

**Teaching Nature:**

**Opportunities for Permaculture Education at the University of Michigan**

**Project Team:**

*Hannah Gingerich*  
*Colleen Rathz*  
*William Benjamin Rogers*  
*Precious Smith*  
*Rachel Voyt*

**Sponsors:**

*Chiwara Permaculture:*  
Nathan Ayers

*University of Michigan Sustainable Food Program:*  
Jerry Tyrrell

## Executive Summary

Permaculture is a design science that focuses on modeling man-made systems on natural ecosystems. As a form of sustainable design, permaculture can teach students about agricultural, ecological, and locally appropriate solutions for a more environmentally responsible future. Permaculture has great potential within a higher education curriculum and as a co-curricular activity. Co-curricular components, including the development of a Permaculture Design Team (PDT) and the creation of on-campus permaculture gardens, have already been partially implemented at the University of Michigan (UM). The present study, sponsored by the UM Sustainable Foods Program (UMSFP), the PDT, and Chiwara Permaculture, sought to identify opportunities to integrate permaculture education into the UM curriculum.

Our survey of UM students (474 respondents from 19 UM schools/colleges) demonstrated widespread interest in permaculture. Nearly half of students (41%) were interested in electing a permaculture course, especially those who have taken previous courses in sustainability or seek to study sustainable food systems. In student focus groups, participants identified education as a necessary step towards sustainable agriculture. Both students and faculty found particular value in experiential and field-based learning in relation to agro-ecological classes. Taken together, our findings indicate strong student demand for permaculture education within the UM curriculum.

The creation of a permaculture course will respond to demand and help establish a balance between curricular and co-curricular permaculture education on campus. While several extant courses relate to sustainable agriculture, a dedicated course is necessary to educate students on the principles and practice of permaculture design. A course will offer interested students a chance to learn about permaculture in an intensive, experiential context.

We recommend six immediate and near-future solutions:

1. **Create a Permaculture Advisory Team (PAT) within PDT:** The PAT subcommittee will supervise the realization of recommendations in collaboration with community partners.
2. **Support Honors 135: “Methodology and Practices of Permaculture”** Madeline Dunn, the leader of PDT, will teach a first-year seminar in permaculture in Fall 2013. As a ‘small experiment,’ the course will both test the viability of permaculture curricula and meet student demand (36% of first-years expressed interest in a permaculture course). Input from the project team will include faculty advice, focus group feedback, and campus resources.
3. **Develop an independent study template for permaculture:** Given that 32% of survey respondents would dedicate 4 hours/week to a permaculture course, students may want to design an independent study. The project team template offer suggested project ideas, resources, and readings. UMSFP will add the template to its website.
4. **Integrate permaculture into existing courses:** Faculty identified an overlap between sustainable agriculture and permaculture. Given student interest in experiential education, faculty should consider adding a ‘permaculture unit’ with a field-based component to existing agro-courses. The PAT will communicate with faculty and offer resources.
5. **Create a permaculture course by 2015:** About a third of UM students surveyed would consider electing a permaculture course. Interested faculty are encouraged to draw upon ‘small experiments’ (e.g., Honors 135) and offer a permaculture course by Fall 2015.
6. **Develop a UM PermaWiki:** Most (69%) survey respondents wanted to learn more about permaculture, yet less than half would elect a class. To bridge this gap, the PAT should create a permaculture wiki with news, community projects, and relevant courses. Hyperlinks would create a web of knowledge branching out to community organizations.

## Project Background

### *Past Efforts*

Permaculture is gaining momentum at the University of Michigan as a result of student efforts. The present study stems from work conducted by the Fall 2012 Permaculture Integration Team from the *Sustainability and the Campus* course (ENVIRON 391). Two community actors—Chiwara Permaculture and UMSFP—sponsored the team, challenging them to define a place for permaculture on campus. After a semester of research, the Fall 2012 team offered three actionable recommendations for permaculture integration at the University of Michigan: (1) creating a satellite garden on campus, (2) developing a co-curricular permaculture program, and (3) producing an interdisciplinary capstone permaculture course and possible permaculture certificate program (Marco, et al., 2012).

Since 2012, students have formed the Permaculture Design Team (PDT) and identified a plot for a satellite garden on campus. Interested students may now join PDT to design and create ecologically informed landscapes. Students may also become involved with UMSFP and participate in the design, planting, and harvest of a sustainable campus farm. Though the presence of PDT and UMSFP demonstrates co-curricular student interest in permaculture, at present there exists no course focused exclusively on permaculture.

### *Community Involvement*

Chiwara Permaculture, founded and led by Nathan Ayers, describes itself as a Michigan-based research, education, design, and incubation firm. Chiwara focuses on small-scale, community-based solutions in food, energy, water, building, transportation and waste. In addition to research and design projects, Chiwara Permaculture offers educational programming at the K-12, college/university, and professional levels. Chiwara Permaculture was inspired, primarily, by Bill Mollison and David Holmgren's 12 principles of permaculture (Holmgren, 2010).

1. *Observe and Interact*
2. *Catch and Store Energy*
3. *Obtain a Yield*
4. *Apply Self-regulation and Allow Feedback (set limits to growth)*
5. *Use and Value Renewable Resources and Services*
6. *Produce No Waste*
7. *Design From Patterns to Details*
8. *Integrate Rather than Segregate*
9. *Use Small and Slow Solutions*
10. *Use and Value Diversity*
11. *Use Edges and Value the Marginal*
12. *Creatively Use and Respond to Change*

In sum, Chiwara is inspired by nature and the lessons that can be learned from the study of complex, natural systems.

With projects in Highland Park, Beaver Island, and Ann Arbor, Chiwara Permaculture works to create permaculture learning opportunities within the state of Michigan. Chiwara serves as a

community permaculture lab with backyard and basement experiments, as an environmental library, and as a community meeting space. Chiwara seeks to teach permaculture to a wide audience, thus helping create a permaculture course at UM directly relates to its core mission.

In addition to Chiwara, UMSFP sponsored the Fall 2012 project. Established in 2012, UMSFP has quickly emerged as UM's leading organization in sustainable food systems. UMSFP's overarching mission in carrying out such actions is to "foster collaborative leadership that empowers students to create a sustainable food system at the University of Michigan while becoming change agents for a vibrant planet" (UM Sustainable Food Program, 2012).

UMSFP focuses its mission in three different areas. First, UMSFP helps develop responsible citizens and leaders through educational approaches that include building living laboratories on campus, supporting opportunities for service-based learning, offering mentorship for volunteers and interns, and promoting food-related university classes. Second, UMSFP works to strengthen communities through collaboration and outreach by regularly connecting with (and supporting) other food-related groups on campus and hosting events that connect diverse groups. Finally, UMSFP devotes one-third of its central mission to growing sustainable food and operates a campus farm in conjunction with Matthaei Botanical Gardens. UMSFP strives to be a visible proponent of a healthy environment, demonstrate ethical agricultural practices, and support the UM's sustainability goal of sourcing 20% local and sustainable food by 2025. The organization exists as a positive, driving force within the sustainable food community, both on campus and within the Ann Arbor community.

### *Current Study*

The present study sought to assess further options for permaculture education at UM. In general, these options include both curricular and co-curricular offerings—two modes of education that compete for students' attention and often overlap. After meetings with project sponsors and preliminary interviews with UM faculty, the project team outlined options for permaculture programming at the university and set an evaluative criteria:

- *Contribution to curricular diversity*: integrates permaculture principles and ethics into the curriculum; includes design, cultural, and agriculture components of permaculture
- *Opportunities for student engagement/input*: students help design, develop, and implement the program/offering; the program is student-driven
- *Focus on experiential learning*: learning is an active, iterative process; involves the practice of permaculture principles
- *Implications for the longevity of on-campus permaculture education*: the program lends itself to the sustained presence of permaculture education at UM

Each option was then rated as 'high' (3), 'medium' (2), or 'low' in its fulfillment of each criterion. Assigning equal weight to each criterion, an average score was calculated for each option to aid the selection of a project objective.

### *Options for On-Campus Permaculture Programming*

#### **1. Lay the foundation for a permaculture course:**

To accomplish this, the project team would work alongside professors interested in offering a permaculture class in Fall 2013 or Winter 2014. Our work would include reviewing syllabi from previous sustainable food/agriculture courses, identifying overlap with the permaculture designer manual (Mollison, 1988), and outlining possible areas for instruction. The project team would then produce a report for interested professors and project stakeholders describing the possible structure for a course in permaculture and integrating results from the student interest survey. Data, analysis, and evidence from the report would empower faculty to design and implement a permaculture course.

Contribution to curricular diversity: **High (3).** An experimental (first-time) course in permaculture would help better integrate permaculture into the curriculum at the University of Michigan by providing a template for future courses and demonstrating student interest in permaculture.

Opportunities for student engagement/input: **Medium (2).** Student interest would likely shape the course, and students may be involved in course planning and evaluation. Faculty, however, would retain full discretion over the content and structure of a course.

Focus on experiential learning: **High (3).** A permaculture course would necessarily include opportunities for experiential learning.

Implications for the longevity of on-campus permaculture education: **High (3).** A dedicated course would be the basis for a recurrent permaculture course or for a permaculture capstone (towards a possible minor in sustainable food systems), as recommended by the Fall 2012 Permaculture Team.

Overall: **2.75**

## **2. Create a permaculture track within a sustainable food systems minor:**

The University of Michigan Sustainable Food Program is currently working towards a certificate or minor in sustainable food systems. Such a program could offer students tracks, allowing them to design a program that closely fits their sustainability interests. These tracks would likely include capstone courses within a student's area of interest, thereby allowing students to integrate their coursework into a cohesive program of study. Permaculture could be an exciting addition to the track options. The project team would work to envision and describe such a track, articulating how permaculture would fit into the minor and composing a long-term plan for its creation.

Contribution to curricular diversity: **Medium (2).** Planning a long-term permaculture track would entail both identifying existing courses and advocating for new course offerings.

Opportunities for student engagement/input: **Medium (2).** Students would be able to articulate their interest in a sustainable food systems minor, but approval would be contingent upon faculty and administrative support.

Focus on experiential learning: **High (3).** A permaculture track would necessarily involve experiential education.

Implications for the longevity of on-campus permaculture education: **High (3).** A clearly articulated permaculture track would enhance the profile of permaculture education on campus and enable students to designate permaculture as a part of their program of study.

Overall: **2.5**

### **3. Develop a co-curricular permaculture certification in collaboration with the Permaculture Design Team (PDT) and the University of Michigan Sustainable Food Program (UMSFP):**

Students might wish to study permaculture both inside and outside of the classroom. A co-curricular program would offer students a permaculture certificate from a non-university actor (e.g., the PDT or UMSFP). This would entail developing a ‘menu’ of permaculture-related courses at the university and outlining the course and experiential requirements of a co-curricular certificate program. Recommendations for a co-curricular certificate program would be drafted in collaboration with university faculty and students, allowing for critical input from institutional actors.

Contribution to curricular diversity: **Low (1).** A co-curricular certification program would not directly influence the curriculum at the University of Michigan.

Opportunities for student engagement/input: **High (3).** While faculty would help shape the ‘menu’ of recommended courses, students would have full discretion when selecting courses towards the completion of a non-university certificate. A certificate would thus be a marker of interest, not skill-based competencies.

Focus on experiential learning: **High (3).** Students would be encouraged to participate in both course-based experiential learning and co-curricular experiential programming.

Implications for the longevity of on-campus permaculture education: **Medium (2).** A high rate of student participation may spur interest curricular change, whereas low participation would likely yield relatively little. Given the co-curricular nature of certification, long-term institutional change seems unlikely without a plan for curricular integration.

Overall: **2.25**

### **4. Assemble a syllabus for independent study in permaculture**

Given interest in permaculture coursework, some students may wish to plan an independent study in permaculture with a similarly interested faculty member. An independent study would allow students to engage in formal study of permaculture-related texts while designing an academic product of their choice. To facilitate independent study, the project team would work with faculty, students, and project sponsors to compile permaculture resources (readings, films, etc.) and develop recommendations for student projects (e.g., a memo to the curriculum committee about the value of permaculture-related coursework). This would ensure student engagement with permaculture at the institutional level and bolster the momentum of the movement for sustainable food curricula.

Contribution to curricular diversity: **Low (1).** Though an independent study would offer students to explore permaculture content unavailable in current course offerings, it would not influence the broader UM curricula directly.

Opportunities for student engagement/input: **High (3).** In collaboration with faculty, students would tailor an independent study to fit their individual interests within the study of permaculture.

Focus on experiential learning: **Medium (2).** Students may build in field-based learning (e.g., garden/farm work) or university-based education (e.g., producing a memo about permaculture education). Students may, however, opt to forego experience-based learning, thus the nature of learning is mostly student-driven.

Implications for the longevity of on-campus permaculture education: **Low (1).** Given its individual nature, an independent study would not lend itself to long-term institutional change.

Overall: **1.75**

## **5. Organize a permaculture field day for Fall 2013**

Generating student interest may require greater visibility and understanding of permaculture principles. To this end, the project team would plan, organize, and obtain funding for a permaculture field day to occur at the beginning of the upcoming academic year. A field day could take place at Chiwara House, the UMSFP Campus Farm or a garden space secured by the PDT. Participants would gain a basic knowledge of permaculture and be linked with co-curricular offerings (e.g., Chiwara, PDT, and UMSFP). The results of the student interest survey would guide marketing materials and identify the target demographic for this event. Funding may come from the Student Sustainability Initiative, Central Student Government, or other university groups.

Contribution to curricular diversity: **Low (1).** As a one-time occurrence, a field day would not produce curricular change.

Opportunities for student engagement/input: **High (3).** Students would be solely responsible for organizing and implementing a field day, thus their input would be paramount.

Focus on experiential learning: **High (3)**. A field day would offer students the opportunity to learn permaculture techniques in a farm or garden setting.

Implications for the longevity of on-campus permaculture education: **Low (1)**. The singular nature of a field day would not lend itself to long-term institutional change.

Overall: **2.0**

#### *Options Matrix:*

The aforementioned options for permaculture education at UM are rated and summarized below:

	<b>Curricular Diversity</b>	<b>Student Input</b>	<b>Experiential Learning</b>	<b>Longevity</b>	<b>Avg. Score (Rank)</b>
<b>Permaculture Course</b>	High (3)	Medium (2)	High (3)	High (3)	2.75 (1)
<b>Permaculture Track</b>	Medium (2)	Medium (2)	High (3)	High (3)	2.50 (2)
<b>Permaculture Certificate</b>	Low (1)	High (3)	High (3)	Medium (2)	2.25 (3)
<b>Independent Study</b>	Low (1)	High (3)	Medium (2)	Low (1)	1.75 (5)
<b>Permaculture Field Day</b>	Low (1)	High (3)	High (3)	Low (1)	2.00 (4)

#### *Problem Statement*

After garnering feedback from project sponsors and stakeholders regarding the aforementioned options, the project team selected the highest rated option (lay the foundation for a permaculture course) as its principle objective. Given the presence of a growing co-curricular permaculture presence on campus (through the efforts of the Permaculture Design Team), there is greater need to develop curricular avenues to permaculture education in order to bolster the presence of permaculture on-campus. A course poses a strong contribution to curricular diversity and, if designed in reference to student interest, would engage students in experiential education. Moreover, a course offers a pathway towards the institutionalization of permaculture education.

Drawing on the work of previous ENVIRON/RCDIV 391 students and on contemporary research, the current ENVIRON/RCDIV 391 permaculture team worked closely with Chiwara Permaculture and the UM Sustainable Food Program to address the following questions:

- How can UM aggregate passion for permaculture into a cohesive curriculum and future co-curricular activities at the University of Michigan?
- What is the best way to implement a permaculture course at UM?



- What barriers would prevent UM from implementing a permaculture course? What options exist to overcome these challenges?

With these questions in mind, the project team sought to assess the viability of a permaculture course at the University of Michigan through primary and secondary research and produce a set of vetted recommendations for UM, Chiwara Permaculture, and UMFSP that address how the University can incorporate the lessons and lens of permaculture into its academic programming.

## Research Objectives

The present analysis used both qualitative and quantitative research to chart a path forward for permaculture education on campus. In conducting mixed-methods research, the project team winnowed out unfeasible options, thereby generating a list of vetted recommendations for permaculture integration. Aggregating knowledge about the integration of permaculture within higher education and, more narrowly, the possibility for permaculture education at the University of Michigan was key to this process.

Thus, in conducting our study, we sought to address the following set of objectives:

1. *Produce a case study of permaculture programming at Indiana University, Bloomington:*  
Permaculture programs at peer institutions serve as valuable models of the integration of permaculture with higher education. A semi-structured interview with Professor David Haberman offered an overview of his permaculture course at IU Bloomington. Through this interview, the project team sought to glean an understanding of factors critical to the success of campus-based permaculture initiatives, as well as stories and advice from a permaculture program. In turn, this case study serves as an evidence base for permaculture education and practice at the University of Michigan.
2. *Quantify student interest in permaculture curricula:*  
For permaculture education to succeed at the University of Michigan, there must be student demand for permaculture-related offerings. The project team conducted a survey of undergraduate and graduate students to assess student interest in permaculture course offerings. In doing so, we identified five areas of inquiry:
  - Assess previous knowledge, if any, of permaculture
  - Gauge the level of interest in permaculture education on campus
  - Measure past involvement with environmental learning on campus
  - Distinguish the importance of sustainability in the student university experience
  - Identify a target demographic for a permaculture course
3. *Analyze the sustainable natural environment and food-related behaviors of current University of Michigan students:*  
In that permaculture involves ecological landscape design and sustainable agricultural practices, data about students' natural environment and food-related behaviors indicated the extent to which students are already engaged with these concepts. The project team drew on data from the Sustainability Cultural Indicators Project (SCIP), a campus-wide assessment conducted by the Graham Institute towards the fulfillment of the University of Michigan's

2025 sustainability goals. Analyses indicate the scope and depth of student involvement in permaculture-relevant behaviors and serve as a baseline for future analysis.

4. *Qualify student interest in permaculture through student focus groups:*  
Though interested in permaculture, students may hesitate to take a permaculture-related academic course. To gauge student interest in permaculture and solicit student input, the project team held two student focus group sessions. Throughout the focus groups sessions, participated engaged in conversation about the implementation of permaculture education on campus. These responses may serve as input towards the design of a permaculture course.
5. *Assess faculty interest and attitudes towards a permaculture course:*  
Faculty interest in permaculture is of critical importance to the creation of permaculture curricula. Through individual interviews, the project team engaged the faculty members in meaningful conversations about permaculture education on campus. Interviewers aimed to gain a better understanding of how to implement a permaculture course. Lastly, interviewers sought a clearer understanding of if, and how, permaculture education fits at UM from the viewpoints of multiple faculty members.
6. *Conduct an analysis of project stakeholders:*  
Successful integration of permaculture into the curricular and co-curricular offerings of the university will require effort beyond the scope of the project. A matrix of project stakeholders profiles key permaculture actors on campus and outlines their role in project implementation.

## Methods

The present analysis drew from five sources: (1) a semi-structured interview with David Haberman of Indiana University, Bloomington, (2) a student interest survey, (3) the campus-wide Sustainability Cultural Indicators Project (SCIP), (4) student focus groups, and (5) faculty interviews.

*Semi-Structured Interview with David Haberman of IU Bloomington:* The project team sought to gain a deep knowledge of the formation of permaculture course at IU Bloomington. To this end, interview questions assessed the design, formation, and administration of Professor David Haberman's permaculture course. See the Appendix for the question guide.

*Student Interest Survey:* The project team surveyed a randomly generated group of 4,000 graduate and undergraduate students at UM from all disciplines and departments. Of the persons emailed, 612 responded to some or all of our survey. Of those responses, 474 responses were considered complete. See the Appendix for a complete list of survey questions.

*Sustainability Cultural Indicators Project (SCIP):* The Sustainability Cultural Indicators Project (SCIP) was an assessment conducted by the UM Graham Sustainability Institute and the UM Institute for Social Research. Conducted in 2012, the survey reached more than 4,000 graduate and undergraduate students and 1,500 staff. The student questionnaire contained 64 items about students' knowledge, attitudes, and practices related to climate action, waste prevention, and

healthy communities. Here, data from four questions are used to gauge students' current knowledge and practices with regard to sustainable landscape management and sustainable food consumption.

*Student Focus Groups:* Two focus groups were conducted to solicit student input about permaculture education on campus. In these focus group sessions, prepared questions assessed student understanding and interest in permaculture as an overall concept. Transcripts were recorded during the focus groups. General themes and illustrative quotes were then extracted for analysis and discussion. See the Appendix for the focus group rules and question guide.

*Faculty Interviews:* We conducted three interviews with faculty from the School of Natural Resources and the Environment and one with a faculty member from the Penny W. Stamps School of Art and Design. In these interviews, we assessed faculty attitudes towards permaculture, knowledge of current permaculture-related courses offered at UM, and interest in teaching a permaculture-related course. See the Appendix for the faculty interview question guide.

## **Findings**

### *Case Study: Indiana University, Bloomington*

The Indiana University Permaculture Design Course was initiated in 2003 by David Haberman, a professor in the Department of Religious Studies at Indiana University, Bloomington. Haberman's vision for a permaculture class was inspired after attending a course at an eco-village in South Carolina, where he was searching for holistic methods to approach environmental problems. After finding such methods in permaculture methodologies, Haberman presented his idea for a permaculture course to the director of the Collins Living-Learning Center in the College of Arts and Sciences, where the course was ultimately housed. It is now in its ninth year, taught as an immersive three-credit two-week summer course by David Haberman, Peter Bane, Keith Johnson, and Rhonda Baird, and is open to both students and faculty within and outside of Indiana University. The course is broken up into two major sections, where the first half centers on learning the principles and ethics of permaculture and the second focuses on self-selected design projects set up by the instructors. The class is limited to 25 students in order to better facilitate student learning and project work.

The program has gained an excellent reputation at the university through its continued student involvement and the quality of students that the program attracts. While the course was initially promoted through advertising via class advisors and in the school newspaper, the majority of the program's success is due to student promotions, which speak to the quality of the course and help greatly with student recruitment. It is hoped that the program will continue to be successful, with possible involvement by the Indiana University Center for Sustainability in the future.

### *Survey Findings*

#### **Demographics:**

Of the 474 survey participants, 37.3% (177) identified as male, 61.8% (293) identified as female, 0.2% (1) identified as other, and 0.6% (3) preferred not to answer. Students of each academic year responded to the survey, though first-year and graduate students comprised about half of all responses:

*Student Response by Academic Standing*

Freshman	104 (21.9%)
Sophomore	66 (13.9%)
Junior	89 (18.8%)
Senior	76 (16.0%)
Graduate Student	139 (29.3%)

All undergraduate and graduate schools and colleges at the University of Michigan were represented in the survey response. Of these, the College of Engineering and the School of Literature, Science, and the Arts were best represented among survey respondents. Respondents were also asked to identify their major or degree program. A robust array of academic programs was represented in the survey, and only 11 of the 474 respondents were majoring in Program in the Environment. See Appendix A for a chart of respondents by academic program.

**Attitudes Towards Sustainability**

Students seemed generally positive in their attitudes toward sustainability. A large majority (over 75%) agreed or strongly agreed with the value of learning and practicing sustainability, with few expressing strong dissent (less than 5%). Fewer students believed that sustainability was an important part of their college experience, though again the majority either agreed or strongly agreed (62.9%). One may surmise, then, that sustainability enjoys a positive image on campus, with many students willing to engage in sustainability-oriented discussions within the classroom.

	Strongly Agree	Agree	Disagree	Strongly Disagree
“I like to learn about sustainability in the classroom.”	138 (27.3%)	262 (51.8%)	85 (16.8%)	21 (4.2%)
“I like to practice sustainability outside the classroom.”	156 (30.8%)	301 (59.5%)	42 (8.3%)	7 (1.4%)
“Sustainability is an important part of my college experience.”	91 (18.0%)	227 (44.9%)	157 (31.0%)	31 (6.1%)

A total of 506 individuals responded to these questions, thus percentages are taken out of 506.

### **Interest in Sustainable Agriculture**

Compared to endorsements of sustainability, attitudes towards sustainable agriculture were again robust and positive. A strong majority (over 75%) of students were interested or strongly interested in learning about sustainable design and local food systems, and a majority (over 50%) expressed interest in learning about sustainable agriculture and/or working on a garden or farm as part of a college course. One might be surprised by students' eagerness to engage in 'scholarship with the soil,' but it seems that a plurality of students are interested in sustainable agriculture and experiential learning.

A smaller cadre (8.5%) of students expressed strong interest in earning a minor in sustainable food systems. Given the rigor of adding an academic minor, we were again surprised to find robust support for new programming in this area. Combined, nearly a quarter of those surveyed had some interest in earning a minor in sustainable food systems, and many more were interested in its core academic themes.

	Strongly Agree	Agree	Disagree	Strongly Disagree
"I am interested in learning about sustainable design."	119 (23.5%)	262 (51.8%)	98 (19.4%)	27 (5.3%)
"I am interested in learning about sustainable agriculture."	103 (20.4%)	231 (45.7%)	133 (26.3%)	39 (7.7%)
"I am interested in learning about local food systems."	131 (25.9%)	254 (50.2%)	88 (17.4%)	33 (6.5%)
"I would be interested in working for a garden or farm as part of a college course."	107 (21.1%)	170 (33.6%)	158 (31.2%)	71 (14.0%)
"I would earn a minor in sustainable food systems if one were offered."	43 (8.5%)	82 (16.2%)	245 (48.4%)	136 (26.9%)

A total of 506 individuals responded to these questions, thus percentages are taken out of 506.

### **Permaculture-Related Attitudes**

When asked about their interest in permaculture-related programming, respondents seemed open to new lines of academic inquiry. Here, responses seemed to taper as time commitments increased: 68.3% would be interested in learning more about permaculture, 41.5% would take a course on permaculture if one were offered, and 32.5% would consider a four-hour course (combining "strongly agree" with "agree").

From these responses, one can conservatively estimate that about 6% of the student body at large would be interested in a permaculture course (the percentage of respondents who expressed strong interest in a four-hour course) or optimistically estimate that up to 41.5% of students would be interested (the percentage of respondents expressing interest or strong interest in taking a permaculture course).

	Strongly Agree	Agree	Disagree	Strongly Disagree
“I would be interested in learning more about permaculture.”	77 (16.0%)	251 (52.3%)	121 (25.2%)	31 (6.5%)
“I would be interested in taking a course on permaculture if one were offered.”	48 (10.0%)	151 (31.5%)	228 (47.5%)	53 (11.0%)
“I would take a permaculture course for college credit, but not as an extra-curricular activity.”	31 (6.5%)	149 (31.0%)	239 (49.8%)	61 (12.7%)
“I would dedicate 4 hours per week to a permaculture course.”	29 (6.0%)	127 (26.5%)	235 (49.0%)	89 (18.5%)
“I would be interested in earning a Permaculture Design Certificate.”	24 (5.0%)	76 (15.8%)	260 (54.2%)	120 (25.0%)

A total of 480 individuals responded to these questions, thus percentages are taken out of 480.

### Permaculture-Related Behaviors

Most respondents have never participated in an environmental student organization, ecological design project, farm work, rainwater harvesting, home composting, or volunteer gardening. Gardening, however, is a common experience, as nearly three-quarters of respondents reported that they have helped plant a garden. Surprisingly, 28.5% of those sampled reported having ever worked on a farm. Given the overbroad nature of this question and a failure to define “worked on a farm,” these responses are less informative than one might hope.

“Have you ever \_\_\_\_\_?”

	Yes	No
Participated in an environmental or sustainability-oriented student organization	67 (14.0%)	410 (86.0%)
Volunteered in a garden	179 (37.5%)	298 (62.5%)
Helped plant a garden	347 (72.7%)	130 (27.3%)

Worked on a farm	136 (28.5%)	341 (71.5%)
Participated in an ecological design project	70 (14.7%)	407 (85.3%)
Participated in rainwater harvesting	57 (11.9%)	420 (88.1%)
Participated in home composting	190 (39.8%)	287 (60.2%)

A total of 477 individuals responded to these questions, thus percentages are taken out of 477.

### **Familiarity with Permaculture**

A slight majority of students were knowledgeable about the term ‘sustainable agriculture,’ whereas most were unable to define ‘permaculture,’ ‘biomimicry,’ ‘ecological design/engineering,’ and ‘closed-loop systems.’ Of these, ‘permaculture’ was the least understood. Just 9 respondents (1.9%) expressed comfort in explaining all five terms, whereas most could explain at least one term.

Familiarity with individual permaculture-related terms:

“I would feel comfortable explaining \_\_\_\_\_ to a friend”

Term	Number of Respondents Familiar with Term (Percentage out of 474)
Permaculture	31 (6.5%)
Biomimicry	89 (18.8%)
Sustainable Agriculture	239 (50.4%)
Ecological Design/Engineering	131 (27.6%)
Closed-loop Systems	119 (25.1%)

### **Interest in Permaculture**

Next, we were interested to assess variability in respondents’ interest in permaculture. Here, we examined how interest in a permaculture course varied by academic standing, by school, and by prior coursework in sustainability.

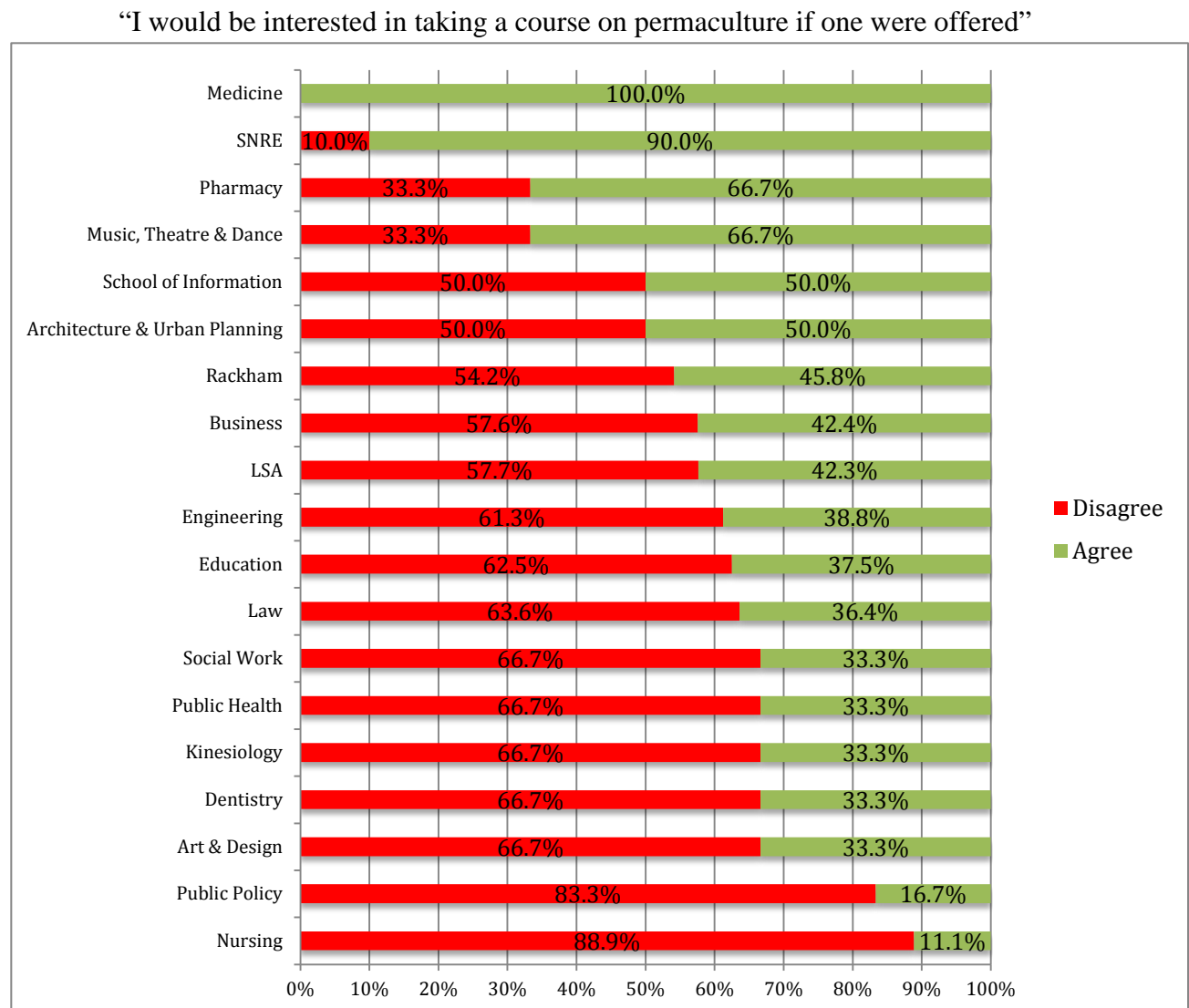
*By academic standing:*

First, students were divided by academic standing (freshman, sophomore, junior, senior, or graduate student) and categorized by interest in a permaculture course (interested, disinterested). Next, we conducted a Chi-squared test to assess for uniform distribution by academic standing. The Chi-squared statistic on 4 degrees of freedom was not significant at  $\alpha < 0.05$ , thus we may

conclude that interest in permaculture does not vary significantly by academic standing. Put simply, students of every level seem similarly interested in permaculture coursework.

*By school:*

Interest in permaculture was especially high among Medicine and School of Natural Resources and the Environment students. At least one student in *every* school represented was interested in taking a course on permaculture. The below graph represents interest in permaculture coursework by UM school or college:



*By prior coursework in sustainability:*

Last, we predicted that students with previous coursework in sustainability would be more interested in taking a permaculture course. To test this hypothesis, we created a cross-tabulation of interest in permaculture by prior sustainability coursework, which is presented below:



“I would be interested in taking a course on permaculture if one were offered”

	Agree	Disagree
Has taken a sustainability-related course	79 (40.5%)	32 (11.4%)
Has NOT taken a sustainability-related course	116 (59.5%)	248 (88.6%)
Total	195 (100%)	280 (100%)

Next, we conducted a Chi-Squared test for uniform distribution. The Chi-squared statistic on 1 degree of freedom was highly significant at  $a < 0.001$  (a robust level of significance), thus we conclude that interest in permaculture varies significantly by prior coursework in sustainability. In general, students with prior coursework in sustainability are more likely to express interest in taking a permaculture course.

## Logistic Regression

### *Background:*

We sought to identify a combination of variables that would best predict student interest in a permaculture class. To this end, we conducted a logistic regression—a statistical technique that assumes a binomial distribution and a dichotomous response (e.g., Yes/No). Here, we chose interest in a permaculture course as the dependent variable and divided respondents into groups by their interest (interested = 1, disinterested = 0). Since we had no *a priori* hypotheses about which independent variables would best predict a student’s interest in a permaculture course, we used a technique called *backward selection*—a process whereby all candidate variables are individually entered into the regression model and, at each step, the least significant variable is removed. The analysis thus converges on a model that contains the fewest variables needed to explain a significant portion of the variance in the response variable.

### *Interpreting the model:*

Here, the best model contained six predictor variables and explained approximately 30% of the variance in the dependent variable. This model correctly predicted 74.8% of all responses (as a comparison, a coin flip would explain about 50% of all responses), thus it does better than chance. The odds ratios displayed in the third column may be interpreted as follows:

*Respondents who said yes to variable X were approximately -- \_\_\_ times more likely to indicate an interest in taking a permaculture course than respondents who said no, when controlling for the other variables in the model.* All but one variable were significant at  $a < 0.05$  (practicing sustainability outside the classroom achieved trend-level significance of  $a < 0.10$ ). The two most substantial predictors of interest in a permaculture-related course include endorsement of interest in a sustainable foods minor and prior coursework in sustainability.

*Logistic Regression:*

<b>Predictor</b>	<b>Beta</b>	<b>S.E. (B)</b>	<b>Odds</b>	<b>Sig.</b>
Constant	-3.360	0.572	0.031	0.000
Has Taken a Sustainability-Related Course	1.153	0.278	3.169	0.000
Practice Sustainability Outside the Classroom	0.914	0.533	2.496	0.086
Interest in Sustainable Design	0.850	0.371	2.341	0.022
Interest in Sustainable Agriculture	0.867	0.312	2.379	0.005
Interest in working on farm or garden for college course	0.636	0.257	1.889	0.013
Interest in Sustainable Food Systems Minor	1.229	0.295	3.417	0.000

Model is significant at  $\alpha < 0.001$

Cox & Snell R-Square Estimator: 0.296

Method: Backward Conditional Binary Logistic Regression (in SPSS)

Percentage correct: 74.8% of responses correctly predicted (observed vs. predicted)

*Discussion:*

The strongest predictor of interest in a permaculture course were previous coursework in sustainability and interest in a sustainable food systems minor; students with either experience coursework or expressed interest in a sustainable food systems minor were about three times more likely to report interest in a permaculture course. Notably, variables that predicted interest in permaculture generally clustered around interest, not experience. Excepting previous coursework and an enjoyment of practicing sustainability outside of the classroom, interest in permaculture might best be considered as part of a larger interest in sustainable processes in agriculture, design, and experiential learning. Permaculture coursework would thus rest well within the larger whole of a sustainable food systems minor and fit securely within a framework of experiential learning.

**Sustainability Cultural Indicators Project (SCIP) Analysis**

Data from the SCIP were used to assess campus wide participation in environmentally minded landscape management and sustainable food practices. First, we examined student use of rain barrels, rain gardens, and native species/plantings at their individual residences. As a whole, students have resoundingly little experience in each domain; 4% indicates the highest endorsement of any individual item. It seems that students often have little control over landscape management at their residence (as indicated by high rates of ‘not applicable’) and, when they do have control, they typically do not use environmentally minded methods of management. A course in permaculture may therefore be an opportunity to engage students in thought about the design and maintenance of their residential gardens and/or lawn.

*Environmental Landscape Use:*

At your current residence, have you \_\_\_\_\_?

	Yes	No	Not applicable	Total respondents
Installed a rain barrel	2%	53%	45%	100% (2273)
Installed a rain garden	1%	53%	46%	100% (2271)
Intentionally planted native species in your lawn or garden	4%	48%	48%	100% (2269)
Converted all/part of lawn to native/natural plantings	4%	45%	51%	100% (2271)

### *Sustainable Food Knowledge:*

In that permaculture is a means of producing local, organic, and sustainably grown food, a baseline of student knowledge in this area may be useful to individuals seeking to design and market a course. The SCIP data indicate that, in general, students tend to have a stronger knowledge of organic food than locally-grown/processed food; 56% of students reported ‘a lot’ or ‘a fair amount’ of knowledge about organic food, compared with just 48% for local food. Education about the significance of local, sustainably grown and harvested food is needed to close this knowledge gap, and a permaculture course may play a role in edifying its participants about the value of local food.

How much do you know about \_\_\_\_\_?

	A lot	A fair amount	A little	Not much/ Nothing	Total
Locally grown or processed food	14%	34%	38%	14%	100% (4013)
Organic food	17%	39%	34%	10%	100% (4011)

### *Sustainable Food Practices:*

Last, we sought to examine the frequency with which students make sustainable food purchases. Here, disparity between organic and local food knowledge seems to be expressed in the ‘always’ category; 14% of respondents ‘always’ or ‘mostly’ bought local food, whereas 16% ‘always’ or ‘mostly’ bought organics. Encouragingly, many students placed themselves in the ‘sometimes’ category. A permaculture course may interest both groups of students, allowing them to examine the chain of production for both organics and local goods. Given the wide spread in response, a course might also ask its respondents to examine their own patterns of consumption as a means of engagement and education.

During the past year, about how often did you buy \_\_\_\_\_?

	Always/Most of the time	Sometimes	Rarely	Never	Don't Know	Total
Locally grown or processed food	14%	52%	17%	4%	13%	100% (2331)
Organic Food	16%	49%	20%	7%	8%	100% (2330)

## Focus Groups

The results of the focus groups are summarized as follows:

### *Sustainable Food Movement*

Most students saw a sustainable agriculture system as one that offered a holistic, community-based alternative to the current industrial agriculture model. Students emphasized responsible land, water, and soil use to ensure the survival of future generations by operating with closed-loop, zero-waste interactions. There was an overwhelmingly positive belief in the ability of these systems to replace the current agro-industry model, with perceived major roadblocks being policy, economics, behavior change and public perception.

### *Education/Experiential Learning*

The students viewed education, particularly that which emphasized experiential learning, as the first step toward implementing a sustainable agriculture system. The participants spoke passionately about their classes that had included experiential learning experiences, noting that those courses had been the most influential for them as students. Although they commented on the potential difficulties in testing the knowledge gained from these classes at a theoretical institution like the University of Michigan, the students were veritably in favor of experiential learning, arguing that it is difficult to visualize and connect to knowledge until there is some kind of experience and tangibility attached to it. Additionally, students believed that one of the most important products of hands-on learning was the high degree of self-motivation to invest and learn more about the subject at hand, which they saw as a key to success especially within environmental studies.

Students were also asked to describe their ideal class and the specific characteristics that they look for when choosing classes. Key components are as follows:

- Dynamic and interesting professor with a keen investment in the material, and a willingness to provide open-door communication with students
- Diverse use of educational resources, including guest lectures, community outreach, and different types of media
- Small class size
- Group project component
- Engaging course description

- Theoretical background applied to hands-on, applicable experiential learning

### *Permaculture Course Logistics*

The focus was narrowed even more as students were asked to speak to the specifics of what permaculture could look like at the University. All participants prized a course over an extracurricular option, noting that students tend to prioritize coursework over extracurricular opportunities and that courses allow for more consistency and longevity. There was a further, unanimous emphasis on experiential learning and a project component to the class, as well as an emphasis on a holistic, interdisciplinary teaching style that offered multiple perspectives on permaculture and its role in sustainable agriculture.

In terms of course goals, students would want to come away with a holistic and diverse understanding of permaculture and an ability to clearly communicate their knowledge. Some students suggested adding a community involvement component, enabling potential collaboration with the University of Michigan Campus Farm and possible partnerships within the Ann Arbor community.

There was some debate as to what the course should look like and to whom it should be offered. They believed the course should be somewhere between 2 and 4 credits, with arguments that 4 is too much work and that 2 would not allow enough time for the experiential component. The need for prerequisites was also debated. Some believed prerequisites would provide valuable background knowledge, whereas others believed that it would unnecessarily limit enrollment to those who had time and/or interest in multiple courses related to this topic.

Similarly, there was some disagreement as to whether the course should be open to underclassmen, upperclassmen, or graduate students, with a final consensus that it should be a natural science course open to all students of any major, with preferred seating for undergraduates. In the event that the class attracted a large number of students, participants saw potential for the class being divided into two sections at different times.

### **Faculty Interviews**

To generate a cohesive understanding of existing interest in permaculture education among UM faculty, we conducted interviews with four faculty members whom we identified as potential facilitators of a permaculture course: Dr. Raymond De Young, Dr. Ivette Perfecto, Joseph Trumpey, and Dr. Bill Currie. A number of significant themes emerged from these interviews regarding content, format, and feasibility of a permaculture course. Additionally, these interviews yielded an inventory of resources and recommendations from faculty members that helped to guide our project deliverables and recommendations for the future of permaculture education at UM.

### *Themes & Course Recommendations*

A prevalent topic discussed during faculty interviews was the position of permaculture education within the university's infrastructure. Faculty members offered numerous opinions on how and where permaculture could fit within the academic culture of UM. One opinion, brought to attention by Dr. Raymond De Young, was the idea of framing a permaculture course within the university's Third Century Initiative. The Third Century Initiative is a \$50 million, five-year

initiative overseen by the President and Provost. Established in celebration of the university's upcoming bicentennial, the initiative promotes the development of innovative, multi-disciplinary approaches to education scholarship. Dr. De Young suggested that a potential permaculture course might be able to draw momentum or direct support for implementation from the Third Century Initiative.

Additionally, Dr. De Young suggested that a permaculture course be positioned within the structure of the University of Michigan Sustainable Food Program. With support from UMSFP, Dr. De Young suggested possibly hosting an alternative, field-based permaculture course at the university's Matthaei Botanical Gardens. The course could involve faculty from multiple departments without being directly housed in a specific academic department within the university.

In contrast, Joseph Trumpey expressed concern for relying on faculty from different schools within the university, citing that collaboration on a single course between faculty members from different schools often creates financial conflicts for one or more of the colleges involved, particularly concerning which college will receive the financial compensation from the course's implementation. For this reason, collaboration amongst professors from different areas within the university may not be an attractive option to university administration.

Multiple faculty members also discussed holding a permaculture course during a spring or summer semester at UM. Dr. De Young noted that hosting a permaculture course during the growing season might increase its experiential value. On the other hand, Joseph Trumpey noted that finding faculty to teach a spring or summer term course may be difficult considering the fact that many full-time faculty members prefer to not to teach courses during those semesters.

One of the most prevalent suggestions that arose during faculty interviews was the idea of housing a permaculture element within the curricular structure of another course. Dr. De Young first raised this idea and Dr. Perfecto avidly supported it, noting that a course she co-teaches, ENVIRON 318: Food, Land, and Society, or a similar sustainability or agriculture-related course may be the perfect leverage point at which to incorporate permaculture curriculum for UM's current academic atmosphere.

All faculty members expressed concern about the feasibility of implementing a course solely based on permaculture at the university. Each suggested that permaculture might appear too "cultish" of a topic for integration into university curriculum. In addition, faculty members raised concerns about the highly specialized nature of permaculture. Dr. De Young and Dr. Perfecto suggested that a permaculture component could be integrated into a wider curriculum concerning alternative agricultural systems. Considering that the University of Michigan is not a land-grant university and has a limited background in agriculture education, Dr. Perfecto suggested that incorporating aspects of permaculture into a broader course might be the most viable solution for UM's current academic atmosphere.

Another prevalent theme that arose during faculty interviews was the manner in which a permaculture course could be taught at UM. All four faculty members provided tangible

suggestions for potential course formats and content. Suggestions regarding format and content are as follows:

**Format:**

- Formal course offering with one faculty member
- Formal course offering co-taught by two or more faculty members
- Formal honors seminar (Honors 135) taught by an undergraduate student
- Alternative course offering that provides “experiential” credit
- Alternative course offering that combines online modules with a field-based component

**Content:**

- Focus on agricultural components of permaculture
- Focus on biological components of permaculture
- Focus on sustainable living components of permaculture
- Focus on design principles of permaculture
- The role of permaculture in developing countries
- A combined focus on the multiple components of permaculture

*Project Implementation Recommendations*

Interviewed faculty also offered a number of recommendations for the progress and completion of our project’s deliverables. Their recommendations, echoed by multiple professors in some cases, are as followed:

- Develop a catalogue of all UM curriculum pertaining to sustainable food systems, including past and present courses, with the goal of identifying a clear position for permaculture curriculum within existing academic infrastructure
- Start by implementing smaller educational experiments that will help to promote and support greater permaculture curricular initiatives in the future
- Proceed with caution and the understanding a failed course offering has the potential to initiate long-term resistance to permaculture curriculum among UM administration
- Think outside of the box; consider alternative course structures and new modes of learning when designing potential permaculture curriculum

**Recommendations**

After analyzing multiple data gathered from both primary and secondary sources, we recommend five steps be taken to implement permaculture education at the University of Michigan. The options range in implementation from short to long term: (1) the formation of a subcommittee within the Permaculture Design Team (PDT) to continue project work (2) the support of an honors course on permaculture in the fall of 2013, (3) the creation of an independent study for Fall 2013, (4) the integration of permaculture into an existing course for spring of 2014, (5) the creation of a permaculture course incorporated into the Sustainable Foods minor that is applicable towards Program in the Environment (PitE) credit in 2014-2015, and (6) the creation of a UMich PermaWiki site to serve as a resource for the community.

1. Formation of a PDT Subcommittee

In order to ensure that the following recommendations will be carried out, we recommend the formal establishment of a Permaculture Advisory Team (PAT) as a sub-committee within the

existing Permaculture Design Team. The members would consist of the current ENVIRON 391 Permaculture Team members and interested PDT members, many of whom have worked on this project in the Fall 2012 semester. These individuals are already invested and familiar with the goals of this project and will be best able to carry out the project goals that cannot be completed this semester as well as any additional goals formed in the future that relate to this project.

## 2. Support of an Honors Course

Honors 135 is a mini-course intended for Honors freshmen to introduce them to the vast array of academic possibilities in the Honors College and the University. The course is taught by a senior Honors student in order to demonstrate the importance of scholarship and research in the seminar leader's area of expertise to the first-year students in the Honors Program. Madeline Dunn, an Honors senior, will be conducting a course on permaculture in the fall of 2013. We intend to support her course by offering her access to the data that we have gathered thus far as well as any other support that she requests. Additionally, we recommend that PAT members use her class as an experiment for the future implementation of a course on permaculture by garnering student feedback about course components and suggested changes.

## 3. Creation of Independent Study Template

In order to meet the more immediate demand for permaculture education at the University of Michigan, we recommend creating an easily accessible independent study syllabus. Survey data showed a strong interest for a permaculture course, and an independent study template would allow those students to do so. This is especially important to provide in the case that permaculture cannot be integrated into an existing professor-led course in the short term. An independent study could thus be used as a professor-led course alternative or as a way for students to expand on current permaculture knowledge.

As a resource, we have constructed a list of readings, films, and potential projects that will be accessible to all students interested in pursuing permaculture education. Having this resource available will enable students to develop a deeper understanding of permaculture without depending on the structure of a course. Overall, the template will provide students with an excellent outline to permaculture education while allowing room for students to individualize that education.

We recommend that the completed independent study template be housed within the UMSFP and available on their website, ensuring a permanent location for the template and easy accessibility for those interested. Survey data showed that interest in a sustainable foods minor had a positive correlation with interest in a permaculture course, and because UMSFP caters specifically to those interested in sustainable foods, this makes it an ideal location for the template to be housed. Additionally, in order to gain visibility we recommend that the template be advertised by the UMSFP.

## 4. Integration of permaculture into an existing course

Currently, there are multiple agriculture-based courses offered that incorporate permaculture-related topics, a list of which is provided in the Course Catalogue in Appendix E. Within one or more of these courses, we recommend that a unit is dedicated specifically to permaculture as a means of an alternative, sustainable agricultural system. Incorporating permaculture into an



existing agriculture-based course enables a holistic education of agricultural methods, which students cited as a key component of their ideal course.

Many faculty also expressed interest for a more holistic approach to education, encouraging the integration of permaculture within a broader context class focusing on multiple approaches to sustainable agriculture. We would serve as a resource to the professors by offering community partners and surveying syllabi from various courses to minimize overlap. Additionally, if a course is found before the end of the semester we would ideally be involved in helping plan the unit. If no class is found, we recommend that the PAT continue to seek out course integration possibilities, using the Course Catalogue found in Appendix E as a guide.

### 5. Creation of a Permaculture Course

We recommend a longer-term goal of implementing a course specifically dedicated to permaculture at the University of Michigan. The course would allow for a thorough study of permaculture in an academic setting, a need for which has been demonstrated by survey data showing that 41% of students would take a class on permaculture if offered. It would necessarily involve a large component of experiential-based learning so students would learn both inside and outside of the classroom.

By supporting an experiential-based course such as the proposed permaculture course, the university would provide an avenue for students to pursue educational experiences that applied to their clear interest in local environments and farms. Additionally, both students and faculty stressed the need for an experiential emphasis in the course, and the successful permaculture course at the University of Indiana has incorporated experiential learning as approximately half of their course-work. Any costs associated with the experiential learning component could potentially be mitigated via course funding from the Graham Institute for Sustainability.

While there is a demonstrated desire to learn about permaculture in the classroom, several barriers exist in implementing such a course. First and foremost, a professor must be found who is interested in teaching the course and is comfortable working with community partners. Since the University of Michigan is not currently funding new courses, the faculty member would have to be willing to substitute permaculture for one of their current course offerings. Many faculty members are already committed to teaching core classes, so finding someone willing to teach a course on permaculture may be difficult.

However, given the current movement toward a sustainable food minor, the likelihood of implementing a permaculture course is much higher. Additionally, the university has implemented faculty cluster hire in sustainable food systems. Therefore, we recommend that the PAT maintains relationships with professors who have already expressed interest in a permaculture course, as noted in the Stakeholder Matrix (Appendix F) and continues to pursue new relationships with others who may be interested, including the faculty hired as part of the cluster hire. Once a professor is identified by the PAT, we recommend that this professor work closely with the community and campus farm to ensure a meaningful experience.

Another barrier may be the lack of student familiarity with permaculture, as survey data showed that only 6.5% of students would feel comfortable explaining permaculture to a friend. This may

decrease their likelihood of taking the course. In order to mitigate this potential barrier, we recommend that students, faculty, and community partners already involved in permaculture continue to avidly support the growing and present interest in this subject. The importance of promoting a subject through peers within an institution was clearly shown at Indiana University, where David Haberman cited student promotions as the largest factor that contributed to their course's success.

The course would ideally focus on the principles of permaculture and how they are being practiced around the world. The students would be required to do a certain amount of hours on the farm during the semester, learning about permaculture design. Because professors have discretion over the material they teach, the course would change slightly depending on who teaches the course. The professor would also influence the department in which this course would be housed. Additionally, we recommend that the course credits be applicable toward the PitE major or minor. Survey data indicates that previous sustainability coursework correlates with interest in a permaculture course, and since PitE students represent a significant portion of students taking sustainability classes, giving PitE credit would likely garner additional interest for the course.

#### 6. Creation of a UMich PermaWiki site

We recommend the creation of a UMich PermaWiki site that will serve as a resource to the University and the community as a whole. The site will include current news about permaculture, student projects, community projects, relevant courses, and ways to get involved. Survey results showed that 69% of students would like to learn more about permaculture while 41% of students would take a permaculture course if one were offered. Thus, in addition to serving those pursuing permaculture coursework, this site will be particularly useful to those who may want to learn more about permaculture but are unable to take a permaculture course or independent study. We recommend that the site be managed by the PAT. In order to promote the site, we recommend that links are made available on the UMSFP and Chiwara homepages.

### **Conclusion**

The demand for permaculture education at the University of Michigan has been clearly demonstrated. Permaculture education is part of a broader movement towards more participative learning, supporting the student demand for more experience-based courses. By establishing permaculture within the curriculum, the University of Michigan has an excellent opportunity to lead the way in permaculture education, further supporting its reputation as a university committed to sustainability and, most importantly, the educational interests of its students.

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## *Appendices*

### **Appendix A: Student Survey**

#### **Objectives:**

The Permaculture Team intends to send out a survey to a randomly generated group of 4000 graduate and undergraduate students at U of M from all disciplines and departments. We hope to achieve five main goals by close of the survey cycle. First, we wish to assess previous knowledge, if any, of permaculture; this will help us determine the most efficient language for communicating our ideas to the community. Second, we would like to gauge the level of interest in permaculture education on campus; we need this in order to determine what type of program will have the best reception and participation. Third, we want to measure past involvement with environmental learning on campus, whether it be through student organizations, classes, experiential learning, etc.; this tells us what outside campus resources would be best to incorporate into our program, based on what people have participated in thus far. Fourth, we are aiming to distinguish the importance of sustainability in the student university experience; closely related to our second goal, this will also help us design a program that best matches participants' priorities and interest levels. Finally, we want to identify a target demographic for the PDC certification; relationships between demographics (year, major, etc.) and responses to survey questions will help us design a program that appeals to more than one department.

#### **Student Responses by School:**

Architecture & Urban Planning	4 (0.8%)
Art & Design	6 (1.3%)
Business	33 (7.0%)
Dentistry	6 (1.3%)
Education	8 (1.7%)
Engineering	80 (16.9%)
Rackham	24 (5.1%)
School of Information	4 (0.8%)
Kinesiology	15 (3.2%)
Law	11 (2.3%)
LSA	222 (46.8%)
Medicine	3 (0.6%)
Music, Theatre & Dance	6 (1.3%)

SNRE	10 (2.1%)
Nursing	18 (3.8%)
Pharmacy	3 (0.6%)
Public Health	9 (1.9%)
Public Policy	6 (1.3%)
Social Work	6 (1.3%)

### Survey Questions:

Which of the following terms would you feel comfortable explaining to a friend? (select all that apply):

- permaculture
- biomimicry
- sustainable agriculture
- ecological design/engineering
- closed-loop systems

### Attitudes:

#### *Checklist:*

Scale for all is as follows:

[strongly agree----agree----disagree----strongly disagree]

I like to learn about sustainability in the classroom. [Scale]

**Sustainability pop-up:** Sustainability is best defined as the method of development that includes social, environmental, and economic conditions to ensure human subsistence both now and in the future.

I like to practice sustainability outside of the classroom. [Scale]

Sustainability is an important part of my college experience [Scale].

I am interested in learning about sustainable design. [Scale]

**Sustainable design pop-up:** Sustainable design focuses on designing our built environment to comply with the principles that govern the natural environment (e.g.: zero-waste, renewable resource use, etc.)

I am interested in learning about sustainable agriculture. [Scale]

**Sustainable agriculture pop-up:** Sustainable agriculture is an ecological approach to farming that focuses on environmental, economic, and human health for both present and future generations.

I am interested in learning about local food systems. [Scale]

I would be interested in working in a garden or farm as part of a college course. [Scale]

I would earn a minor in sustainable food systems if one were offered.

I would be interested in learning more about 'permaculture.' [Scale]

**Permaculture pop-up:**

Permaculture is a method of systems thinking that works to integrate our water, food, waste, and building systems with the natural environment by mimicking natural recycling and feedback. These landscape are productive, sustainable and don't require extensive human labor.

I would be interested in taking a course on 'permaculture' if one were offered. [Scale]

I would take a permaculture course for college credit, but not as an extra-curricular activity.

I would be interested in earning a Permaculture Design Certificate. [Scale]

**PDC pop-up:** The PDC is an international course that combines coursework and fieldwork to certify participants in the basic principles of ecological design.

I would be willing to dedicate 4 credit hours per week to a permaculture course. [Scale]

Behaviors:

Are you a part of an environmental or sustainability-oriented student organization on campus?

How many sustainability-oriented courses have you taken at the University of Michigan?

Have you ever volunteered in a garden?

Have you ever helped plant a garden?

Have you ever worked on a farm?

Have you ever participated in an ecological design project?

Have you ever participated in rainwater harvesting?

Have you ever participated in home composting?

Demographics [drop down menus]:

School:

Major/Concentration (write-in)

Year:

Male/female/prefer not to answer

**Appendix B: Student Focus Group Question Guide**

**Provided to focus group participants:**

Paper and markers for nametags  
 Handout describing permaculture and its 12 principles  
 Food (using research incentive)

**Participants recruited through:**

SSI email group  
 UMSFP email group  
 Planet Blue Student Leaders email group  
 Graham Scholars email group  
 Permaculture Design Team

**Target Audience:**

Undergraduate students who are currently interested in topics in sustainability

**Objective:**

In this focus group session, we aim to gauge student understanding and interest in permaculture as an overall concept. Furthermore, we seek to assess students' interest in a permaculture-centered course. During the focus group, we will engage students in meaningful conversation that will ultimately allow us to gain a better understanding of how to implement permaculture education on campus, using students' responses as input towards curricular planning.

**Agenda:**

**1. Welcome and Introduction (5-10 minutes)**

- Thank everyone for coming and explain the purpose of the focus group (see above).
- Go over "Rules of the Road" as generated by group participants
- Have everyone introduce themselves with name, hometown, and major.

**2. Brief Project Proposal Outline (2-3 minutes)**

**3. Discussion (total: 60 minutes)**

*What does a sustainable agricultural system look like to you? (10 minutes)*

Follow up:

What role do you think education could play in the creation and/or implementation of such a system?

What are current barriers to installing a sustainable agriculture system?

What flaws do you see in the current agricultural system?

Do you think that a sustainable agricultural system could ultimately replace the current system?

*What gets you interested in taking a class? (10 minutes)*

Follow up:

Can you speak to any specific examples of courses that have stuck out to you? Why?

What would an ideal class look like to you?

*What role would you like to see experiential learning play in your education, if any? (10 minutes)*

Follow up:

What costs/benefits do you think a course including experiential learning would have?

*How do you think a course on permaculture could be incorporated at U-M? (20 minutes)*

Follow up:

What would you hope to gain from a class about permaculture?

How much time would you be willing to dedicate to a permaculture course?

To whom should a permaculture class be offered?

Probe: Graduate students? Undergraduates? LSA students only?

#### **4. Final Discussion (5-10 minutes)**

Is there anything else that you would like us to know?

- What questions should we have asked, but didn't?

#### **5. Wrap-Up and Next Steps (5 minutes)**

- Explain what we plan to do with the data.
- Thank everyone for coming.
- Provide an email address for further comments after the meeting: [ravo@umich.edu](mailto:ravo@umich.edu)

## **Appendix C: Semi-Structured Interviews with Permaculture Practitioners**

*Target:*



Leader of Permaculture Course at Indiana University at Bloomington

*Contact Information:*

Indiana—Professor David Haberman, Department of Religious Studies, dhaberma@indiana.edu

*Objective:*

We seek to gain a deep knowledge of the formation of permaculture programming on a university campus. To this end, we will interview David Haberman—an IU Bloomington professor who implemented permaculture programming for undergraduate students. Our questions will assess the design, formation, and administration of campus-based permaculture programs. Overall, we hope to glean an understanding of factors critical to the success of campus-based permaculture education, as well as stories and advice from a permaculture practitioner.

*Agenda:*

- I. Introductions (5 minutes) – Interviewers and interviewees will introduce themselves
- II. Project Outline (5 minutes) – Interviewers will outline U-M permaculture proposal
- III. Interview Questions (25 minutes) – Interviewers will utilize question guide to direct a semi-structured interview
- IV. Open Dialogue (10 minutes) – Interviewees will have the opportunity to ask questions and engage in conversation with interviewers

Total time: 45 minutes (estimated)

*Question Guide:*

Can you tell me more about how this program got started?

- a. Probe: Which actors were involved?
- b. Probe: How did you gain/keep student interest? Staff/faculty interest?

What is something you wish you had known before starting your program?

- a. Probe: Were there any pitfalls that you think others may run into?
- b. Probe: Do you have any general advice for a group just starting to create a program?

What is the level of community involvement?

Is the program incorporated into the curriculum? If not, do you have any plans to do so in the future?

- a. Probe: How do you describe the course to individuals in different disciplines?
- b. What important lessons can students learn from permaculture?
- c. What is the role of experiential education in your program?

Can you share your favorite story from the permaculture program?

Where do you see your program in 10 years?

#### **Appendix D: Faculty Interview Question Guide**

**Objective:**

In these interview sessions, we aim to gauge faculty understanding and interest in teaching permaculture. In addition, we hope to converse about current courses offered at UM related to permaculture. During these interviews, we hope to engage the faculty members in meaningful conversations that will generate further interest in permaculture education on campus. In addition to generating interest, we aim to gain a better understanding of how to implement a permaculture course. Lastly, we hope to come away from the interviews with a clearer understanding of if, and how, permaculture education fits at UM, from multiple faculty members' viewpoints. Ideally, our interviews will lead us to identifying faculty members interested in actually teaching a permaculture course.

### **Discussion Questions:**

How does your discipline and/or interests fit with permaculture? Elaborate.

Follow-up:

Do you see any tensions with permaculture?

What aspects of classes that you teach relate directly to permaculture?

Do you feel that a course dedicated specifically to permaculture would be a beneficial addition to sustainability education at UM? Please elaborate.

Follow-up:

What do you think is the most effective way for our team to work with faculty to implement a permaculture course?

Where would a permaculture course be most effectively housed?

Is there specific department you envision a permaculture course being housed in?

How do you think permaculture education ties into experiential learning at a university level?

Follow-up:

Do you think that a permaculture education program could or should be more effectively implemented in a format other than a course? What about here at U of M, specifically?

Is there anything else you would like us to know?

-What questions should we have asked, but didn't?

## **Appendix E: Course Catalogue**

Year	Term	Course Number	Course Title	Instructor	Email
2013	Winter	UC254	Sophomore Interdisciplinary Seminar - Much Depends on Dinner	Margot Finn	smargot@umich.edu
2012	Fall	ENVIRON 101	Energy, Food, and the Environment	John Vandermeer	jvander@umich.edu
2012	Fall	ENVIRON 290	Food: The Ecology, Economics, and Ethics of Growing and Eating	Thomas Princen	tprincen@umich.edu
2012	Fall	UC254	Sophomore Interdisciplinary Seminar - Much Depends on Dinner	Margot Finn	smargot@umich.edu
2012	Spring	EEB 445	Ethnobotany	Scott Herron	smherron@umich.edu
2012	Winter	ENVIRON 318	Catherine Badgley	cbadgley@umich.edu	
2012	Winter	UC254	Food, Land, and Society	Margot Finn	smargot@umich.edu
2011	Fall	ENVIRON 101	Sophomore Interdisciplinary Seminar - Much Depends on Dinner	John Vandermeer	jvander@umich.edu
2011	Fall	ENVIRON 290	Food: The Ecology, Economics, and Ethics of Growing and Eating	Thomas Princen	tprincen@umich.edu
2011	Fall	UC254	Sophomore Interdisciplinary Seminar - Much Depends on Dinner	Margot Finn	smargot@umich.edu
2011	Summer	ANTHRBI O 297	From Hunting to Hot Dogs: The Archaeology of Food	Amanda Logan	allogan@umich.edu
2011	Spring	EEB 445	Ethnobotany	Scott Herron	smherron@umich.edu
2011	Spring	ANTHRBI O 297	Are We What We Eat? The Evolution of the Human Diet	Julie Lesnick	lesnickju@umich.edu
2010	Fall	ENVIRON 101	Energy, Food, and the Environment	John Vandermeer	jvander@umich.edu
2010	Spring	EEB 445	Ethnobotany	Scott Herron	smherron@umich.edu
2010	Winter	ENVIRON 318	Catherine Badgley & Ivette Perfecto	cbadgley@umich.edu	
2010	Winter	ENVIRON 319	Food, Land, and Society	Ivette Perfecto	cbadgley@umich.edu
2009	Fall	ENVIRON 101	Field Study	John Vandermeer	jvander@umich.edu
2009	Spring	EEB 445	Energy, Food, and the Environment	Scott Herron	smherron@umich.edu
2009	Winter	ENGLISH 125	Tales of the Global Stomach: Past & Present Politics of Food.	Anne Berg	akberg@umich.edu
2008	Fall	BIOLOGY 101	John Vandermeer	jvander@umich.edu	
2008	Fall	PHIL 196	Biology and Human Affairs	Andrew Egan	egana@umich.edu
2008	Spring	AMCULT 204	Eating Right: The Ethics and Aesthetics of Food	Margot Finn	smargot@umich.edu
2008	Spring	ANTHRC UL 298	American Foodways	Xochitl Ruiz	xruiz@umich.edu
			Food and Eating from an Anthropological Perspective:		

			Tastes, Appetites, and Moral Obligations		
2008	Spring	EEB 445	Ethnobotany	Scott Herron	smherron@umich.edu
				Catherine	
2008	Winter	ENVIRON 318	Food, Land, and Society	Badgley & Ivette Perfecto	cbadgley@umich.edu
				Catherine	
2008	Winter	ENVIRON 319	Food, Land, and Society Field Study	Badgley & Ivette Perfecto	cbadgley@umich.edu
			Global Food Histories: Tales of Commodities and Cookbooks		
2006	Fall	HISTORY 195		Rebekah Pite	rpite@umich.edu
			African Foodways Past and Present	Daphne	
2005	Spring	ANTHRA RC 296		Gallagher	daphneg@umich.edu
			Agriculture and Socio-Political Movements in Latin America		
2005	Winter	RCLANG 324		Katia Aviles-Vazquez	kraviles@umich.edu
			Agriculture and Socio-Political Movements in Latin America		
2004	Fall	RCLANG 324		Katia Aviles-Vazquez	kraviles@umich.edu
				Catherine	
2004	Spring	ENVIRON 318	Food, Land, and Society	Badgley & Ivette Perfecto	cbadgley@umich.edu

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## **Appendix F: Project Stakeholder Matrix**

<i><b>INFLUENCERS</b></i>		<i><b>STRATEGY</b></i>
<b>Individual/Group Name</b>	<b>What do you need from them for your project?</b>	<b>How will you engage the thinking and/or action of these people to help you with your project?</b>
Nathan Ayers (Chiwara)	Nathan Ayers is the Founder and Director of Chiwara Permaculture. Given Chiwara's close ties to the Permaculture Design Team (PDT), Nathan will be a key advisor for decisions made by the Permaculture Advisory Team (PAT).	PAT will continue to meet and communicate with Nathan. The relationship between PAT and Chiwara is an essential one, as it connects permaculture at UM to the broader practice of permaculture in the community.
Catherine Badgley	Catherine is keenly interested in the project. She may help with envisioning a space for permaculture within higher education and as a contact point for similarly interested professors.	We have already met with Catherine. We plan to keep in contact with her for advice and send her a copy of the project report.
Jerry Tyrrell	Jerry, a representative of UMSFP, is a great asset to us. We need his cooperation and support for our project because UMSFP is our sponsor. Additionally, his ideas about the direction of our project and the numerous resources he (and the rest of UMSFP) have access to can potentially be very beneficial to our success.	We will meet with him as necessary and keep him updated on all our plans. We will work with UMSFP to add the independent study template to the UMSFP website.
Liz Dengate	Like Jerry, Liz is a member of UMSFP and has the potential to offer us useful resources and guidance for our project. We do not need anything directly from Liz at this point.	Liz will stay informed on our project progress through Jerry, who will report important progress components back to the other UMSFP members.
Madeline Dunn	As the leader of PDT and the instructor for the Honors 135 course, Madeline is a key stakeholder in permaculture education on the UM campus. The PAT will need her support and guidance as it moves forward with the implementation of project recommendations.	We will keep Madeline updated with the progress of our project via email and at PDT meetings.

Paul Webb	As the director of PitE, we need Paul's support if we intend to offer a course to PitE students, or to fulfill some sort of PitE requirement.	We met with Paul at the beginning, and he expressed some concern as to the feasibility of permaculture as an idea. We will send him a copy of the executive summary to update him on the progress of our project.
Scott Herron	Scott Herron is a professor at Ferris State University who teaches Ethnobotany at the University of Michigan Biostation. He might be interested in adding a permaculture unit to his course.	We will send Professor Herron a copy of our final report and follow up if he has further interest.
Bill Currie	Dr. Bill Currie is an associate professor in SNRE. We wanted to look at his syllabus to see if we could gather any information about the courses he taught. Access to Dr. Currie's syllabi would allow us to realize the overlap his courses may have with some other courses offered.	Dr. Currie is not interested in teaching a course. He might be interested in guest-lecturing and it seems like he is willing to give his syllabi from previous courses.
David Haberman	Dr. Haberman is a professor in the department of religious studies at Indiana University. He initiated the permaculture course at the University. We wanted to gain knowledge about how he initiated a permaculture course. We want advice and guidance from Dr. Haberman.	We used the information gathered from Dr. Haberman to think about how we wanted to contact people who may be interested in permaculture education. We used his experience as a case study and evidence that such a course could exist. We may continue to work with Dr. Haberman for future guidance.
Joseph Trumpey	Trumpey is a professor in the School of Art and Design who is interested in designing sustainable food systems. We need cooperation from Trumpey to get access to his syllabus when designing a future course. Also, we need advice and support from Trumpey.	Trumpey does not seem interested in teaching a course for the fall of 2013, but he supported the design of our proposed course. Trumpey also seemed interested in guest-lecturing. We will continue to work with Trumpey in the future to seek advice and to gain leverage with faculty.
Ivette Perfecto	Dr. Perfecto is a professor in SNRE. We	We plan to continue to work

	need cooperation and collaboration from Perfecto. We recommend that Perfecto includes a unit on permaculture in her course (Food, Land, and Society).	with Perfecto to develop a working relationship. We want to collaborate with Perfecto in designing her course for spring 2014.
Raymond DeYoung	DeYoung is a professor in SNRE. We need cooperation from DeYoung to allow access to his syllabi. Also, he has some faculty leverage within UMSFP so he could support our future goal of having the permaculture course be included in a Sustainable Foods Minor housed within UMSFP.	We plan to continue to work with DeYoung to get advice and support. Also, DeYoung seemed interested in guest-lecturing for a course on permaculture.
Bob Gracie	As Director of Matthaei Botanical Gardens, Gracie was recommended by De Young as a potential connection. We would need his assistance if we were to coordinate a permaculture course/field day in the Botanical Gardens.	We would not organize a meeting with Gracie this semester; we may collaborate later on, as we pursue future recommendations.
Dr. Mary Carol Hunter	Dr. Hunter was also recommended by De Young, as Associate Professor of Ecological Design in SNRE. She has a holistic approach to her teaching of ecological design, which encompasses aesthetics, human health, and ecology. Her advice and support would be valuable with future project developments.	We would not organize a meeting with Dr. Hunter this semester; we may collaborate later on, as we pursue future recommendations.
Larissa Larsen	Recommended by De Young, Larsen is the Associate Professor of Urban and Regional Planning and Natural Resources in SNRE. She has experience with overseeing community-based capstone Master's projects in Detroit neighborhoods, which could be helpful if we were to develop a field-experience/community-based portion of a class in the future.	We would not organize a meeting with Larsen this semester; we may collaborate later on, as we pursue future recommendations.
Jason Duvall	Recommended by De Young, Duvall is a PitE Lecturer. We need more information about Duvall's experiences/background before we can determine a connection to the project.	We would not organize a meeting with Duvall this semester; we may collaborate later on once we do more research.



Dr. Rita Benn	Recommended by De Young, Dr. Benn is the Director of Education at UM Integrative Medicine. Dr. Benn has expertise with planning curriculum/workshops, and with implementing and evaluating coursework. She could be a helpful resource as we develop our permaculture “module”, and with any future curriculum developments.	We would not organize a meeting with Dr. Benn this semester; we may collaborate later on, as we pursue future recommendations.
SNRE Masters Team, Education in Sustainable Agriculture	This team is a resource recommended by De Young. We don’t have any specific information on the Team and their project as of yet, but may be able to share data and collaborate in the future.	We would not organize a meeting with the SNRE Team this semester; we may collaborate later on, as we pursue future recommendations.
Martha Travers	Recommended by Madeline Dunn. She indicated an interest in including permaculture in her classes, and would be interested in future cooperation with our 4th recommendation.	We see potential to include a permaculture unit in one of her classes in the future, ideally sometime in Spring 2014.
<b><i>IMPACTED BY</i></b>	<b><i>DESIRED BEHAVIOR</i></b>	<b><i>STRATEGY</i></b>
Students	There is already demonstrated student interest in a permaculture course. We hope to generate a sustained interest from the student body so that permaculture education is not just a fad.	We plan to continue to offer different ways that students can get involved in permaculture education.
Faculty	We hope to generate more faculty interest in permaculture. Currently, most faculty members do not seem interested in teaching a course dedicated specifically to permaculture. In the future, we hope to convince a professor to teach a permaculture course.	We plan to continue to engage in meaningful conversation with faculty who are interested in sustainability in hopes of convincing them to teach a permaculture course. We will continue to do implement small experiments like the independent study or Madeline's course to demonstrate a need for a permaculture course on campus.

### **Appendix G: Independent Study Template**

Course Goals and Direction: The goal of this independent study is to learn the principles and ethics of permaculture while completing a specialized project relating to permaculture. The student should come away from the course with an understanding of biomimicry, systems thinking, and agroecology. Note: While this template will serve as a guide for students interested in furthering their knowledge of permaculture, the ultimate direction of this course will be molded by the student.

#### **Reading List:**

*Desert or Paradise*, Sepp Holzer

*Gaia's Garden (2nd Ed.)*, by Toby Hemenway

*The One Straw Revolution*, by Masanobu Fukuoka

*Permaculture: A designer's manual*, by Bill Mollison

*Permaculture: Principles & pathways beyond sustainability*, by David Holmgren

The above reading list will give a thorough understanding of permaculture principles and ethics, systems thinking, biomimicry, agroecology, and related topics. However, if the student wishes to pursue a topic more in-depth, it may be advantageous to seek out additional readings. Toby Hemenway's website (<http://www.patternliteracy.com/>), for example, provides a comprehensive reading list on specific topics, which the student may find helpful depending on their specific project. Students should incorporate readings that are specific to their course goals.

#### Video Resources:

How Permaculture Can Save Humanity and the Planet - But Not Civilization (lecture by Toby Hemenway)

Redesigning Civilization - With Permaculture (lecture by Toby Hemenway) (sequel to above)

UMass Amherst Permaculture Videos

Bringing the Dead Sea Back to Life - Greening the Desert - Permanent Agriculture at its Best

Videos may be used as a supplement to the readings. Students may find the above videos useful to their overall understanding of permaculture and/or to their projects. All videos listed can be found on YouTube.

#### Community Resources:

The following community groups are currently involved in permaculture and/or permaculture related topics. Students may contact these groups for project suggestions, possibilities for project implementation, or for other information depending on the student's individual independent study.

Chiwara Permaculture

Website: <http://www.chiwarapermaculture.com/>

Permaculture Ypsilanti

Website: <http://abundantmichigan.wordpress.com/ypsilanti/>

University of Michigan Sustainable Food Program

Website: <http://umsfp.com/>

#### Potential Project Topics:

As per the Chiwara website, the key research areas within permaculture fall into six different categories, including:

- Food
- Water

- Energy
- Building
- Transport
- Waste

Students can choose to create a project that focuses on single or multiple categories. The student may also choose to focus on another area not listed above with the permission of their faculty advisor. Depending on the student's prior knowledge and experience with permaculture, the project may take up more or less of the total coursework.

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**Prior to registration for an independent study in permaculture, the student must first:**

1. Obtain a faculty advisor. The advisor should have an interest or expertise in topics relating to permaculture.
2. With the advisor, establish a plan for what will be accomplished during the semester and what role the advisor will play in the student's permaculture education.