakes Integrated Sciences and Assessment Center, we are supporting several U-M faculty research teams to develop an IA focused on city-scale climate change adaption in the Great Lakes Region (both Canada and the US). To kick off this effort, we convened and hosted approximately 50 key stakeholders representing cities in the region, government agencies, non-governmental organizations and academia to further define directions and objectives for this IA.

Transportation/Sustainable Communities

In partnership with the U-M Transportation Research Institute, we are developing an IA focused on national transportation policy and the Partnership for Sustainable Communities (PSC) – a jointly sponsored effort among the White House Office of Urban Affairs, US Environmental Protection Agency, US Department of Transportation, and US Department of Housing and Urban Development. Potential foci include framing goals, policies, and performance measures for the PSC Livability Principles.
Detroit

Through discussions with City of Detroit representatives and non-governmental organizations, we have been exploring how a Detroit-focused IA could support a variety of policy objectives, such as economic development, infrastructure, transportation and accessibility, open space, environmental justice, urban agriculture, recycling and waste systems, and neighborhood dynamics. As a next step, we are embarking upon a pilot project to create a suite of sustainability indicators and associated data in collaboration with Data Driven Detroit, with the goal of contributing to the efforts of numerous organizations in the region.

Benefits of IA

In collaboration with Michigan Sea Grant, we embarked upon a project to better understand and communicate the value of the IA methodology. This involved interviews with participants across four IA projects that represented different issues, scales, and levels of stakeholder involvement. A diverse collection of individuals were interviewed, including staff and scientists at state and federal agencies, consultants, and community members. Across the interview population, IA participants expressed a common set of themes, benefits, and outcomes related to the IA process and its deliverables, which have been documented in a white paper that is available through our website.
Grants

◊ **Water Sustainability and Climate:**
We were a key partner on a successful proposal to the National Science Foundation (NSF) in response to their Water Sustainability and Climate (WSC) program. Through this five-year, $5 million award, we will address the question: “What are the possible effects of climate-change-induced extreme events on water quality and ecology in the Great Lakes system, and what management strategies will be effective in addressing these changes?” It is expected that our results will advance the scientific understanding of coupled human-climate-water quality systems, and inform and influence decision-making in the Great Lakes region.

◊ **Climate Change Education Partnership:**
We partnered with Eastern Michigan University and a network of educators and extension specialists on a successful $1 million grant proposal to NSF to develop a Climate Change Education Partnership (CCEP). The CCEP will integrate disparate institutions and individuals engaged in climate science research, climate literacy research, and climate education activities within the Great Lakes region. A comprehensive, regional focus will link communities—which often work in isolation and without a systemic, coordinated plan—to better understand climate change and its impact on the Great Lakes region.

◊ **Great Lakes Regional Integrated Sciences and Assessments:**
In partnership with Michigan State University and the Ohio State University, we earned a 5-year, $4.2 million grant from the National Oceanic and Atmospheric Administration to create the Great Lakes Regional Integrated Sciences and Assessments Center (GLISA). GLISA focuses on the watersheds of Lake Huron and Lake Erie, spotlighting three critical sectors in the region—agriculture, watershed management, and natural resources-based recreation and tourism. The two overarching goals of GLISA are to contribute to the long-term sustainability of the region in the face of a changing climate and to improve the utility of scientific knowledge to decision making.
Publications

The Graham Institute supports a wide range of research at the University of Michigan. A sample of publications and white papers resulting from this research during the past year include:

◊ Benefits of Integrated Assessment: Information for Decision Makers, Project Leaders and Scientists, 2010 white paper

◊ A New Planning and Design Paradigm to Achieve Sustainable Resource Recovery from Wastewater, September 2009, Environmental Sciences & Technology

◊ Prevalence of Antibiotic Resistance in Drinking Water Treatment and Distribution Systems, October 2009, Applied and Environmental Microbiology

◊ Sustainable Control of Water-Related Infectious Diseases: A Review and Proposal for Interdisciplinary Health-Based Systems, July 2009, Environmental Health Perspectives


◊ Urban-Rural Connections: Sustainability in a Volatile World Conference Summary Report, 2009 white paper

◊ Water, Health, & the Environment Report: Compilation of White Papers and Abstracts from the Graham Institute’s Annual Conference, 2009 white paper

These reports and others are available on our website www.graham.umich.edu.
Communications

Building on our commitment to produce two, high-quality print newsletters annually, we advanced our communications efforts over the past year, with a heightened focus on online tools to promote sustainability. This included the launch of a U-M Sustainability News html newsletter, with six bi-monthly issues being distributed to 12,000 subscribers.

We also significantly upgraded our website with new content areas, expanded navigation, and other improvements to better communicate our expanding and increasingly complex set of activities. Our website is proving to be a valuable resource, with an average of 4,000 people visiting per month for an average of 2.4 minutes per visit, surpassing industry standards for higher education by 9%. To expand our web presence, we also launched a Facebook Page and Twitter account, helping us to take advantage of popular social media outlets to better communicate our work.

We received extensive media coverage throughout the past year on topics ranging from the U-M sustainability initiative to research on dead zones in the Gulf of Mexico. We were featured in more than a dozen interviews and stories in multiple print and broadcast news outlets, ranging from regional public radio stations to the major national outlets such as CBS News.

Print and electronic newsletters produced by the Graham Institute
Events

As part of our ongoing outreach efforts, we regularly help to organize and sponsor sustainability-focused events, both on and off campus. Some of the significant events we supported in this past year include:

◊ **Campus Sustainability Town Hall Meetings** (January, April, and July 2010): More than 350 faculty, students, and staff attended these public forums, which provided opportunities for community members to share their ideas and perspectives on the topic.

◊ **40th Anniversary Earth-Day Teach-In** (March 2010): This symposium brought together panels of faculty experts with campus stakeholders to discuss critical sustainability issues, such as climate, livable communities, freshwater, and food & health.

◊ **Penny W. Stamps Distinguished Speaker Lecture** (March 2010): This event, titled *The Role of Biomimicry in the New Green Economy*, highlighted a new product design discipline called biomimicry and its potential role in prompting a new industrial revolution.

◊ **Environmental Justice in Michigan** (March 2010): Governmental representatives and key stakeholders shared their views on the State of Michigan’s draft policy on how best to pursue environmental justice in poor and minority communities.

◊ **Constructing Green** (May 2010): This conference explored the strategies, relationships, and opportunities inherent in green building, as a technological, industrial, institutional and cultural shift.

◊ **STEM – Africa** (May 2010): This conference explored natural resource management, climate change, and environmental justice strategies in Africa.
CONCLUSION

As this 2009-10 Annual Report has illustrated, we have made significant progress in supporting the university’s commitment to sustainability – in education, research, and operations.

We have successfully connected academics, policy-makers, and practitioners to help solve challenging sustainability problems. We’ve brought together diverse collections of researchers and stakeholders to develop science-based assessments to inform and assist policymakers in making complex decisions. And, we’ve created and supported interdisciplinary educational programs that explore the complexities of sustainability, emphasizing the interrelationships between human-environment systems.

In the year ahead, we will work hard to advance solutions-oriented research in the critical themes of freshwater, livable communities, and climate change. We will continue to place strong emphasis on education, as we seek to engage students in a powerful learning journey – within and beyond the classroom – that spans disciplines and instills the knowledge and skills they will need to become future sustainability leaders. And, we will accelerate outreach efforts that educate external communities and constituents on how to economically and effectively achieve sustainability on local-to-global scales.

The University of Michigan continues to build momentum as a global leader in sustainability education, research and operations. At the Graham Institute, we are excited to have a central role in this effort, helping the university to make a sustainable difference at home and throughout the world.

To stay apprised of our initiatives, please visit the Graham Institute website at www.graham.umich.edu. If you have any questions, comments, or ideas you would like to share, please feel free to contact us by phone at (734) 615-8230 or by e-mail at graham-institute@umich.edu.
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