



Monitoring Cultural of Sustainability at the University of Michigan:

A Model for Measuring Behavioral Change in Universities and Other Organizations

***Robert W. Marans
John Callewaert
University of Michigan***

***BECC Conference
Sacramento, CA.***

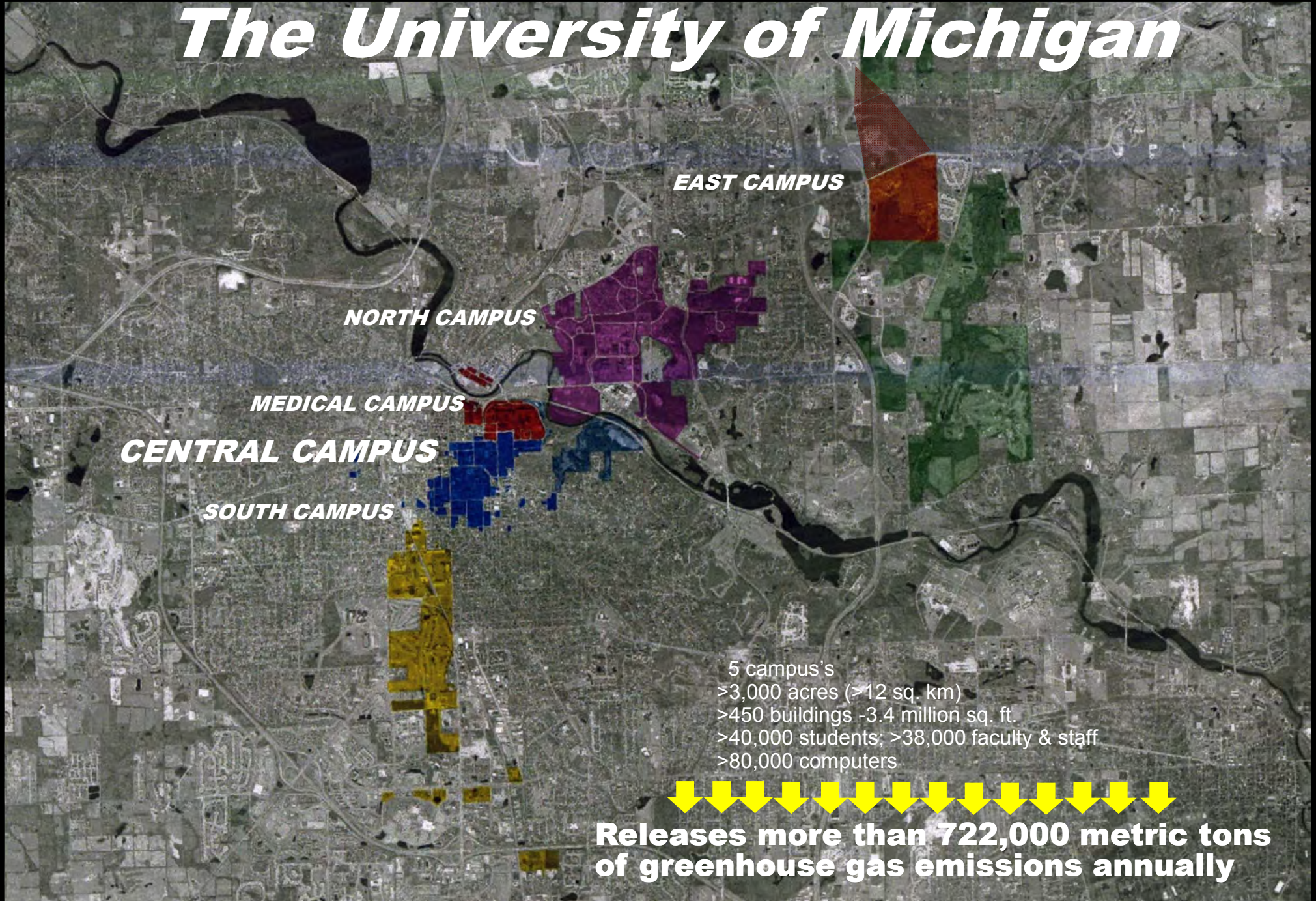
October 2015

Overview

- **The Big Picture**
- **The University of Michigan -Background**
- **A Model for Measuring Cultural Change**
- **Sustainability Cultural Indicators Program (SCIP)**
- **Research Design & Process**
- **Some Findings**
- **Current Status - Next Steps**

The Big Picture

Ann Arbor and The University of Michigan



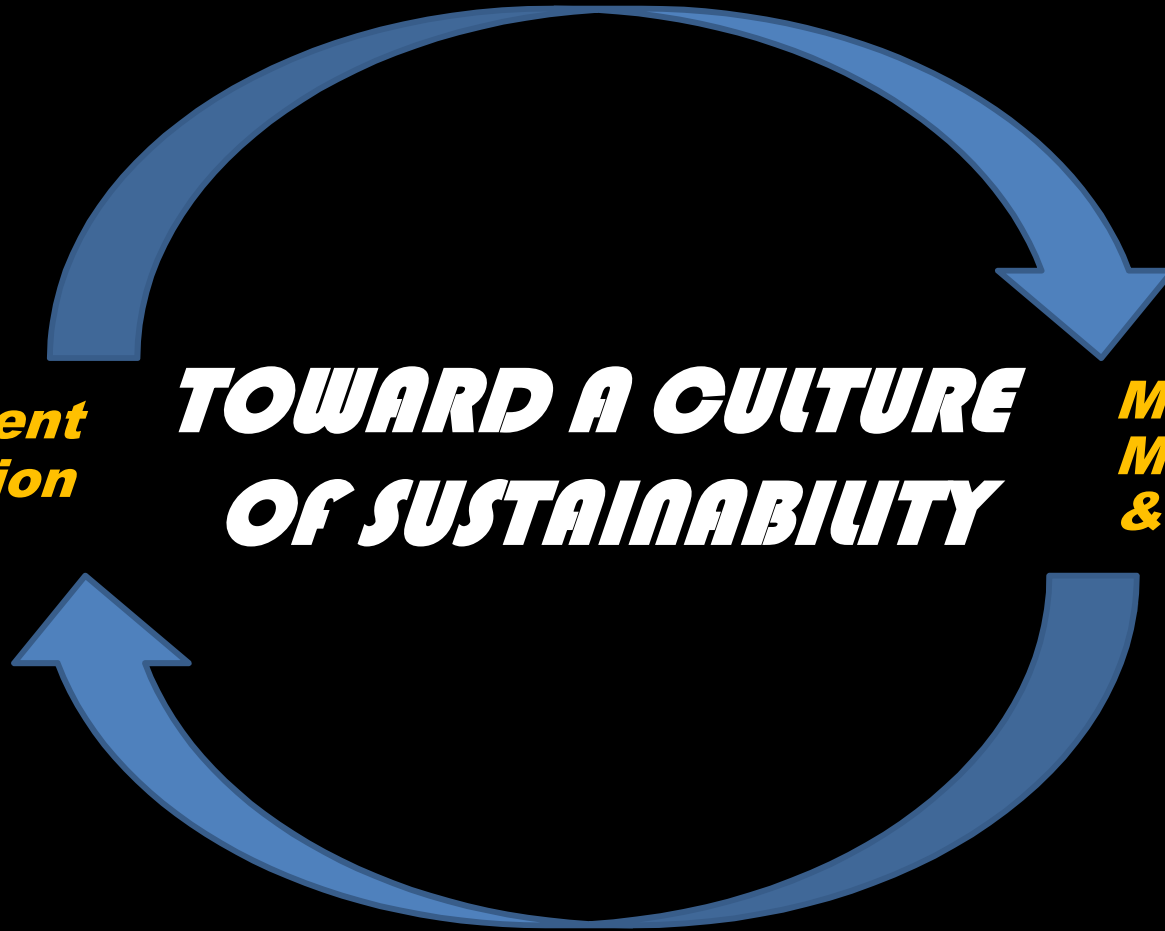
Integrated Assessment Themes

| THEME | GUIDING PRINCIPLE | 2025 GOALS |
|-----------------------------|---|--|
| Climate Action | We will pursue energy efficiency and fiscally-responsible energy sourcing strategies to reduce greenhouse gas emissions toward long-term carbon neutrality. | Reduce greenhouse gas emissions (scopes 1&2) by 25% below 2006 levels. Decrease carbon intensity of passenger trips on U-M transportation options by 30% below 2006 levels. |
| Waste Prevention | We will pursue purchasing, reuse, recycling, and composting strategies toward long-term waste eradication. | Reduce waste tonnage diverted to disposal facilities by 40% below 2006 levels |
| Healthy Environments | We will pursue land and water management, built environment, and product sourcing strategies toward improving the health of ecosystems and communities. | Purchase 20% of U-M food from sustainable sources. Protect Huron River water quality by: <ul style="list-style-type: none">• minimizing runoff from impervious surfaces (outperform uncontrolled surfaces by 30%), &• reducing the volume of land management chemicals used on campus by 40% |
| Community Awareness | We will pursue stakeholder engagement, education, and <i>evaluation strategies</i> toward a campus-wide ethic/culture of sustainability. | The report recommends investments in multiple actions to educate our community, <i>track behavior, and report progress over time.</i> |

***Engagement
& Education***

***TOWARD A CULTURE
OF SUSTAINABILITY***

***Measuring,
Monitoring, &
& Evaluation***



Toward a Culture of Sustainability: Engagement & Education

Staff & Faculty

Sustainable Workplace
Certification

Sustainable Lab
Recognition Program

Green Teams

Energy Managers

Students

Planet Blue Student
Leaders

Water Bottle Initiative

Planet Blue Room

Student Groups (SSI)

Sustainability Courses

Earthfest

Planet Blue Ambassadors
Program

Sustainability Town Halls

Annual Sustainability Guide

Annual Report

RecycleMania

Toward a Culture of Sustainability: Measuring, Monitoring, Evaluating

What is Culture of Sustainability?

“.....a culture in which individuals are aware of major environmental (and social/economic) challenges, are behaving in sustainable ways, and are committed to a sustainable lifestyle for both the present and future”

How do we measure, monitor, and evaluate it?

*...through a program called **SCIP**...*

Sustainability Cultural Indicators Program

a multi-year U-M program of research designed to measure and track the culture of sustainability on campus so as to inform /guide university operations and policies

Culture Indicators Conceptual Framework

INDIVIDUAL INDICATORS

survey based

STUDENTS

FACULTY

STAFF

ALUMNI

general
travel
building
food
recycling
purchasing
land/water

general
travel
building
food
recycling
purchasing
land/water

general
travel
building
food
recycling
purchasing
land/water

general
travel
building
food
recycling
purchasing
land/water

awareness/
knowledge

behaviors

engagement/
commitment

other(research)

barriers;
willingness to;
likelihood (chances of....)
rating of others-social norms;
values, etc.

OBJECTIVE INDICATORS

non-survey based

general

travel

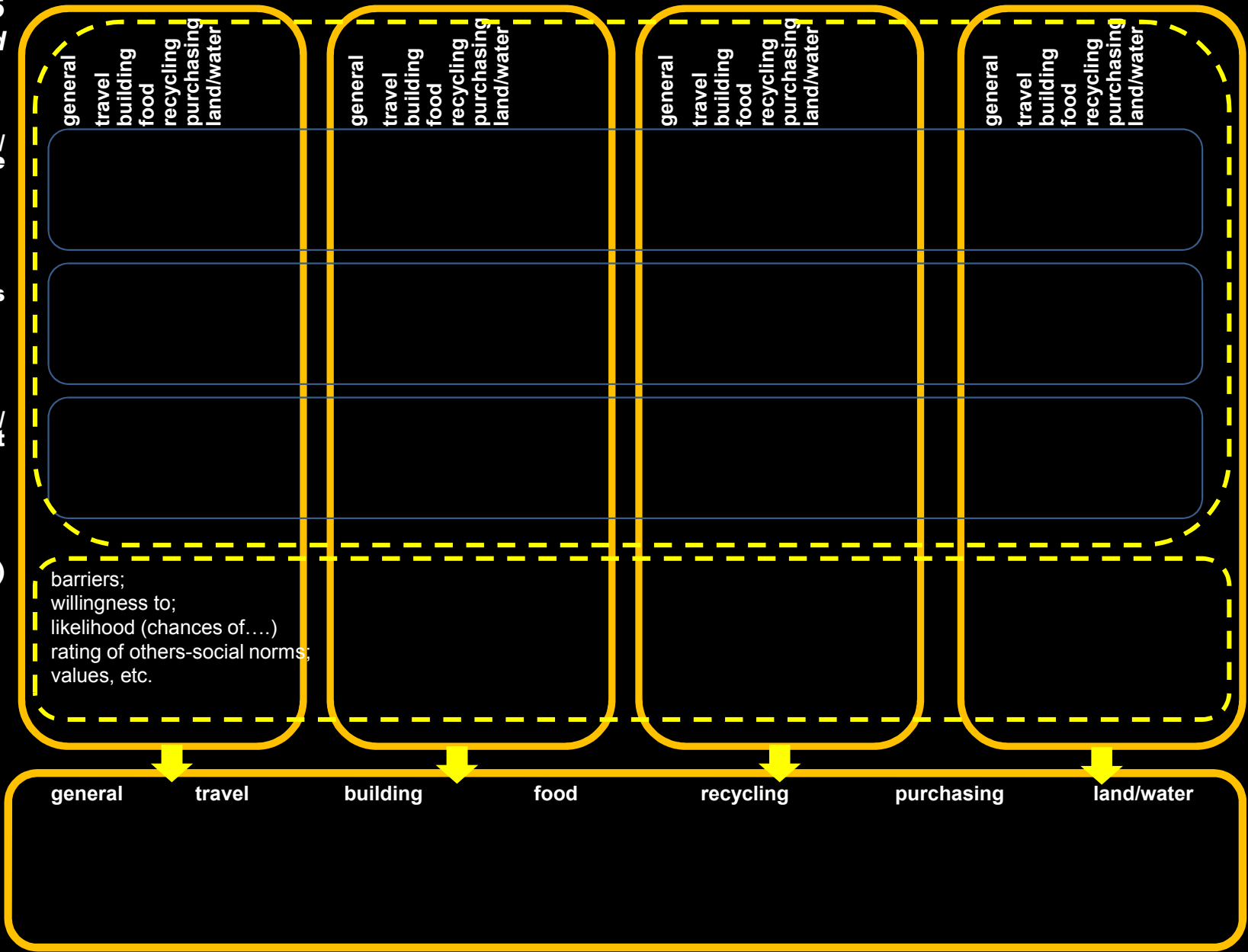
building

food

recycling

purchasing

land/water

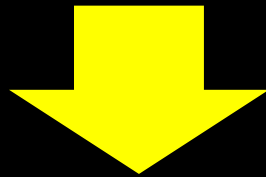


Sustainability Cultural Indicators Program - SCIP

What do we measure? How do we measure? How do we know if its changing?

*Knowledge, Awareness
Behaviors, Actions
Commitments
Values, Dispositions*

*general
U-M specific*



Travel & Transportation

Waste Reduction & Conservation

Natural Environment

Sustainable Foods

Climate Change



CLIMATE ACTION reduce GHG emissions by 25%; decrease GHG/passenger trip for UM trans. options by 30%

WASTE PREVENTION reduce waste tonnage to disposal facilities by 40%

HEALTHY ENVIRONMENTS protect Huron River water quality by reducing volume of chemicals used in land management by 40%; purchase 20% of U-M food from sustainable sources.

COMMUNITY AWARENESS educational programs; monitoring/evaluating progress; reporting

Research Design

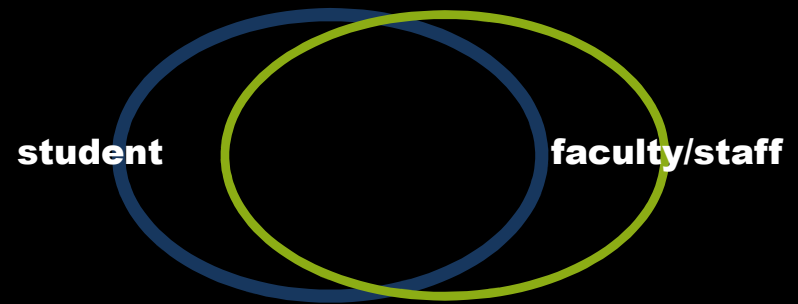
WEB SURVEYS– annually

Undergraduate students (2000)

Graduate students (400)

Staff (750)

Faculty(750)



Undergraduate student panel (800)

SUPPLEMENTAL DATA (OBJECTIVE INDICATORS) -annually

Building Information covering:

Energy Use (BTU/sq ft)

CO2 emissions metric tons per sq ft

Recycling material (lbs per sq ft)

Waste sent to disposal facilities (lbs per sq ft)

Sustainability program initiatives.

Questionnaire Content

| | QUESTION TYPE | | | | | |
|-------------------------------------|------------------|--------------------|-----------------|--------------|---------------------|--------------|
| SURVEY MODULE | Knowledge | Disposition | Behavior | Other | Demographics | Total |
| Travel & Transp. | 9 | 10 | 21 | 1 | 0 | 41 |
| Cons. & Waste Prev. | 5 | 5 | 33 | 1 | 0 | 44 |
| Natural Environm't | 4 | 2 | 9 | 1 | 0 | 16 |
| Food | 7 | 6 | 19 | 2 | 0 | 34 |
| Climate | 1 | 2 | 0 | 2 | 0 | 5 |
| Sustainability (general) | 0 | 20 | 13 | 3 | 0 | 36 |
| Univ. of Michigan | 8 | 0 | 8 | 8 | 0 | 24 |
| Demographics | 0 | 0 | 0 | 0 | 42 | 42 |
| Total | 34 | 45 | 103 | 18 | 42 | 242 |

Sample questions

How much do you know about the following at U-M?

| | A lot | A fair amount | A little | Not much/Nothing |
|---|-----------------------|-----------------------|-----------------------|-------------------------|
| Recycling glass | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Recycling plastic | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Recycling paper | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Recycling electronic waste (i.e. computers, cell phones) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Property Disposition services | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Sustainability Cultural Indicators

Primary

Climate Action

Travel Behavior (1)

Conservation Behavior (4)

Waste Prevention

Waste Prevention Behavior (4)

Healthy Environments

Protecting the Natural Environment (3)

Sustainable Food Purchases (3)

Community Awareness

Travel and Transportation (4)

Waste Prevention (5)

Natural Environment Protection (4)

Sustainable Foods (7)

U-M Sustainability Initiatives (8)

Secondary

Sustainability Engagement

U-M (3)

General (4)

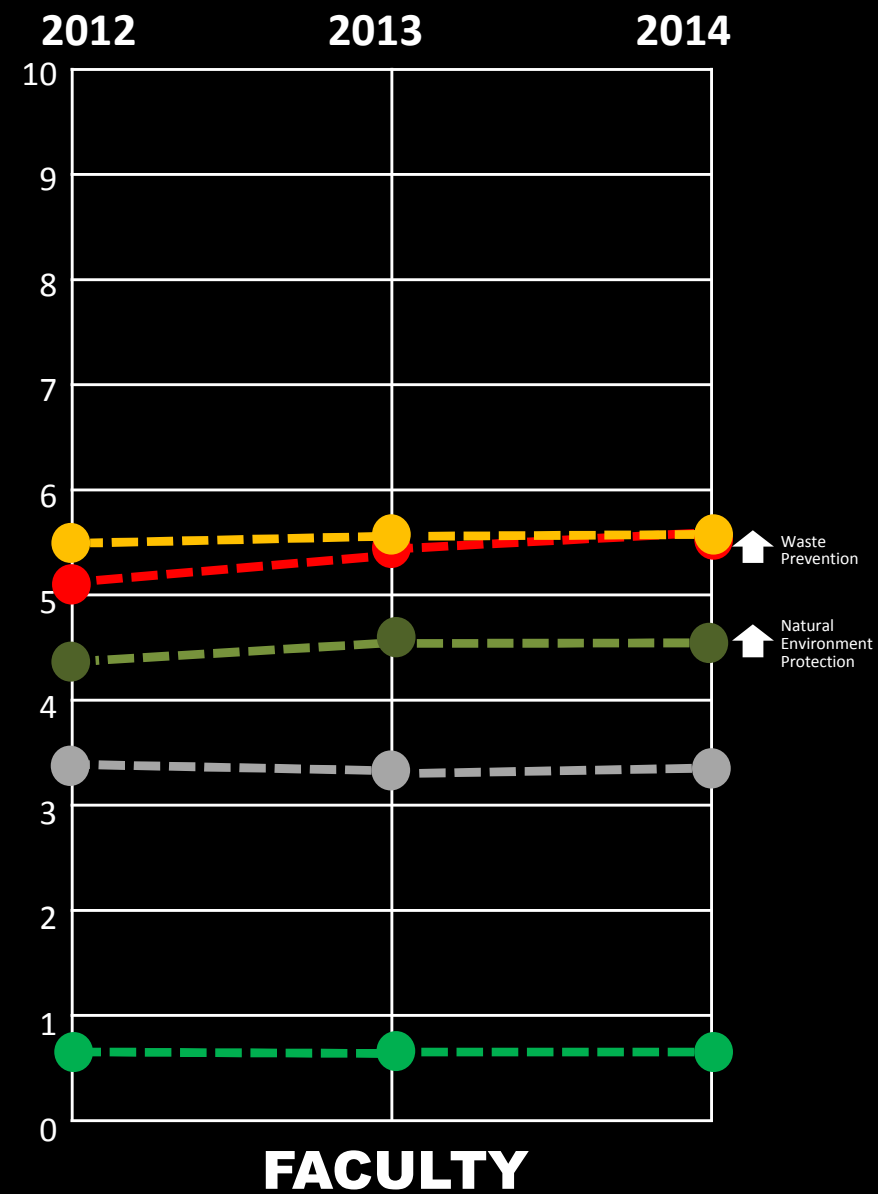
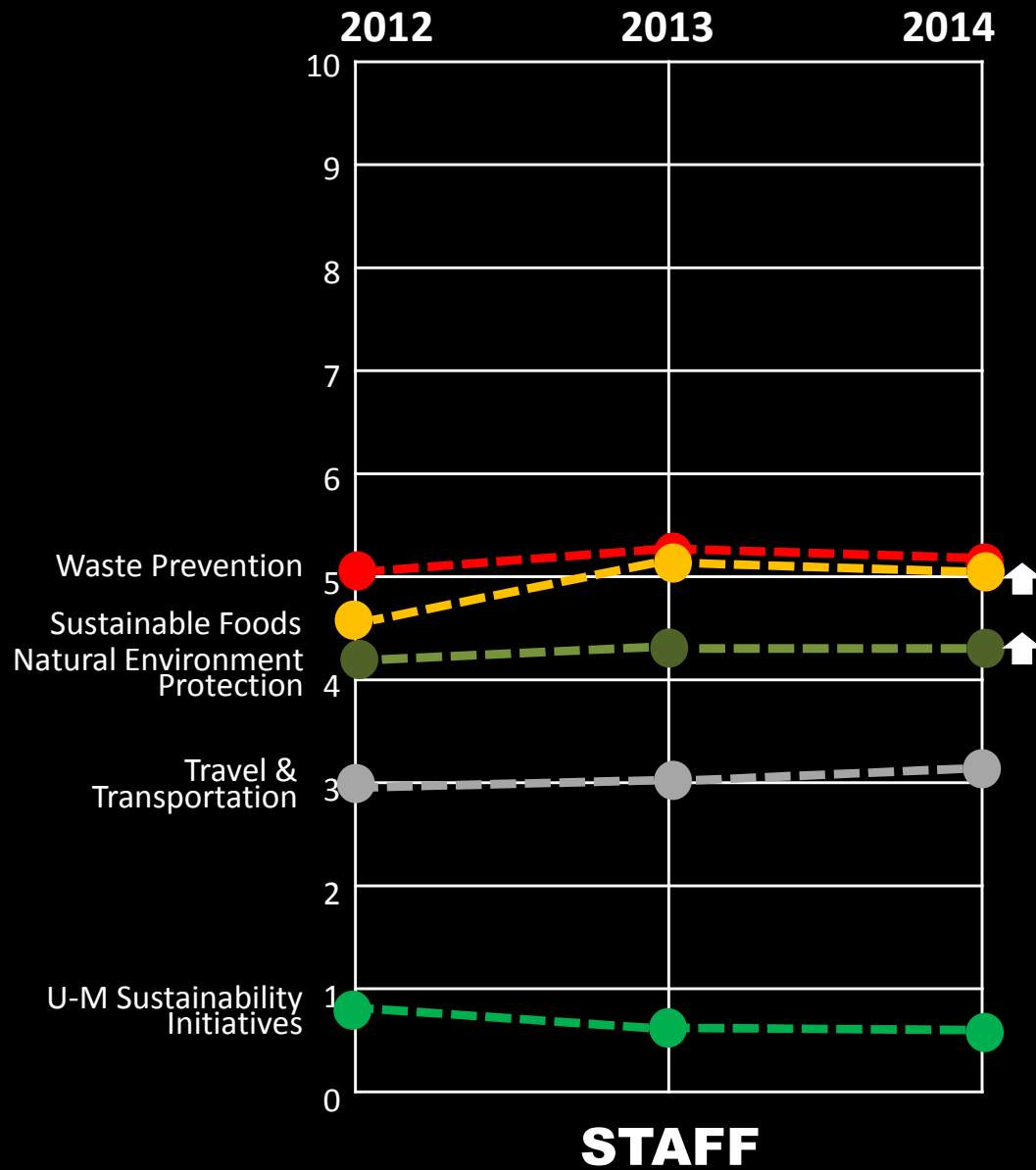
Sustainability Commitment (1)

Sustainability Disposition (3)

Evaluating U-M Sust. Initiatives (8)

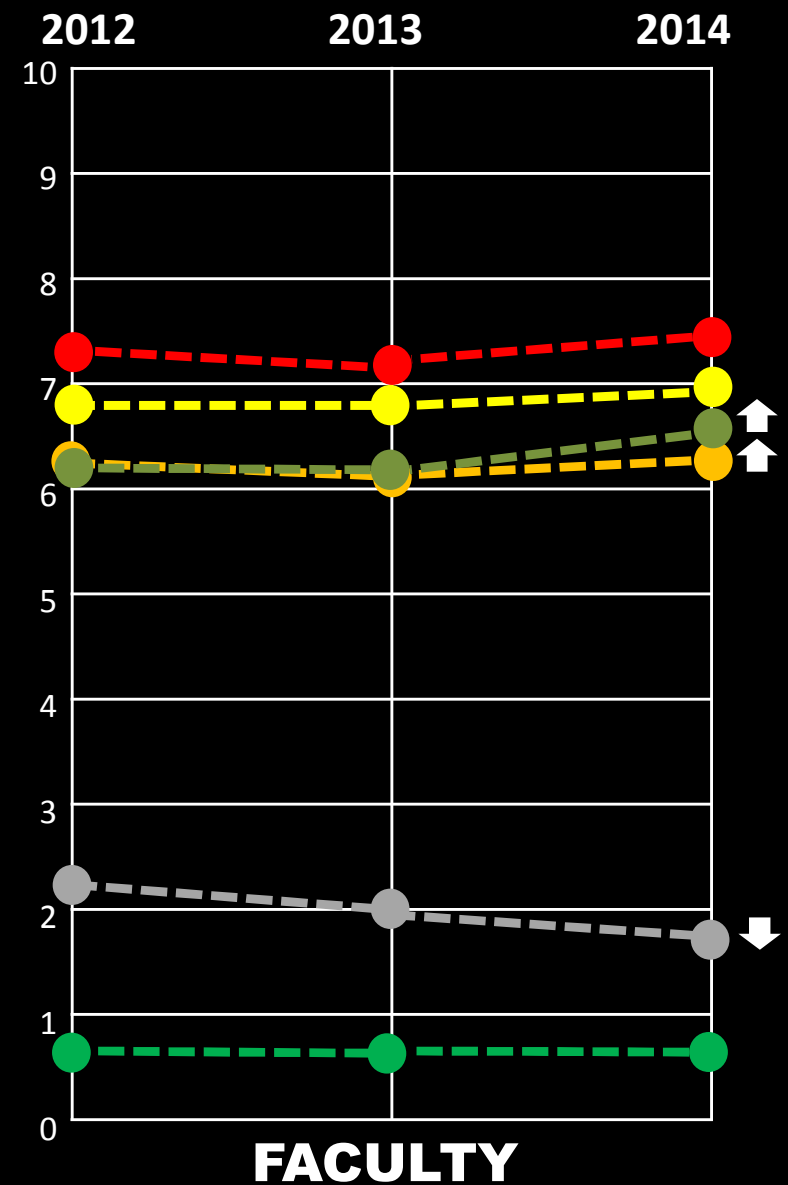
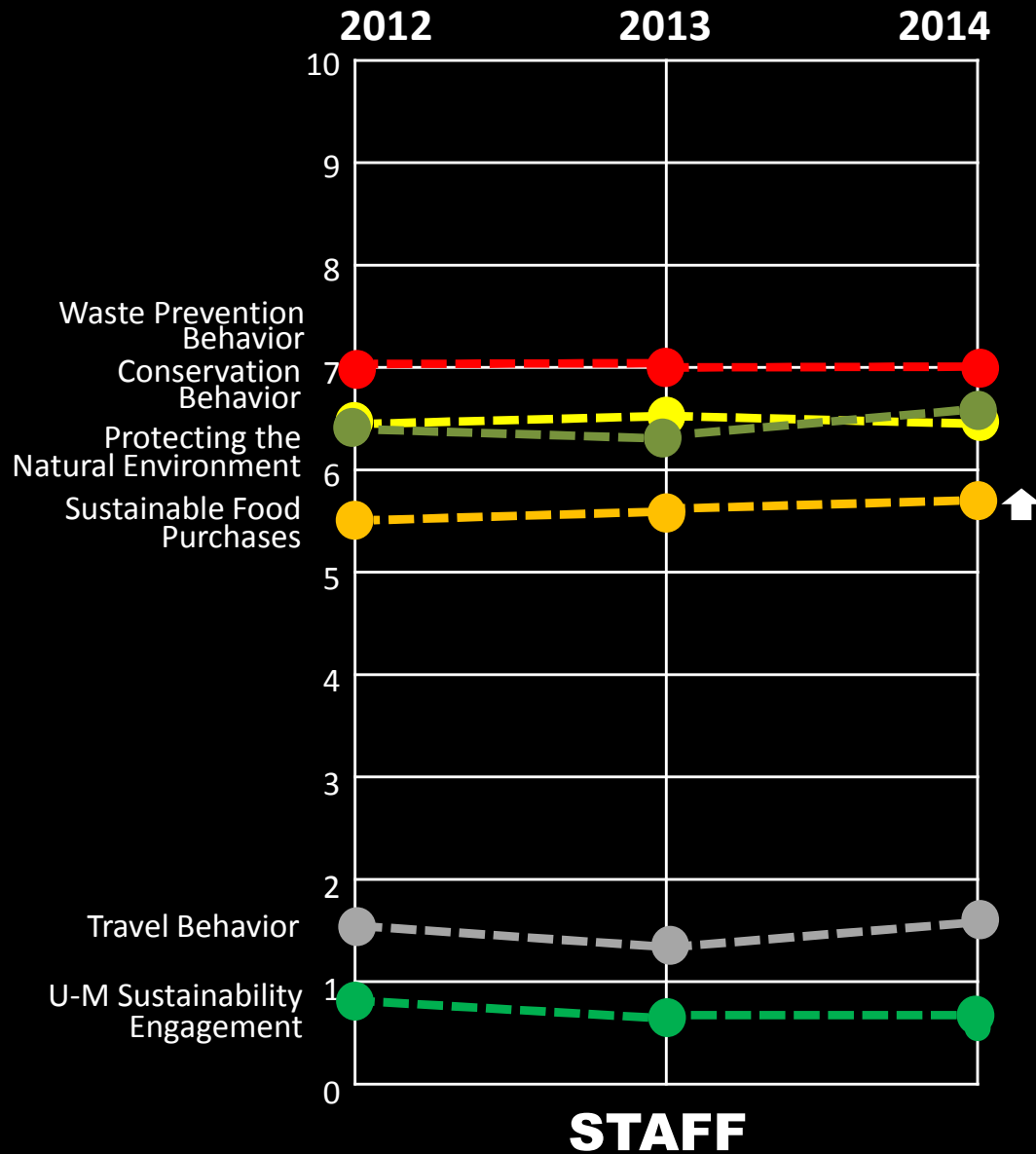
CULTURAL INDICATORS CHANGES – AWARENESS

DIFFERENCES AMONG STAFF AND FACULTY



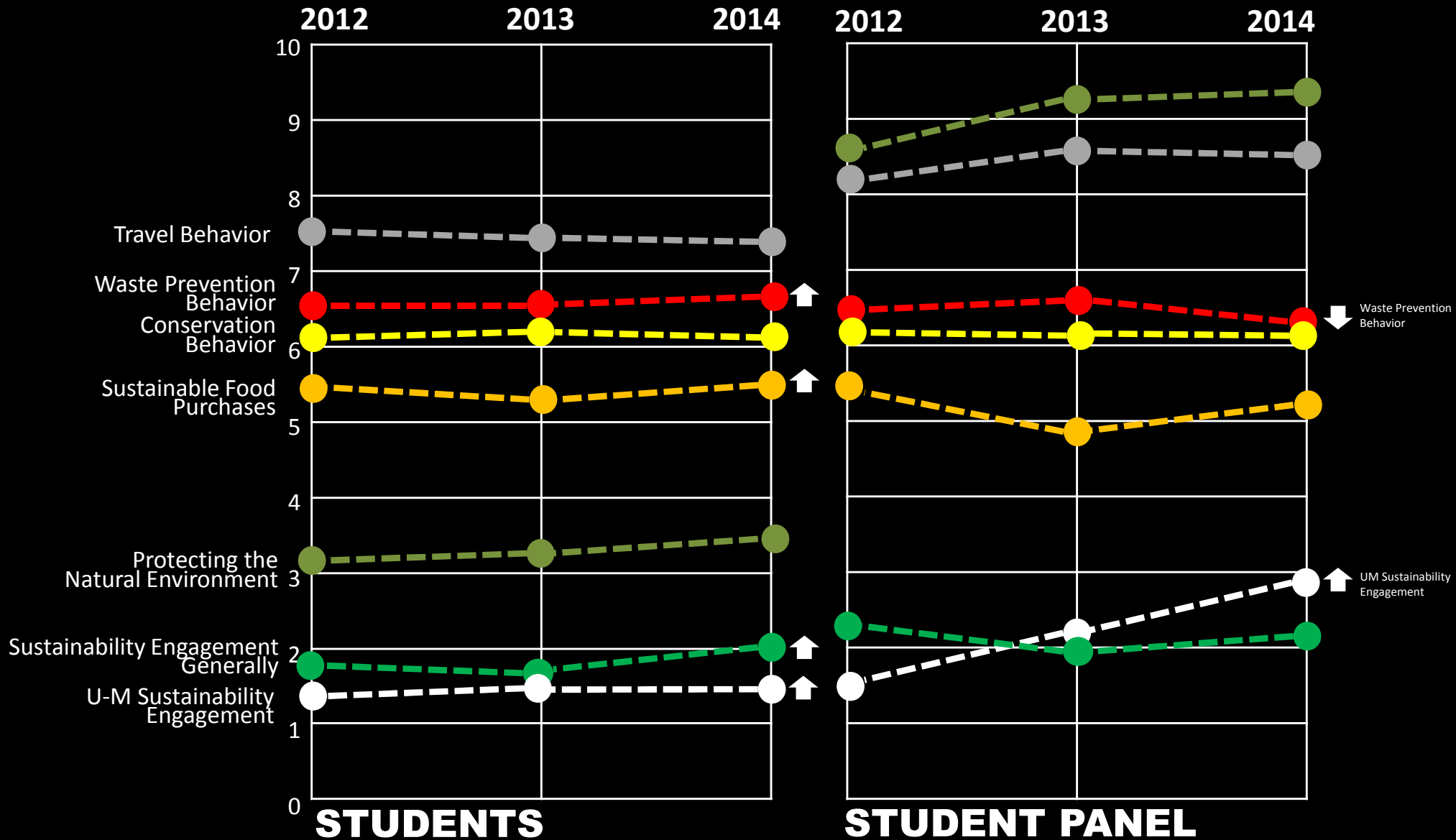
↑ Significant change from 2012

CULTURAL INDICATORS CHANGES – BEHAVIORAL DIFFERENCES AMONG STAFF AND FACULTY



↑ Significant change from 2012

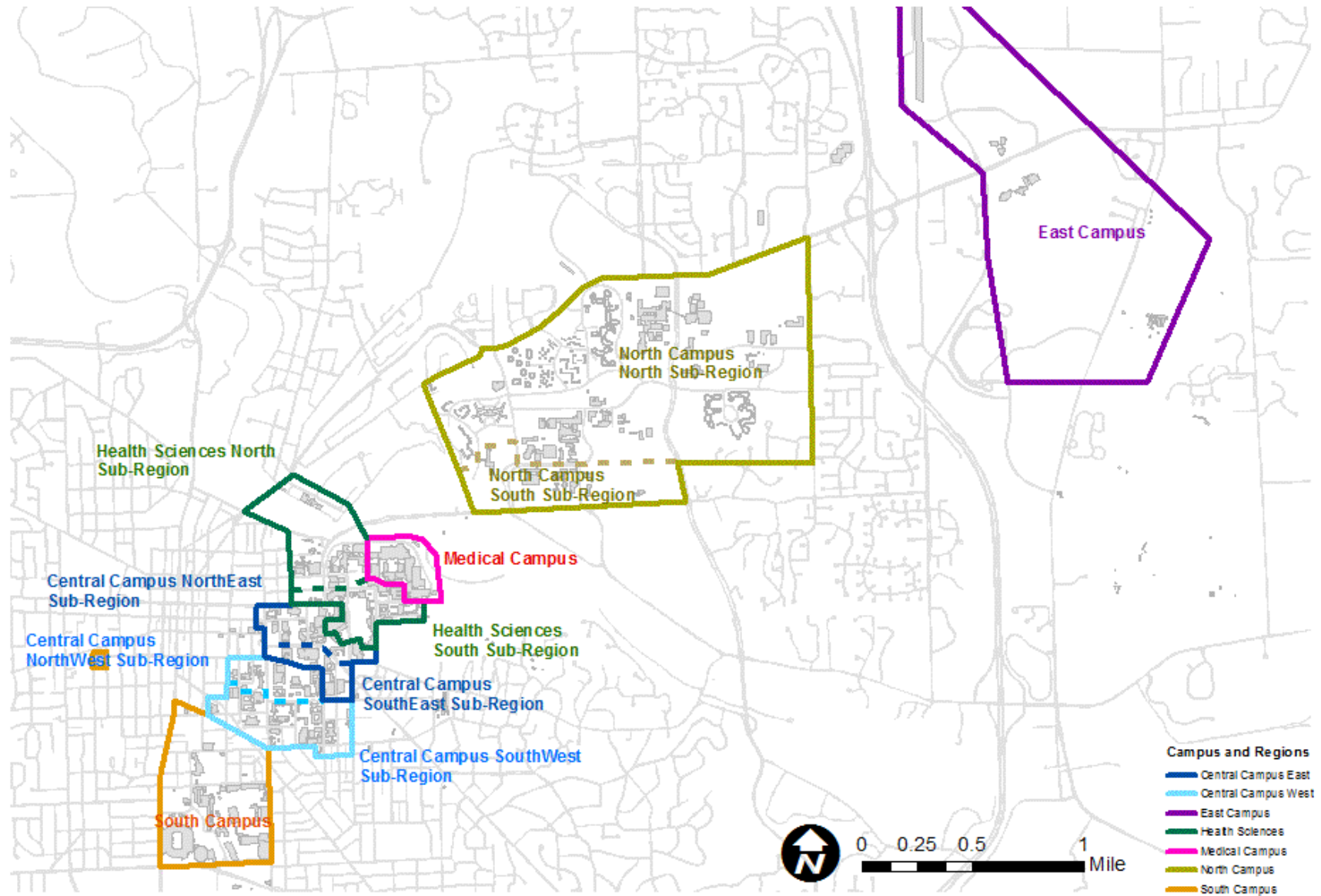
CULTURAL INDICATORS CHANGES – BEHAVIORAL AMONG STUDENTS



↑ Significant change from 2012

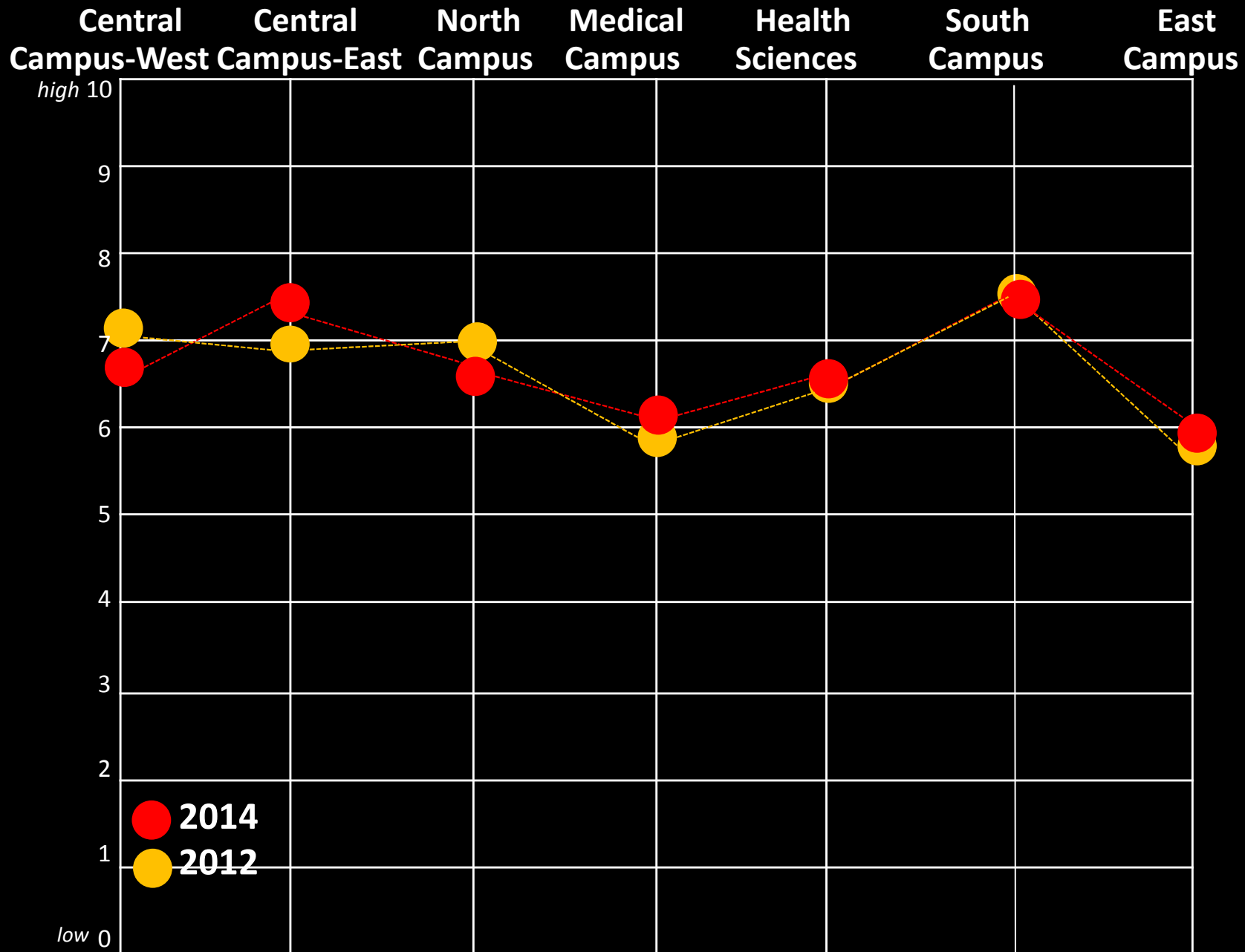
Figure xx

UNIVERSITY OF MICHIGAN CAMPUSES AND REGIONS



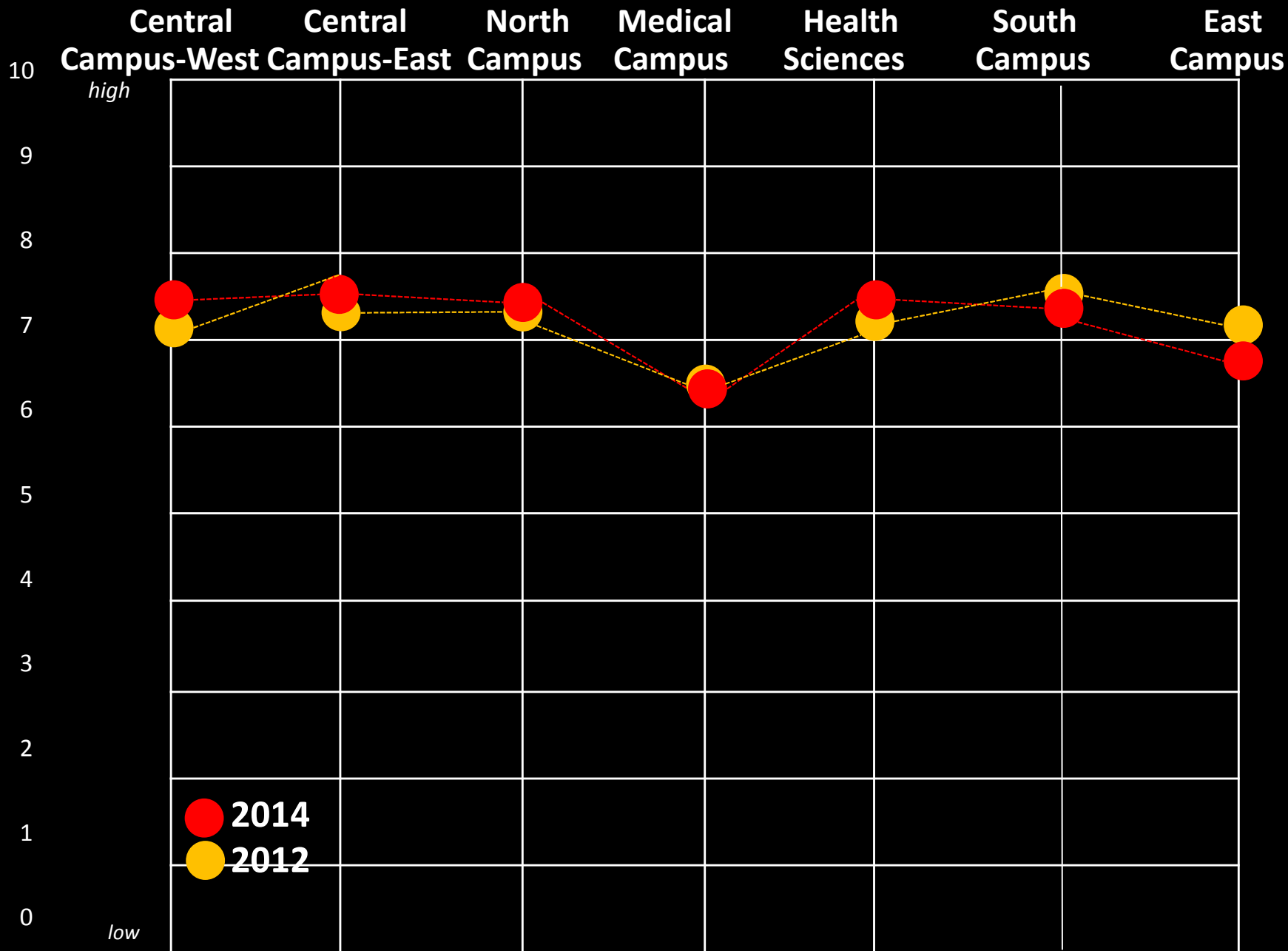
CONSERVATION BEHAVIOR INDICATOR

DIFFERENCES AMONG STAFF-FACULTY -2012 & 2014

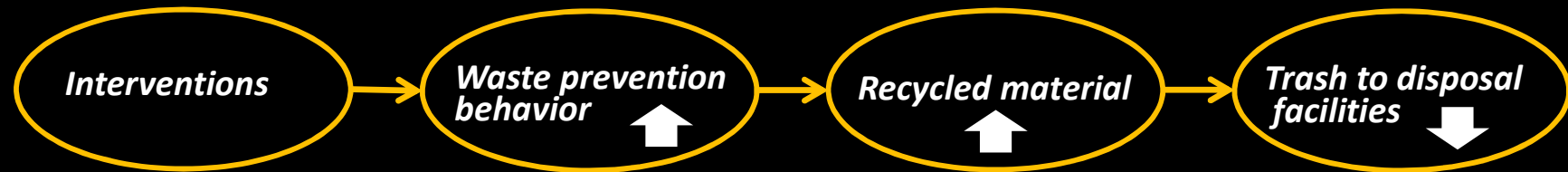


WASTE PREVENTION BEHAVIOR INDICATOR

DIFFERENCES AMONG STAFF-FACULTY -2012 & 2014



Relationships between Changes in Waste Prevention Behavior, Recycled & Trash Material



CHANGE IN RECYCLING, TRASH[#], & WASTE PREVENTION BEHAVIOR AMONG STUDENTS IN U-M HOUSING by PLACE OF RESIDENCE : 2012-2014

| U-M Housing ^a | Recycling Pounds per Square Feet ^b | | | | Trash Pounds Per Square Feet ^b | | | | Change in Waste Prevention Behavior 2012-2014 |
|--------------------------|---|------|------|------------------|---|------|------|------------------|---|
| | 2012 | 2013 | 2014 | Change 2012-2014 | 2012 | 2013 | 2014 | Change 2012-2014 | |
| North Quad | 0.24 | 0.27 | 0.27 | 13% | 0.51 | 0.46 | 0.49 | -5% | -3.1% |
| West Quad* | 0.43 | 0.40 | 0.35 | -18% | 1.14 | 1.07 | 0.86 | -24% | ** |
| South Quad* | 0.45 | 0.44 | 0.02 | -96% | 0.68 | 0.57 | 0.02 | -97% | 6.2% |
| East Quad* | 0.29 | 0.03 | 0.54 | 85% | 0.83 | 0.01 | 0.66 | -21% | ** |
| Stockwell | 0.20 | 0.20 | 0.20 | 0% | 0.94 | 0.82 | 0.56 | -40% | 6.2% |
| Mosher-Jordan | 0.71 | 0.83 | 0.86 | 21% | 1.40 | 1.32 | 1.30 | -7% | 3.1% |
| Mary Markley | 0.53 | 0.53 | 0.53 | 1% | 1.09 | 1.12 | 1.04 | -4% | 3.1% |
| Alice Lloyd*** | 0.04 | 0.24 | 0.25 | 4% | 0.03 | 0.42 | 0.63 | 49% | 0.0% |
| Couzens | 0.18 | 0.21 | 0.19 | 6% | 0.29 | 0.28 | 0.24 | -18% | 7.8% |
| Bursley-Baits | 0.37 | 0.35 | 0.38 | 3% | 0.71 | 0.66 | 0.52 | -28% | 6.6% |
| Northwood Apartments | 0.23 | 0.25 | 0.26 | 11% | 0.53 | 0.50 | 0.52 | -3% | 1.5% |

*The term, Trash is sometimes referred to as Waste. In The context of The University of Michigan, it refers to non-recyclables that are diverted to disposal facilities (i.e. land fills, etc)

^aData are excluded for the smaller residence halls having relatively small numbers of respondents. These include: Betsy Barbour, Martha Cook, Fletcher, Henderson, Newberry, and Oxford.

^bData are based on pounds of recyclables and trash collected from dumpsters associated with each building for the proceeding 12 months. For example the 2012 data cover the period from September 2011 to August 2012.

^cIn 2005, U-M launched a long-term program of selective upgrades and complete renovations to its housing stock. In 2012, East Quad was closed for renovations followed by the closure of South Quad in 2013 and the West Quad closure in 2014. Figures for recycling and waste during renovation do not reflect the normal occupancy use.

** During renovations, residence halls were unoccupied. Therefore, there were no East Quad students in the 2012 SCIP sample while the 2014 SCIP sample had no West Quad participants. Consequently, survey data covering both 2012 and 2014 were not available to measure change scores for students in these residence halls.

*** 2012 data covering recycling and waste for Alice Lloyd are low since the building was being renovated and therefore unoccupied during the previous year. Change for this building is based on the difference between 2014 and 2013

Current Status-Next Steps

Launch 4th wave of surveys in Fall 2015 (next week)

Design and conduct interventions (tests/experiments) in conjunction with U-M operational units

On-going analysis

- **Develop and test causal models using panel data**
- **Examine relationships between behavioral change & changes in energy consumption, CO2 emissions, & other “hard” indicators**
- **Other**

Continue to promote uses of the data within U-M and elsewhere

Explore Opportunities for Replication

- **Other universities**
- **Other organizations**
- **Cities and neighborhoods**

Questions?

marans@umich.edu

<http://graham.umich.edu/leadership/scip>

AWARENESS OF U-M SUSTAIN. INITIATIVES INDICATOR

DIFFERENCES AMONG STAFF-FACULTY -2012 & 2014

