Permaculture in Higher Education

By Joshua Shultz
Permaculture Program Coordinator
Western Michigan University Office for Sustainability

Table of Contents

What is Permaculture

Permaculture is an **ecological design science** drawing inspiration from natural ecosystems and permanent cultures from around the world.

The term permaculture originated in Australia in 1978 – originally a combination of the words permanent & agriculture. It has since been expanded to mean permanent-culture and includes all aspects of what makes a human culture successful, from where we obtain food, fuel, fiber, medicine, energy, water, building materials and even expands into the connection between people and how we organize our social interactions and rely on one another.

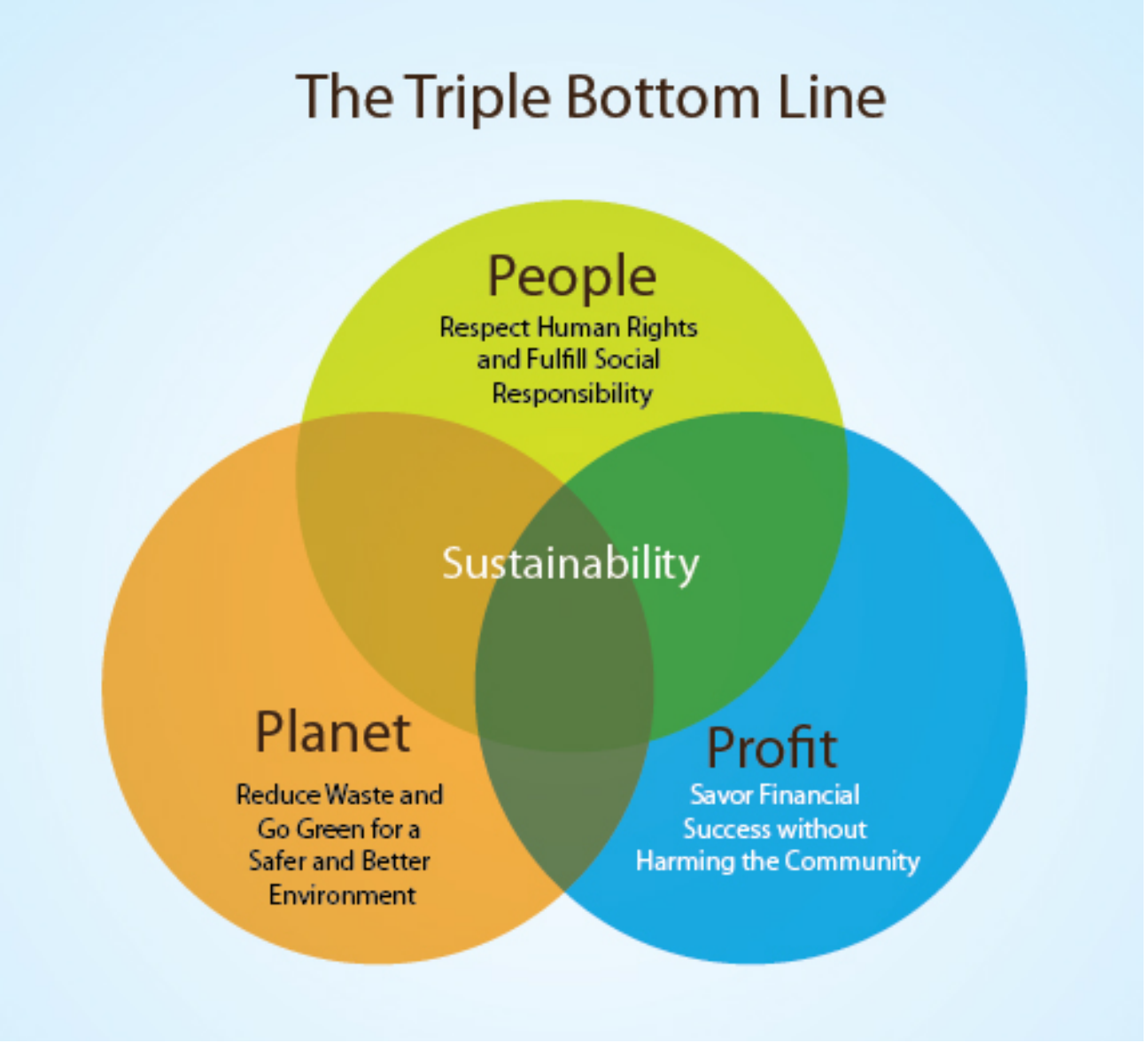
Permanent Culture

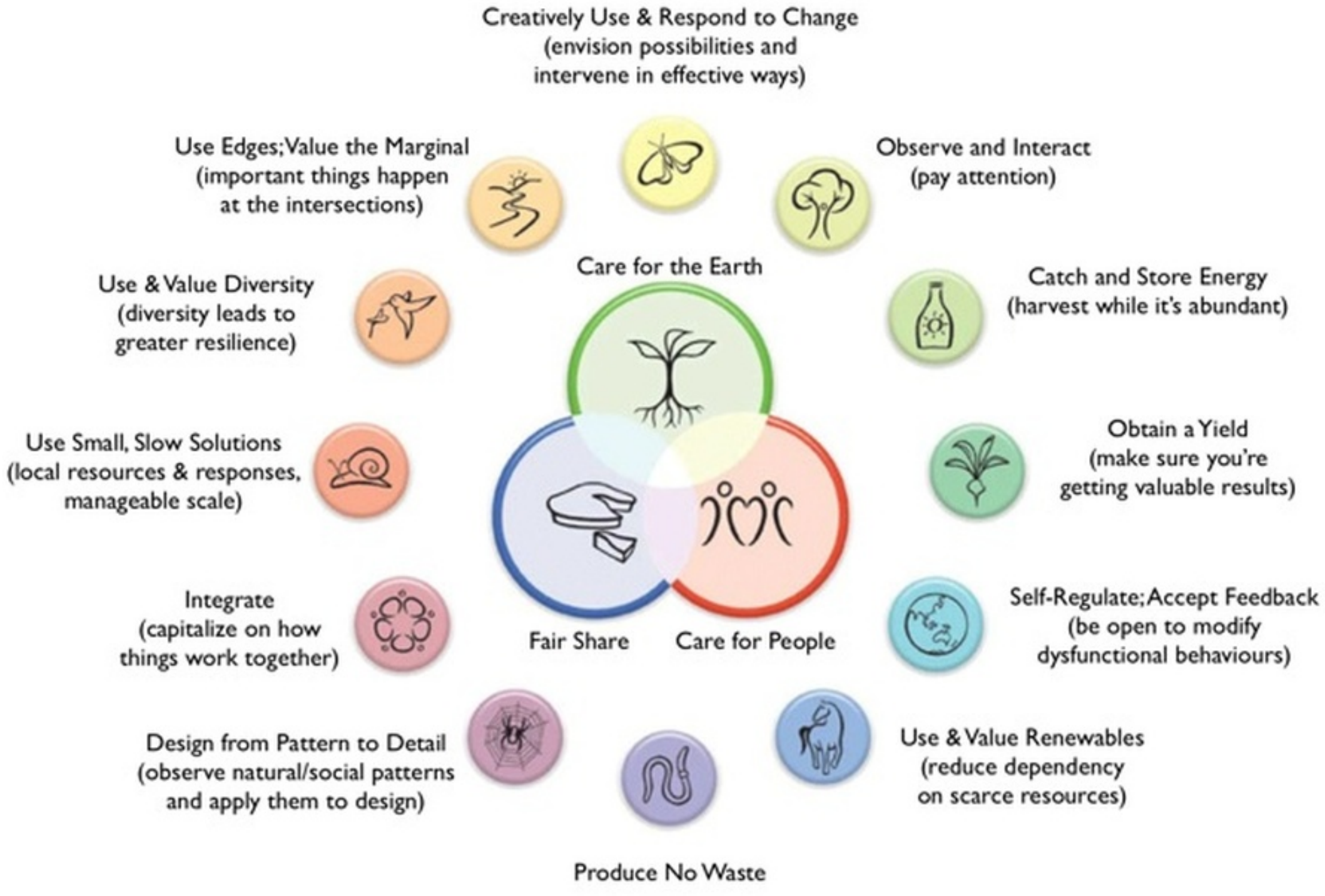
- Permaculture = permanent-culture
- Bill Mollison wrote “Permaculture One” in 1978
- Everything that makes up a culture
  - Food, fuel, fiber, medicine, energy, buildings, water, people, nature, livestock
- Optimize rather than maximize
- Relationships between elements
- Observe before interacting
- Slow and steady
- Value the margin

Permaculture

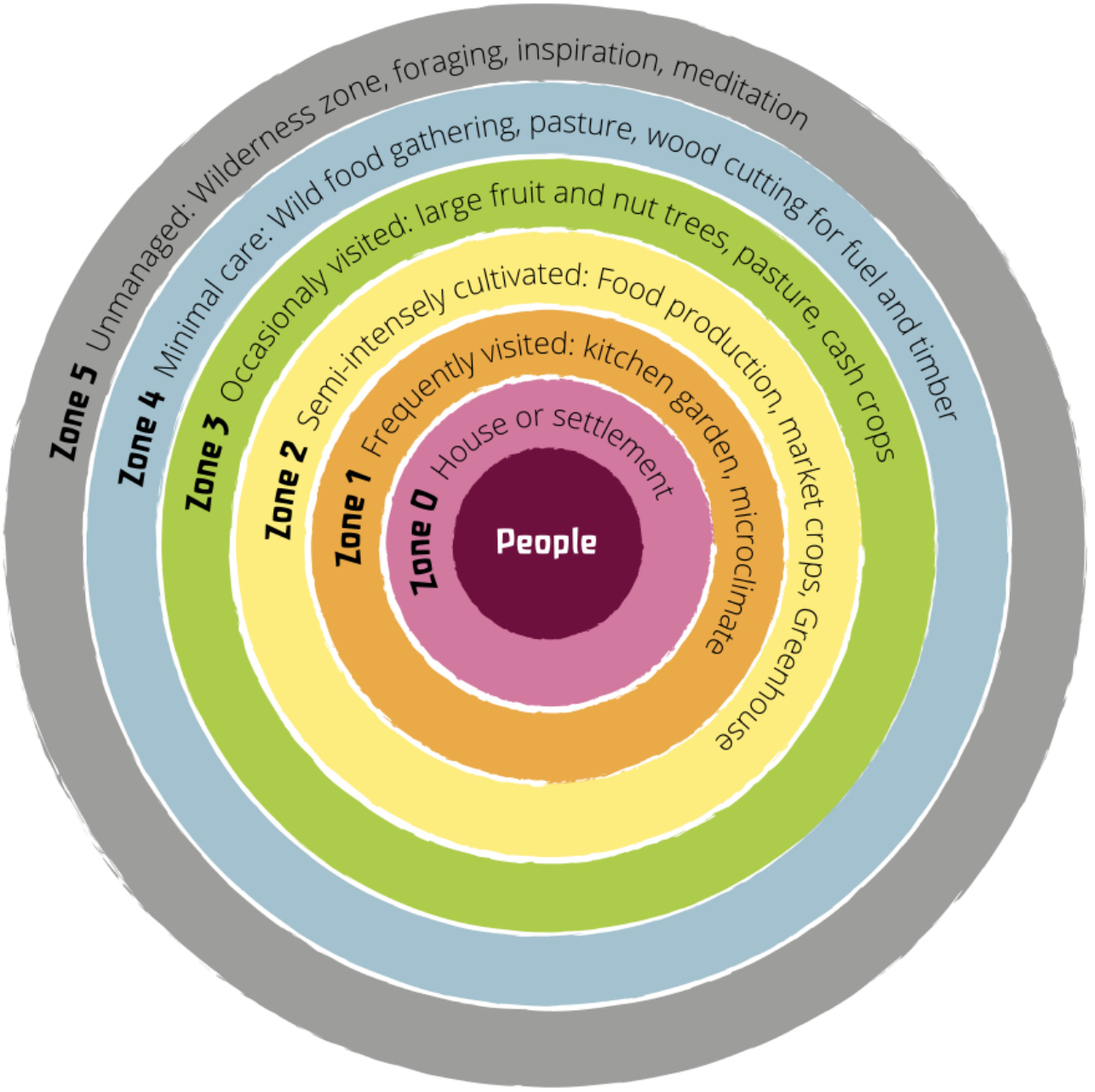
Sustainability, when we arrive at the center where ethics inform actions in each of three spheres so that a decision in one considers and enhances the others.

Triple Bottom Line of Sustainable Businesses




Creatively Use & Respond to Change
(envision possibilities and
intervene in effective ways)
Use Edges; Value the Marginal
(important things happen
at the intersections)
Observe and Interact
(pay attention)
Use & Value Diversity
(diversity leads to
greater resilience)
Care for the Earth
Catch and Store Energy
(harvest while it's abundant)
Use Small, Slow Solutions
(local resources & responses,
manageable scale)
Obtain a Yield
(make sure you're
getting valuable results)
Integrate
(capitalize on how
things work together)
Fair Share
Care for People
Self-Regulate; Accept Feedback
(be open to modify
dysfunctional behaviours)
Design from Pattern to Detail
(observe natural/social patterns
and apply them to design)
Use & Value Renewables
(reduce dependency
on scarce resources)
Produce No Waste

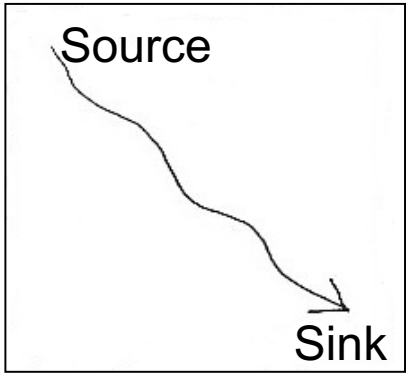
Zones

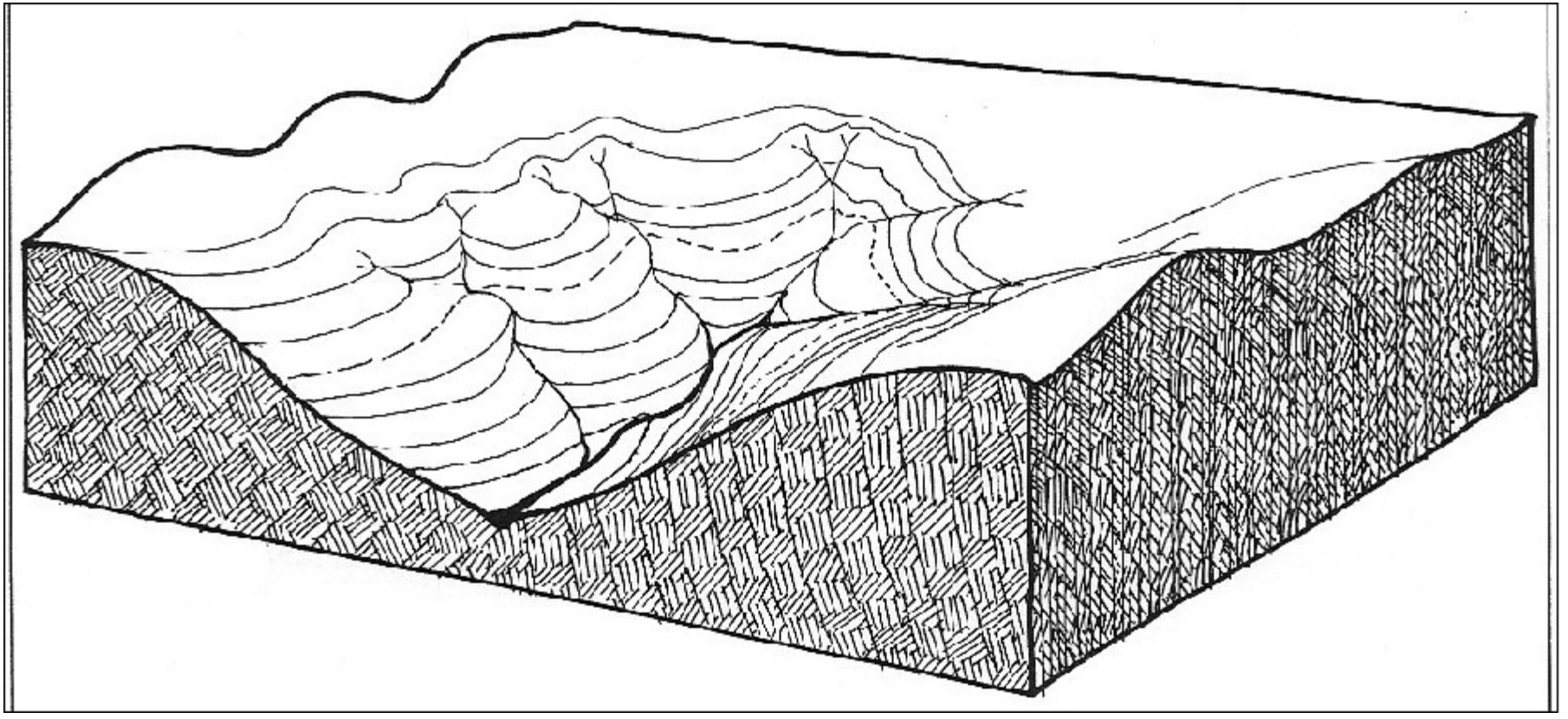

Zone 5 Unmanaged: Wilderness zone, foraging, inspiration, meditation
Zone 4 Minimal care: Wild food gathering, pasture, wood cutting for fuel and timber
Zone 3 Occasionaly visited: large fruit and nut trees, pasture, cash crops
Zone 2 Semi-intensely cultivated: Food production, market crops, Greenhouse
Zone 1 Frequently visited: kitchen garden, microclimate
Zone 0 House or settlement
People

Non-sustainable Water Use

Current Water Culture:

Channel water off landscape as quickly as possible
Move polluted water away from area
Disregard communities downstream

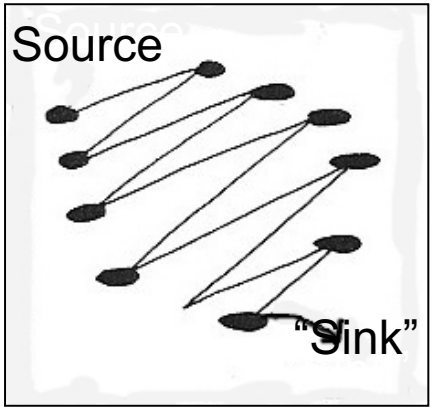


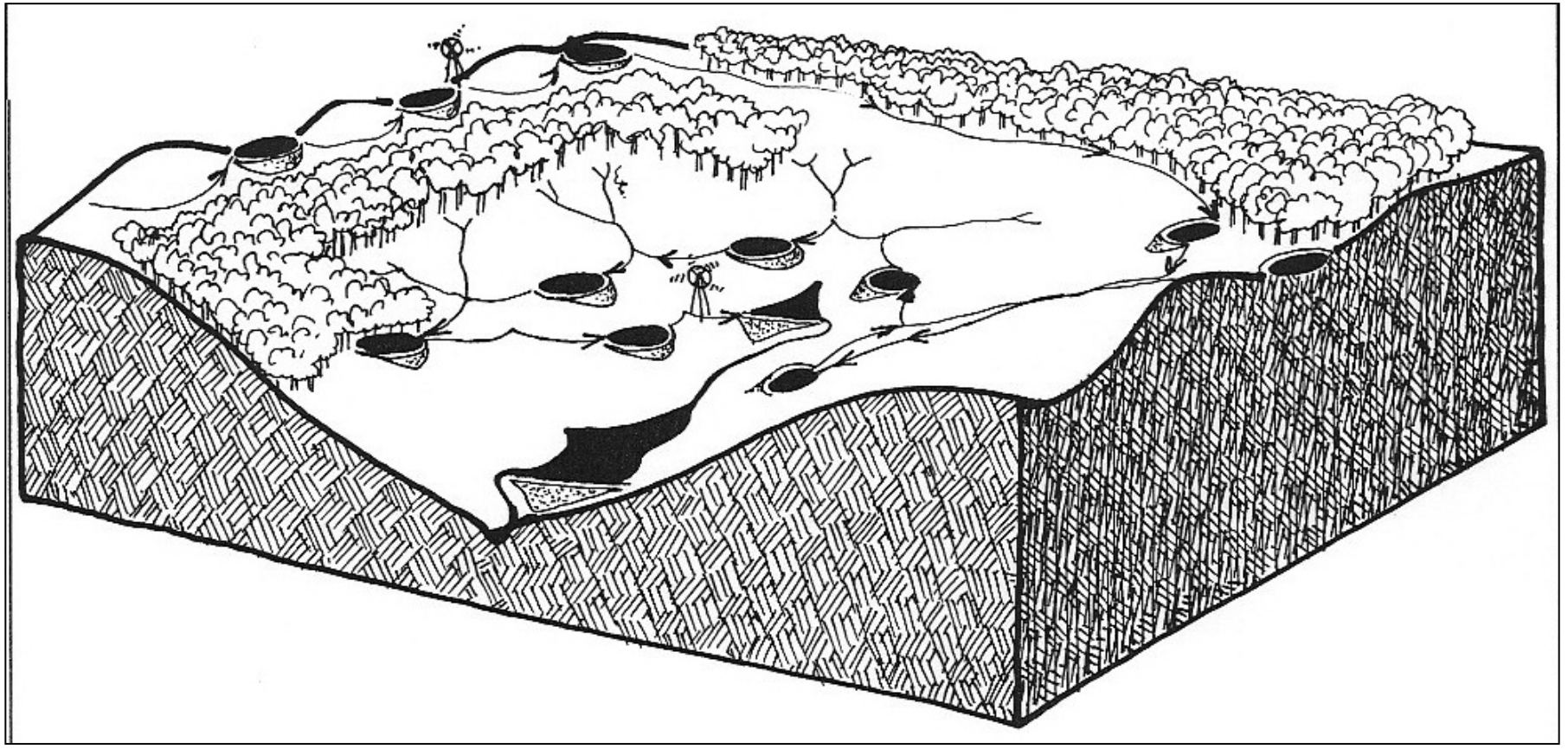


Sustainable Water Use

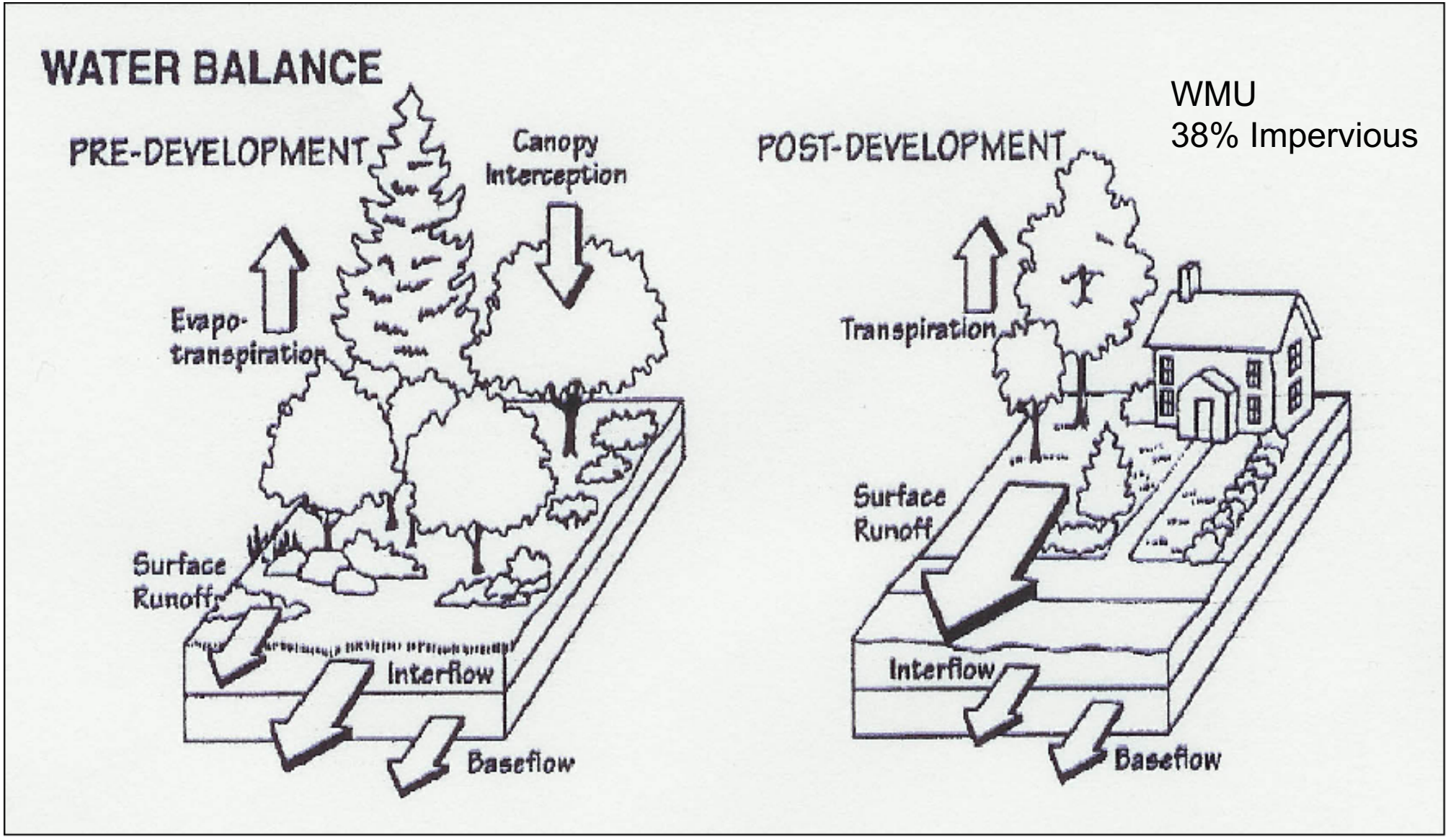
A New Water Culture:

Landscape to collect and store precipitation
Minimize water pollution
Maximize Efficiency
Eliminate Waste
Maintain social and ecological integrity of the community

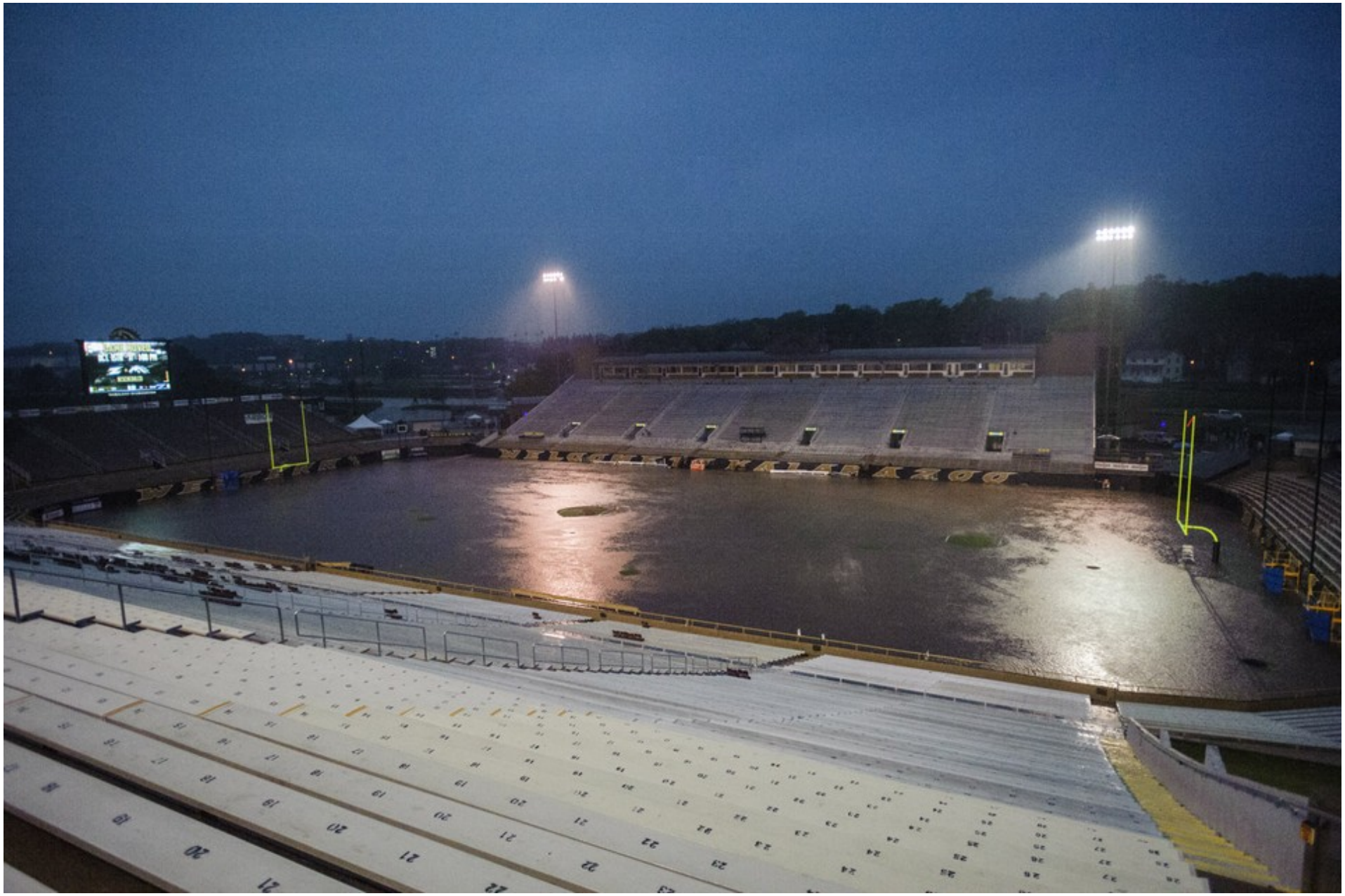




Changes in Our Water Budget

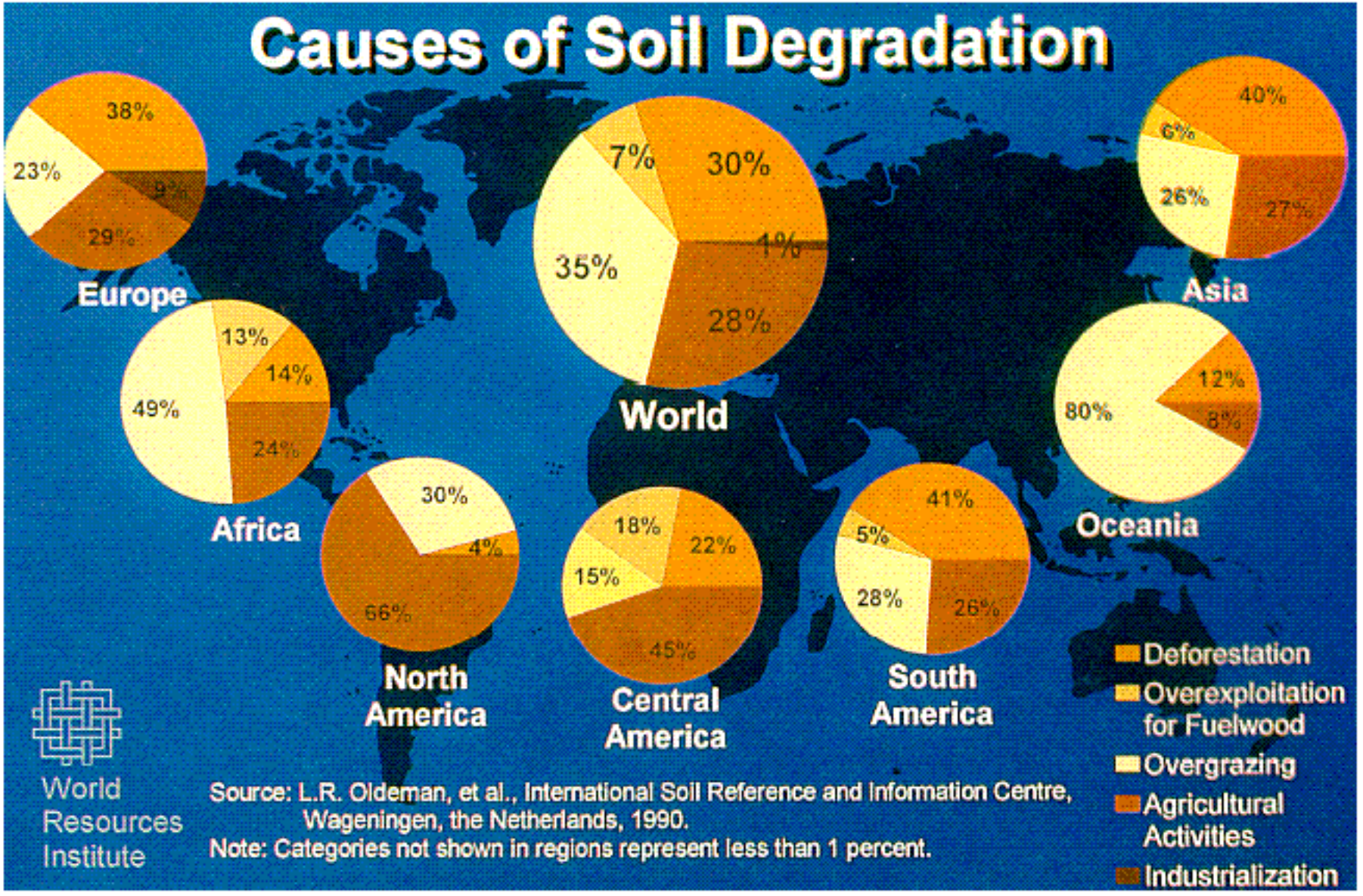


Problems?

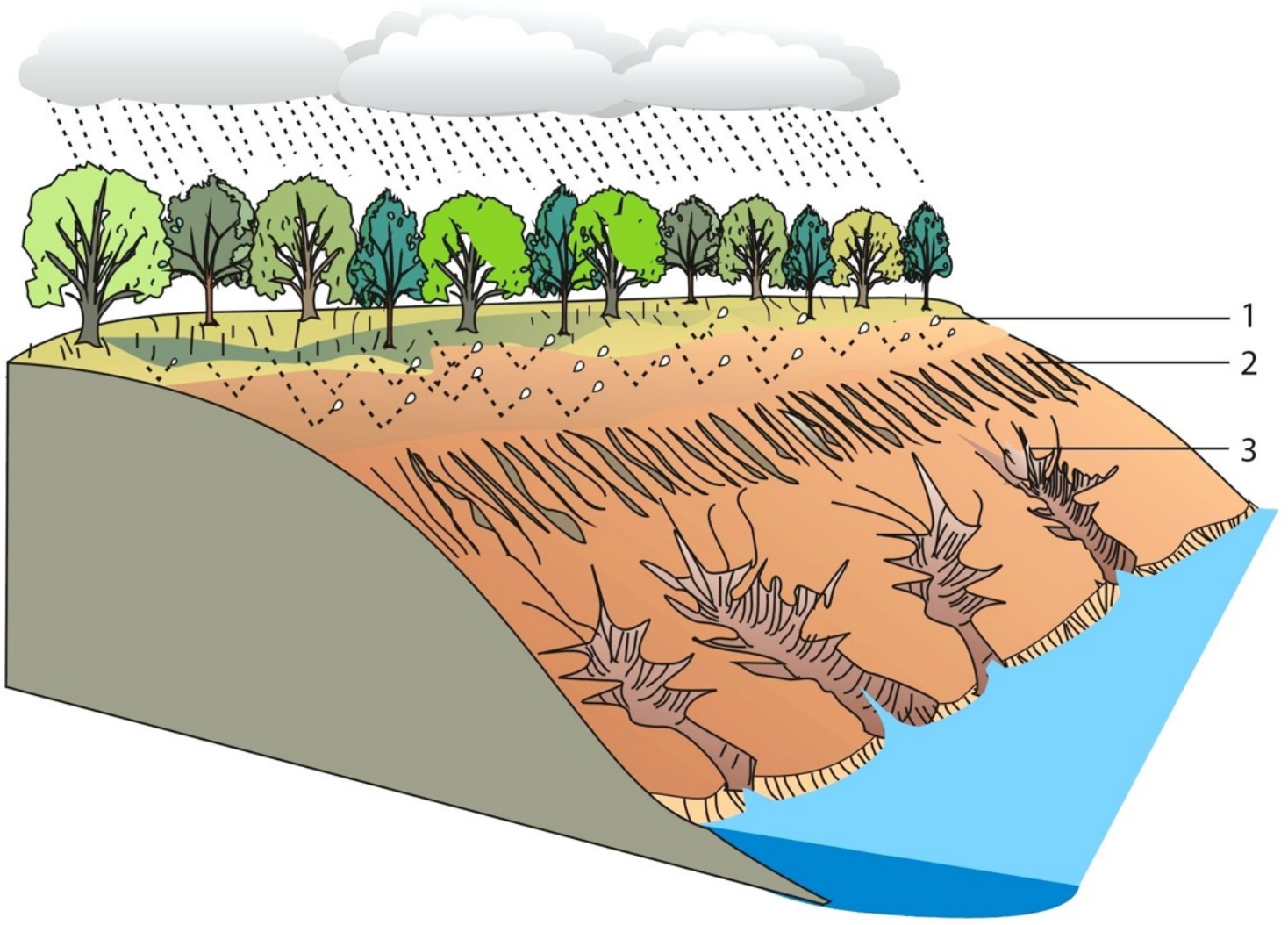


Contaminants

Organic Material and Soil Loss



Mechanical Loss

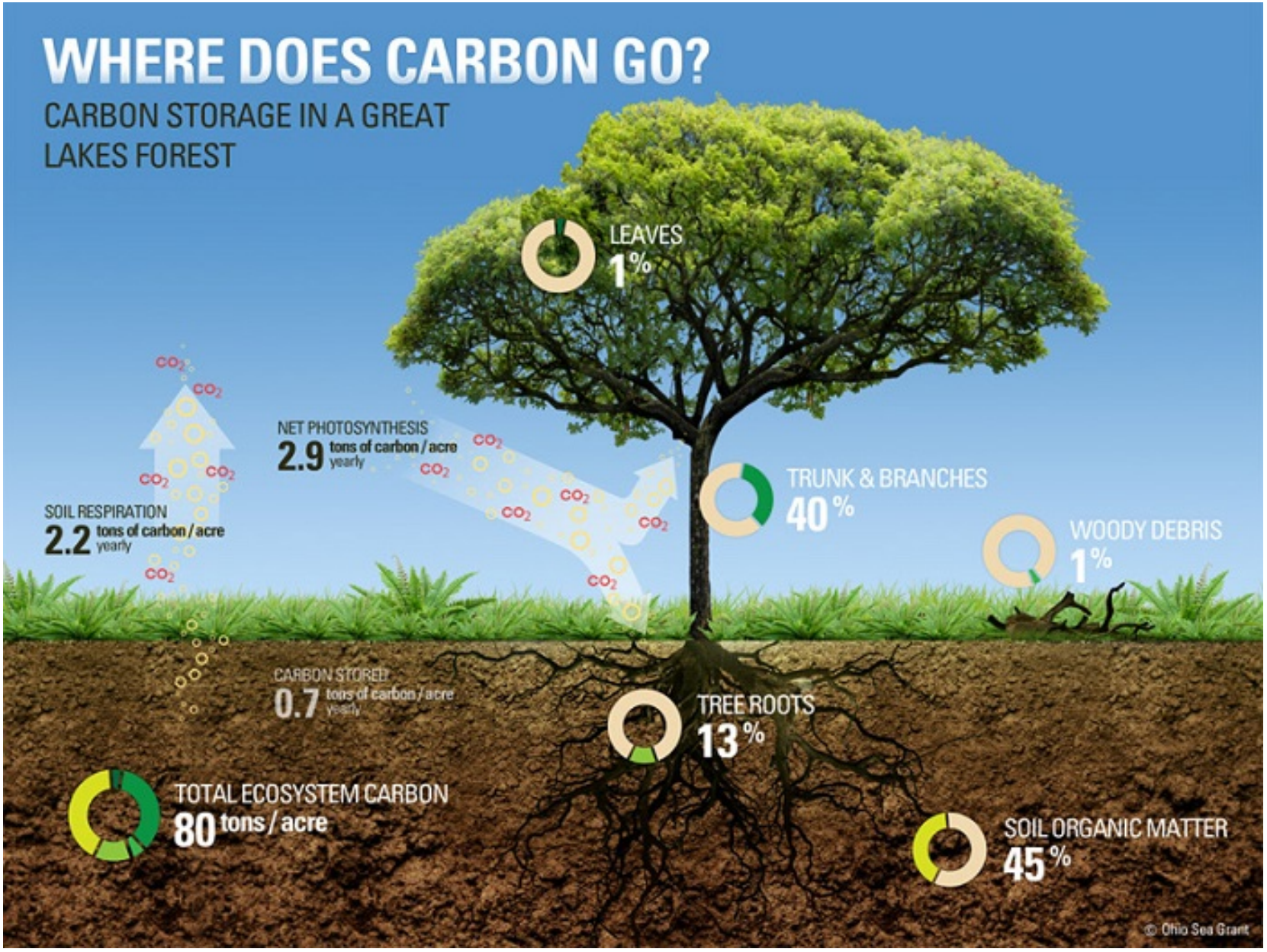


1. Sheet erosion
Raindrops that hit the ground can loosen soil. These loose grains are easily washed away. Sheet erosion removes the loose grains. It may go unnoticed until most of the productive **topsoil** has been lost. The field is gradually eroded in a more or less uniform way.

2. Rill erosion (channel)
Water collects in small channels called rills. Each rill is like a mini-river. The rills carry soil down a slope. Rills can grow into gullies.

3. Gully erosion (dongas)
A gully is a deep trench with steep sides. In South Africa, a gully is called a donga. Dongas appear as deep scars on a slope. In some dongas all the soil and some of the loose bedrock have been washed away. Dongas usually occur near the bottom of slopes.

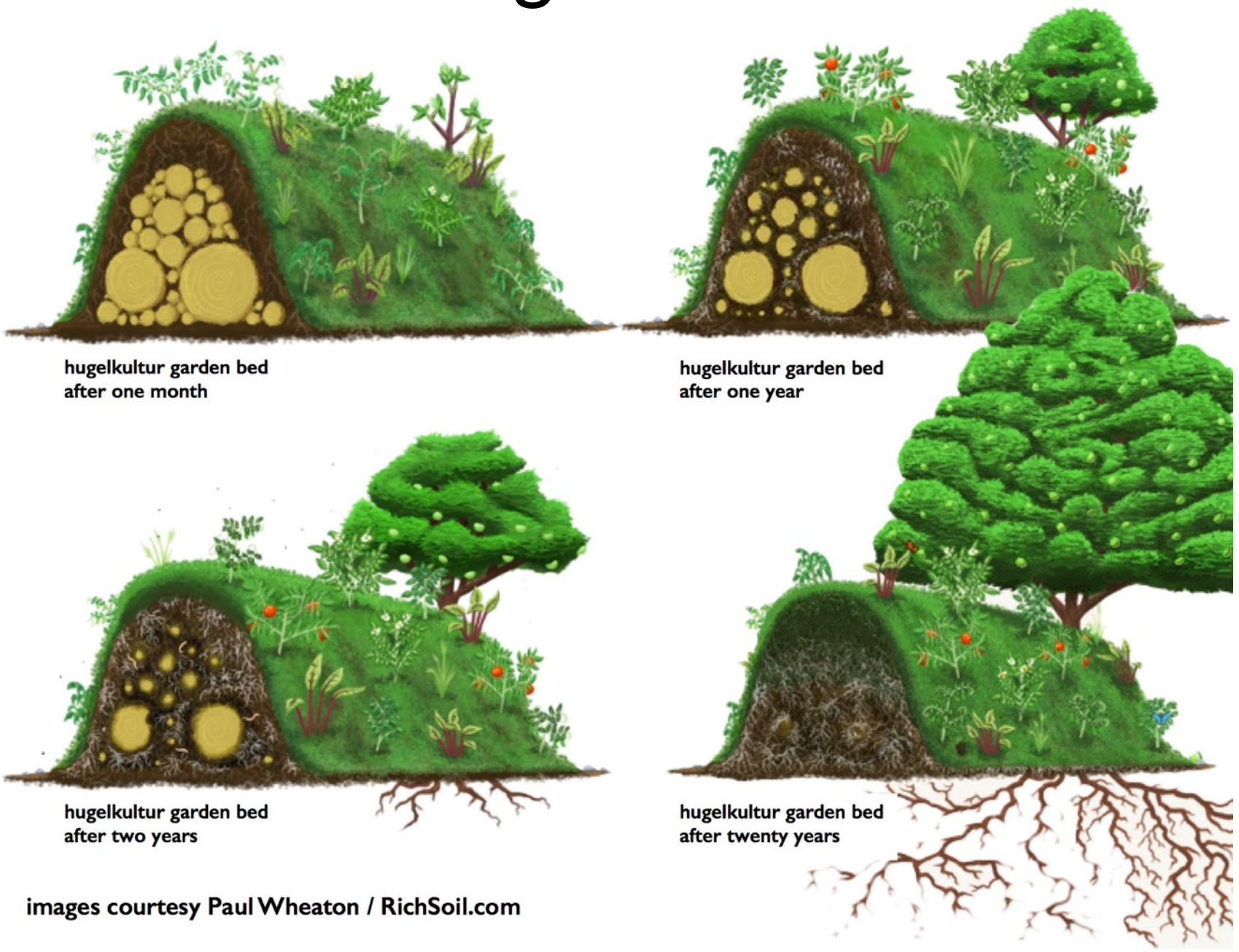
Carbon Loss


WHERE DOES CARBON GO?
CARBON STORAGE IN A GREAT LAKES FOREST
LEAVES 1%
NET PHOTOSYNTHESIS 2.9 tons of carbon / acre yearly
SOIL RESPIRATION 2.2 tons of carbon / acre yearly
TRUNK & BRANCHES 40%
WOODY DEBRIS 1%
CARBON STORED 0.7 tons of carbon / acre yearly
TREE ROOTS 13%
TOTAL ECOSYSTEM CARBON 80 tons / acre
SOIL ORGANIC MATTER 45%
© Ohio Sea Grant

Food Forest


9 LAYERS IN A FOREST GARDEN
SMALL TREES
10-30' HEIGHT
Plum, Apple, Apricot, Pear, Quince, Pawpaw, Hawthorn, Medlar, Chinquapin Chestnut, Jujube, Some Juneberries, Mountain Ash, Asian Persimmon, etc.
SHRUBS
4-15' HEIGHT
Currants, Most Hazelnuts, Viburnums, Seaberry, Aronia, Gooseberry, Rose, Elderberry, Some Juneberries, Eleagnus, Bush Cherries, Quince, etc.
FORBS/HERBS
1-6' HEIGHT
Asparagus, Perennial Greens, Brambles, Nettles, Mints, Indigos, Most Grasses, Daylilies, Rhubarb, etc.
GROUNDCOVERS
1' OR LESS HEIGHT
Strawberries, Violets, Clover, Mints, Thymes, etc.
ROOTS/TUBERS
BELOW SOIL SURFACE
Sunchokes, Groundnuts, Potatoes, Scorzonera, Licorice, Horseradish, Salsify, etc.
FUNGI
UNDERGROUND, OR ON MUSHROOM LOGS IN SHADE
VINES
CLIMBING PLANTS
Groundnuts, Hops, Grapes, Hardy Kiwi, Mountain Yam, Schisandra, Squash, Maypop, Melons, Pole Beans, etc.
CANOPY/TALL TREES
50-100+ FT. HEIGHT
Most Oaks, Hickory, Pecan, Black Walnut, American Persimmon, American Chestnut, Hackberry, Most Locusts, etc.
Small yards may not have the room for some of these larger species, or you could prune for height control. Taller species should be placed toward the North, shorter to South, for optimal partitioning of sunlight.
MEDIUM-TALL TREES
30-50' HEIGHT
Euro/Asian Chestnut, English Walnut, Wild Pear, Sassafrass, Heartnut
SUN-LOVING/SHORTER SPECIES TO SOUTH
SHADE-TOLERANT SPECIES BELOW
NITROGEN-FIXERS
CAN GROW IN ANY LAYER–IMPORTANT TO OVERALL SYSTEM
Locust Trees, Kentucky Coffeetree, Alders, Autumnberry, Seaberry, Buffaloberry, Indigo, Leadplant, Licorice, Clovers, Peas, Beans, Groundnut, Acacia, etc.
SMALL TREES
VINES
UNDER-STORY TREES
GROUNDCOVER
FORBS
SHRUB
FORBS
SHRUB
GROUNDCOVER
ROOTS
TUBERS
FUNGI
NORTH
100'
50'
20'
12'
6'
HEIGHT

Hugelkultur



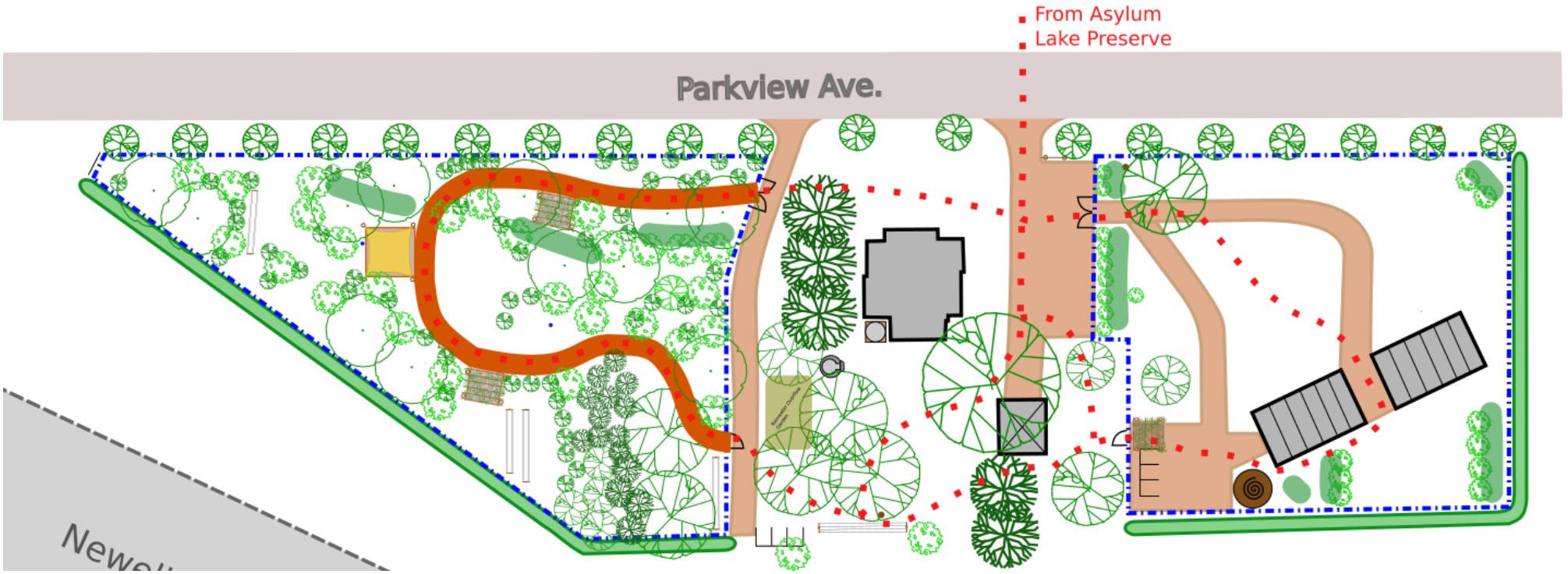
images courtesy Paul Wheaton / RichSoil.com

Western Michigan University

Gibbs House

Property Master Plan

Prepared for the Office for Sustainability By:
Cedar Creek Permaculture Design
Joshkhan2001@gmail.com
269.331.0461



Gibbs Hugelkultur 2014 & 2017

2014

2017

Gibbs Rainwater Cistern

Gibbs Compost Hot Water Heater

2015

2017

Gibbs Vermicomposting

Black Soldier Fly Larvae

Gibbs Food Forest

2015

2017

Gibbs Food Forest

Vegetable Garden

WESTERN MICHIGAN UNIVERSITY
PARKVIEW CAMPUS

WMU FACILITIES MANAGEMENT
GEOGRAPHIC INFORMATION
AUGUST 2017

WMU Interactive Map
http://www.wmich.edu/maps

WMU Campus Map
http://www.wmich.edu/maps/print

CEAS Zone OVerview

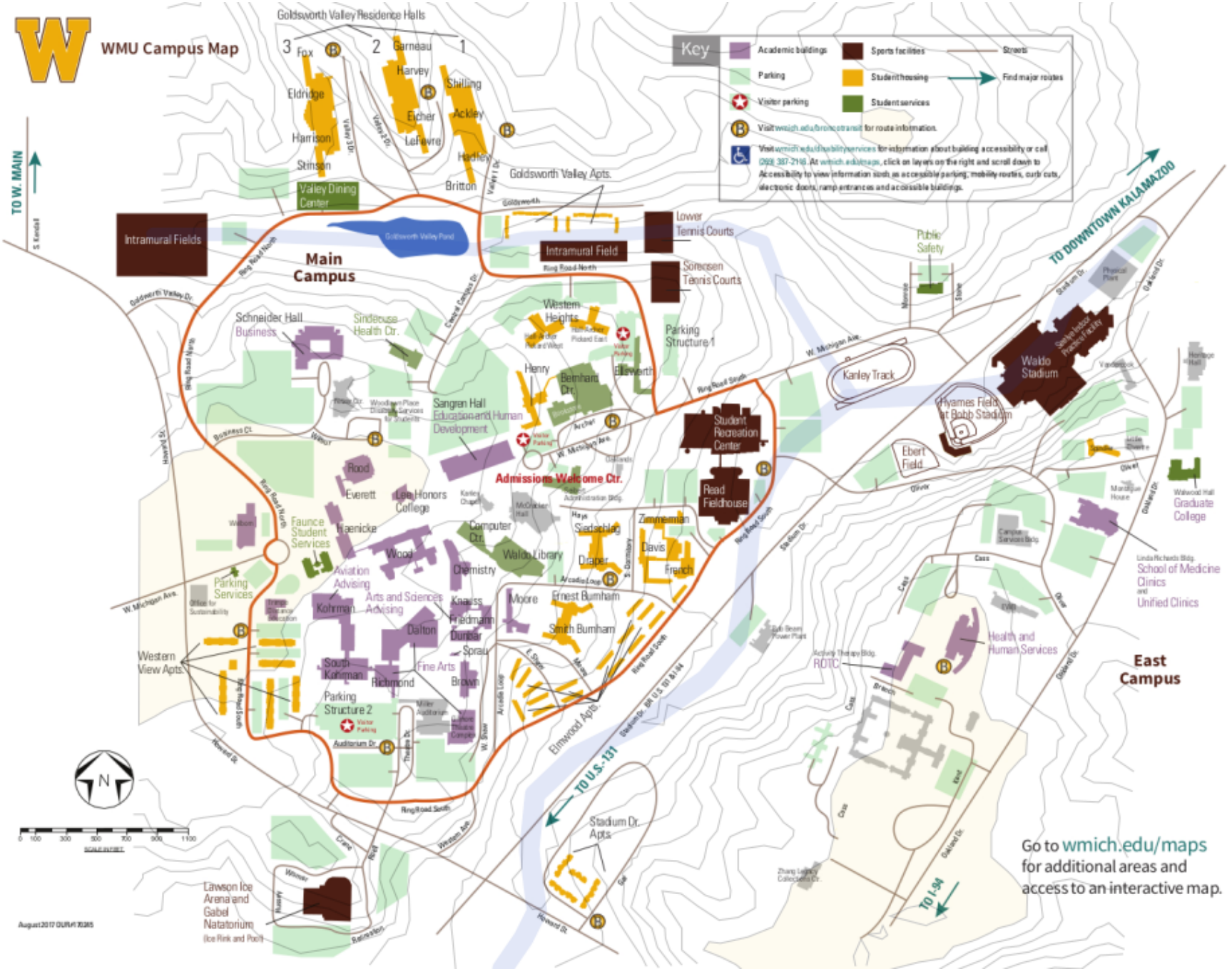
Prescribed Burn at Asylum Lake Preserve

Lawnscaping

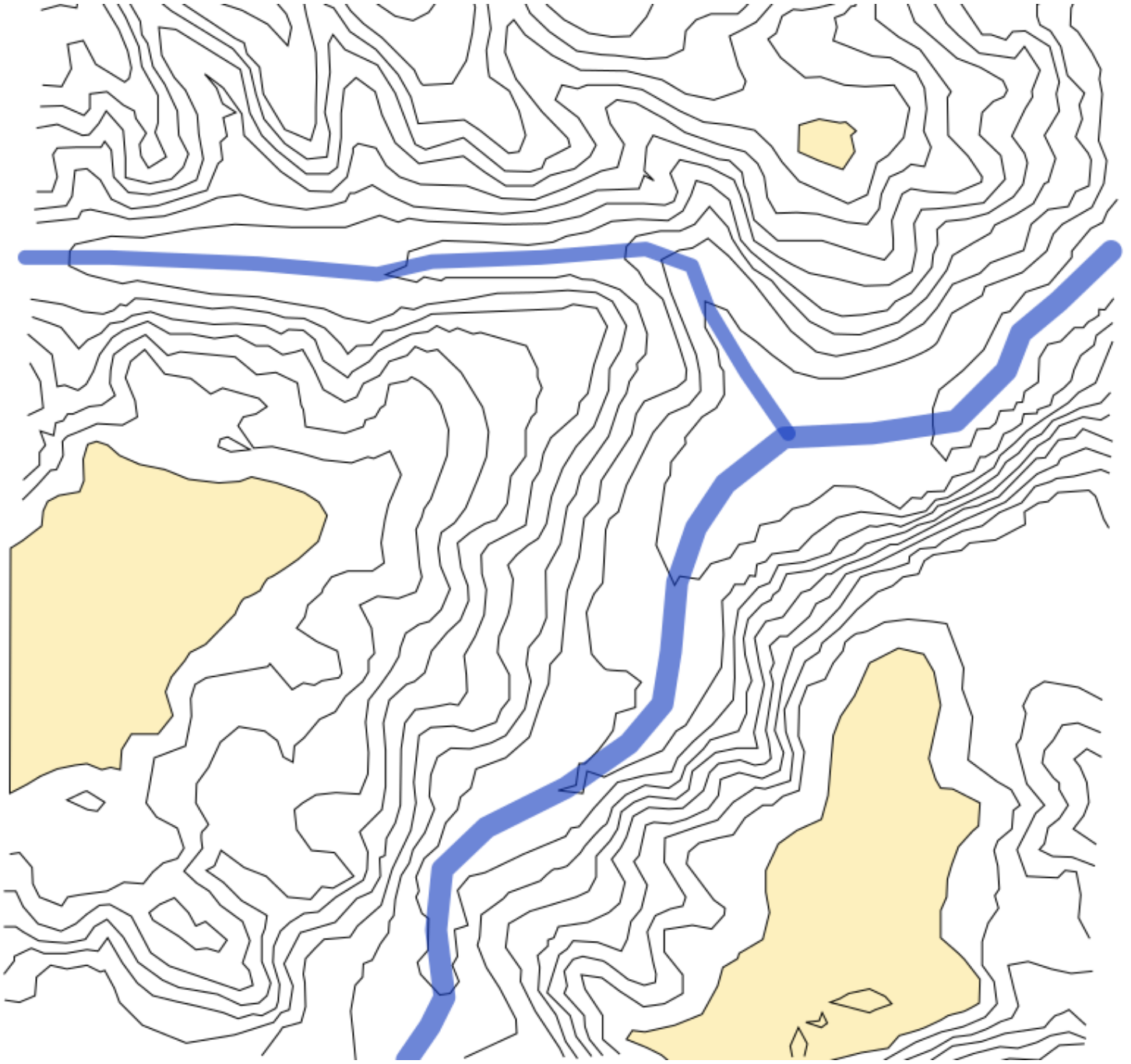
Turf Management

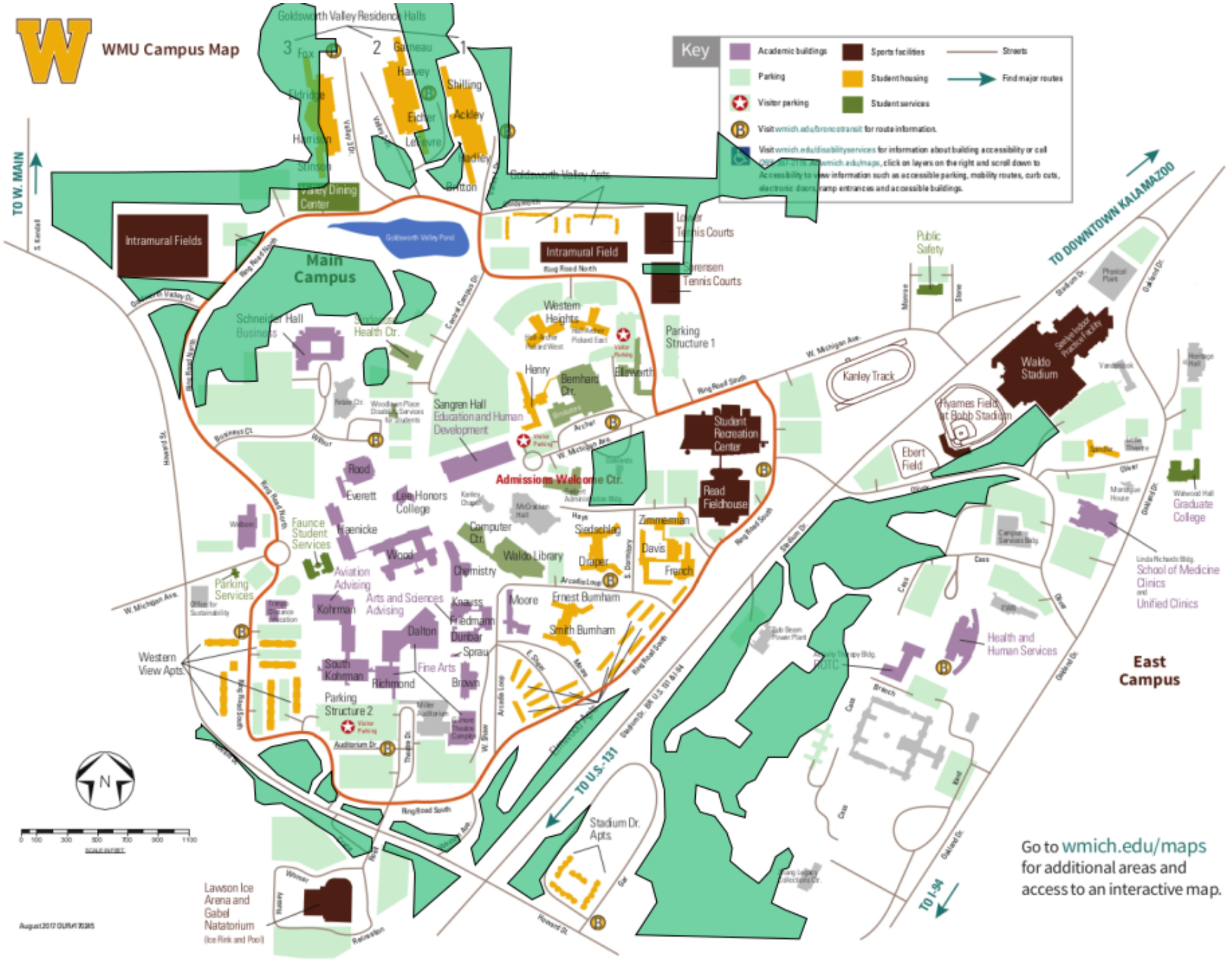
Managing the turf on East and CEAS campuses requires keen observation as the team follows natures lead. Soil testing along with low impact practices such as aeration and topdressing using compost helps to return the soil back to a biologically active state.

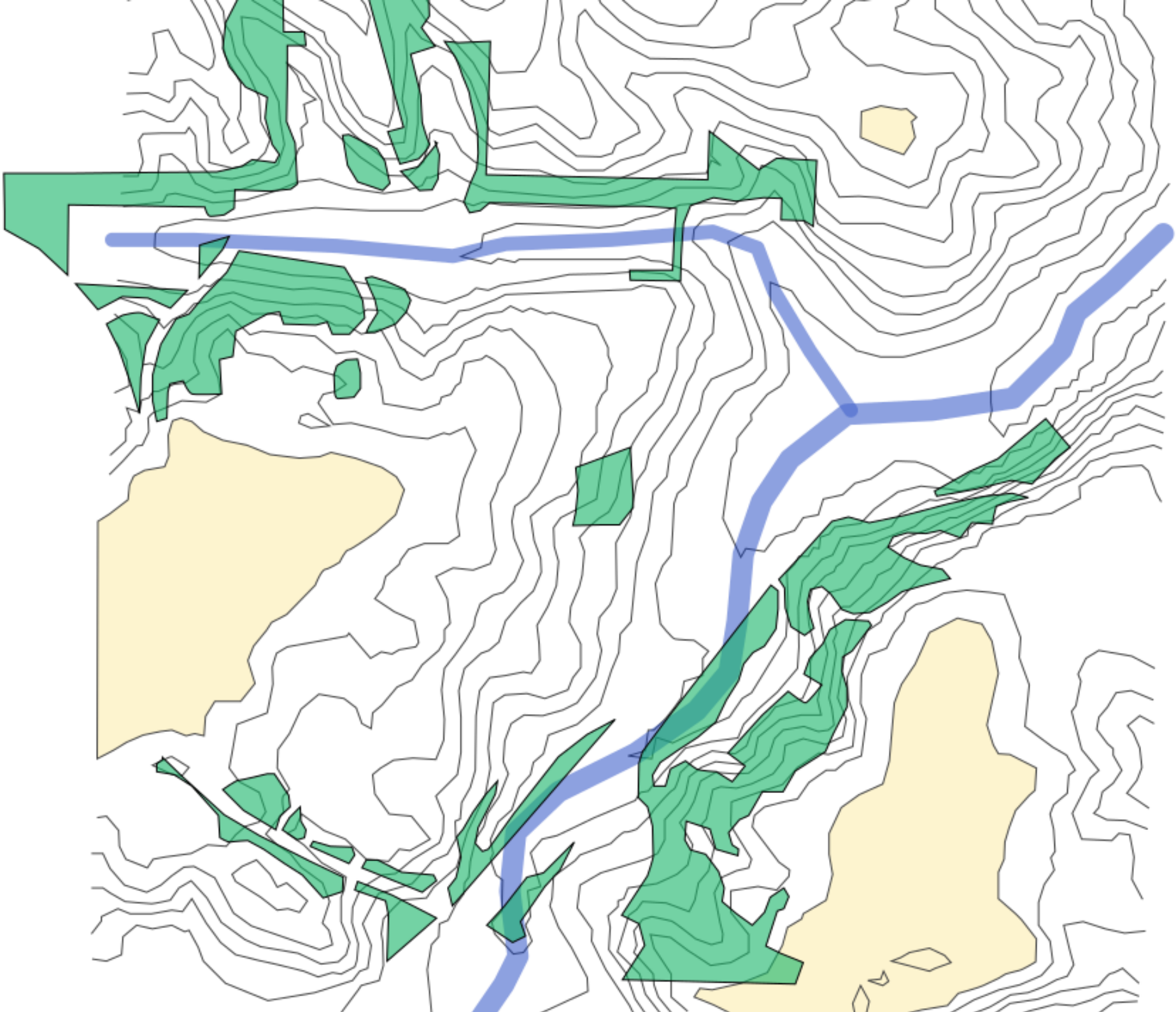
WMU Main Campus



WMU Hills and Valleys

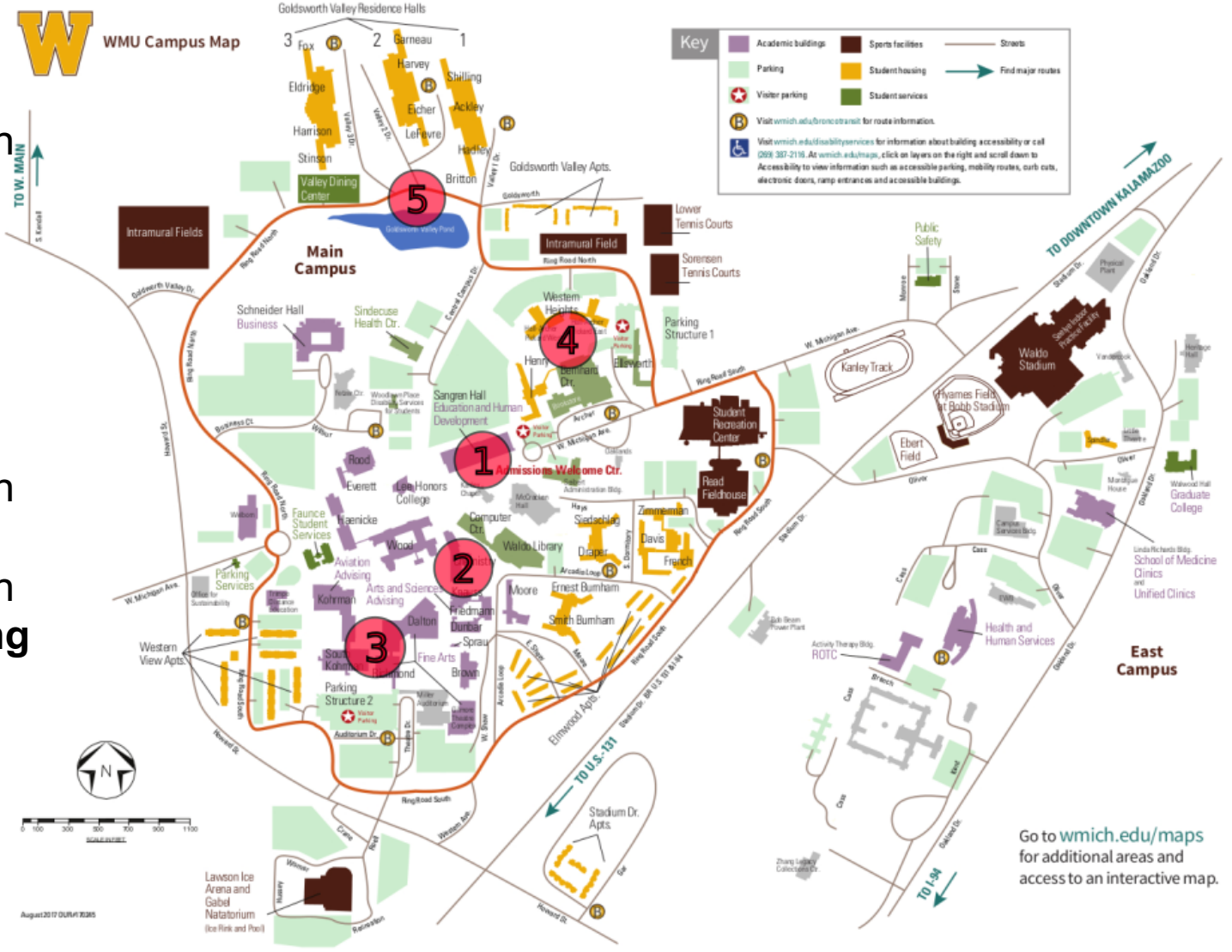



WMU Campus Map
Key
Academic buildings
Parking
Visitor parking
Sports facilities
Student housing
Student services
Streets
Find major routes
Visit wmich.edu/broncotransit for route information.
Visit wmich.edu/disabilityservices for information about building accessibility or call
Accessibility to view information such as accessible parking, mobility routes, curb cuts, electronic doors, ramp entrances and accessible buildings.
TO W. MAIN
TO DOWNTOWN KALAMAZOO
TO U.S.-131
TO I-94
Goldsworth Valley Residence Halls
Fox
Gilmeau
Harvey
Eicher
Shilling
Ackley
Eldridge
Harrison
Stinson
Lemaire
Hadley
Britton
Valley Dr.
Goldsworth Valley Apts.
Valley Dining Center
Intramural Fields
Goldsworth Valley Pond
Intramural Field
Lower Tennis Courts
Sorensen Tennis Courts
Main Campus
Schneider Hall Business
Health Dr.
Western Heights
Parking Structure 1
Public Safety
Kanley Track
Waldo Stadium
Stadium Practice Facility
Physical Plant
Hyames Field at Bobb Stadium
Ebert Field
Henry
Bernhard Dr.
Ellsworth
Sangren Hall Education and Human Development
Admissions Welcome Ctr.
Student Recreation Center
Read Fieldhouse
Rood
Everett
Lee Honors College
Faunce Student Services
Haenicke
Computer Ctr.
Waldo Library
Wood
Chemistry
Aviation Advising
Parking Services
Arts and Sciences Advising
Kohrman
Knauss
Friedmann
Dunbar
Sprau
Dalton
Fine Arts
Moore
Ernest Burnham
Smith Burnham
Siedschlag
Draper
Zimmerman
Davis
French
South Kohrman
Richmond
Brown
Parking Structure 2
Auditorium Dr.
Western View Apts.
Stadium Dr. Apts.
Lawson Ice Arena and Gabel Natatorium
(Ice Rink and Pool)
Linda Richards Bldg.
School of Medicine Clinics and Unified Clinics
Walwood Hall
Graduate College
Health and Human Services
ROTC
East Campus
Go to wmich.edu/maps for additional areas and access to an interactive map.
N
0 100 300 500 700 900 1100
SCALE IN FEET
August 2017 OUR#170265



WMU Campus Storm Water

1. **Sangran Hall**
   - Underground Detention
   - Porous Pavement
   - Green Roof
   - Solar PV Array
2. **Chemistry Building**
   - Surface Detention
3. **S. Kohrman Hall**
   - Underground Detention
4. **Western Heights**
   - Underground Detention
5. **Goldworth Valley Dining Facility and Detention Pond**
   - Underground Storm
   - Rain Gardens
   - Surface Detention



Native Planting

"Native Plantings aid in the restoration of the ecological systems on East campus" May 31, 2018

Inventory: 45 Flats

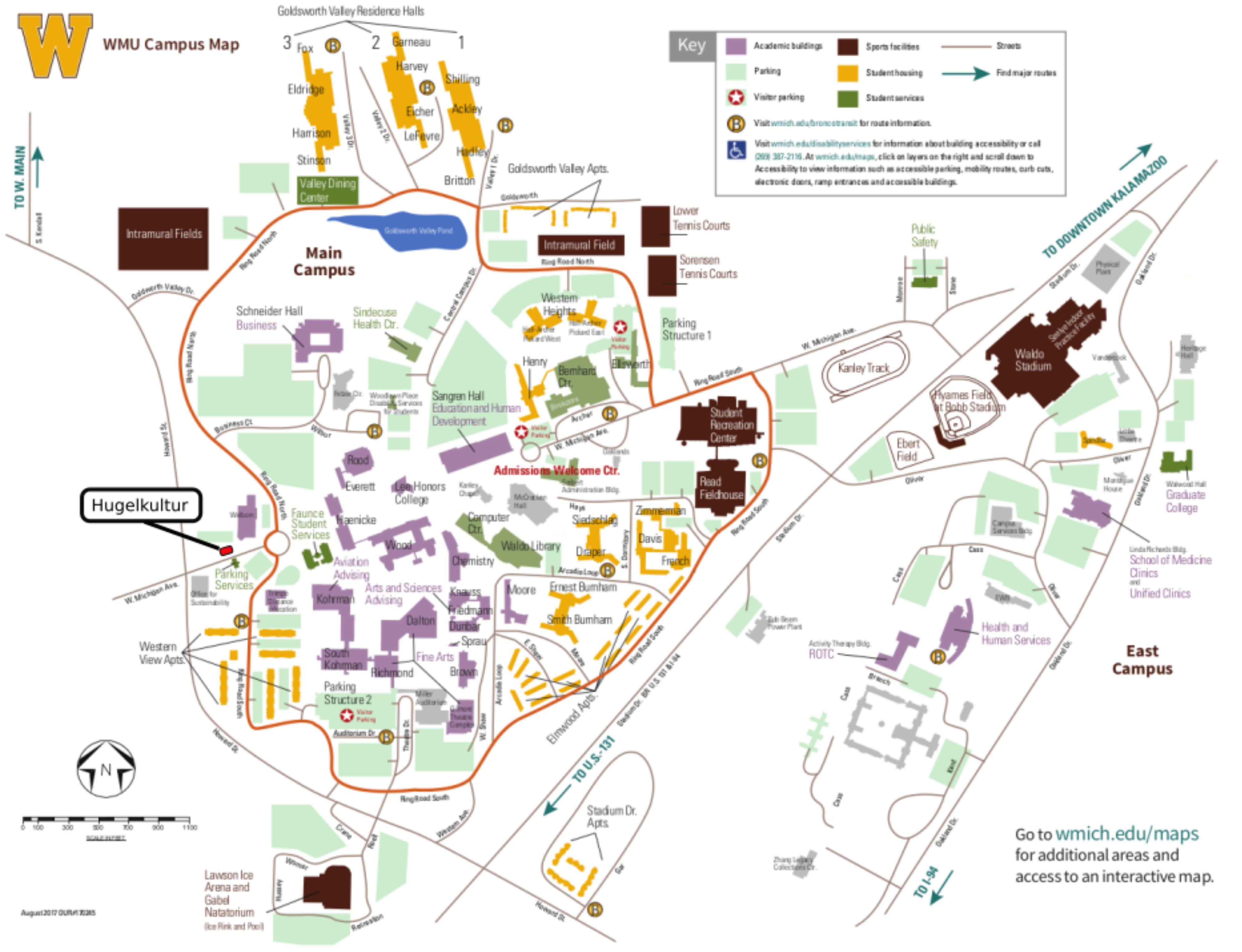
- **Columbine**
- **C. Cristata**
- **C. Lanceolata**
- **"Family Jewels" Milkweed**
- **Eupatorium Maculatum**
- **Tradescantia Pallida "Spiderwort"**
- **Asceplias Syriaca**
- **Cassia herbacarpa**
- **Smooth Penstemon**
- **Eupatorium**
- **Whorled Milkweed**
- **Veronica "Stricta"**
- **Elymus hystrix**
- **Helianthus**
- **Smooth Aster**
- **Rosin Weed**
- **Butterfly Weed**
- **Elymus "Canadian Wild Rye"**
- **Iron Weed**
- **Cup Plant**

*Seeds were harvested from WMU prairies and landscapes. Plants were grown on at the WMU Finch greenhouse.

Heritage Hall No-Mow/Reforestation/Natives

Little Theater No-Mow/Natives

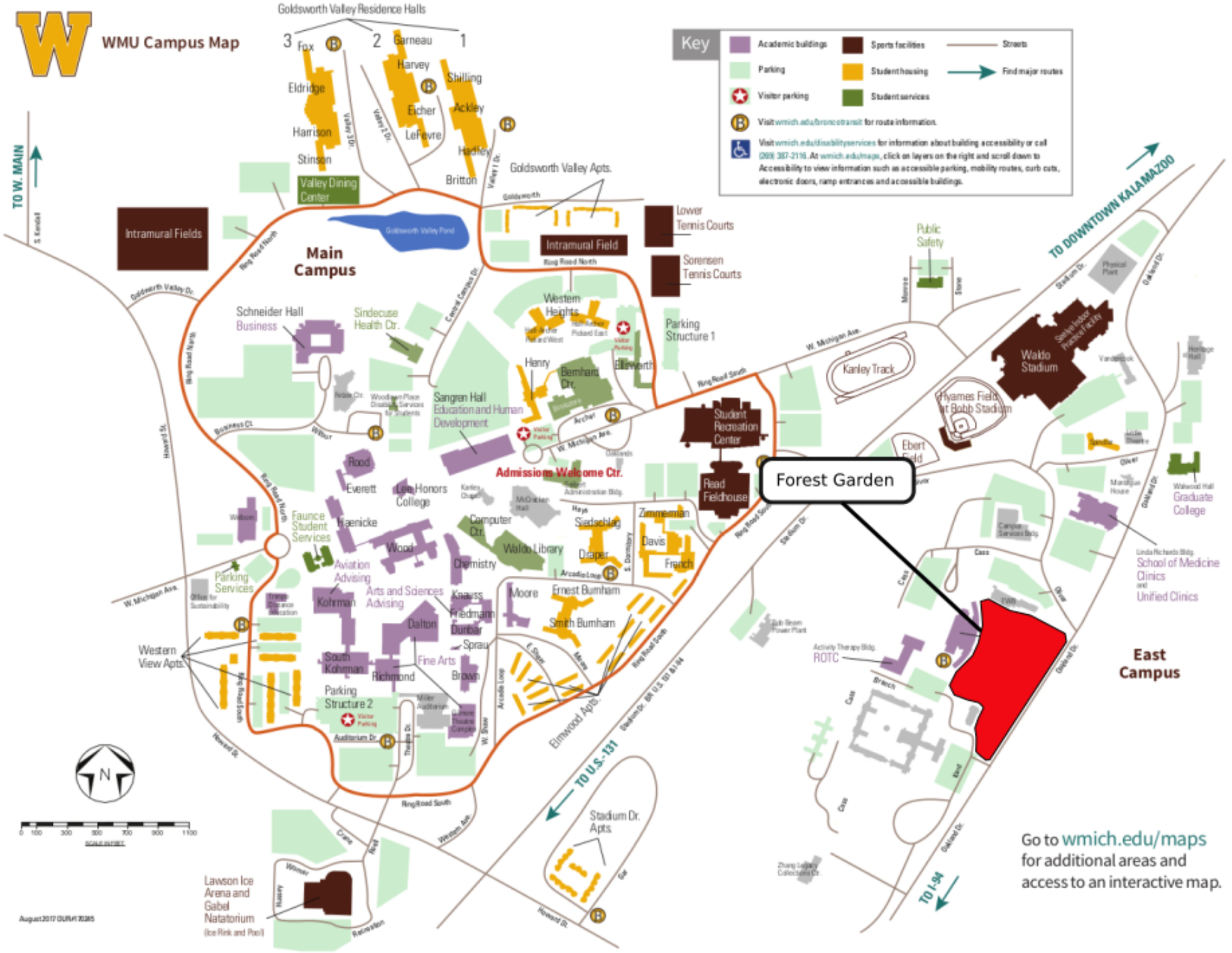
WMU Hugelkultur


WMU Campus Map
Goldsworth Valley Residence Halls
3 Fox
2 Garneau
1
Harvey
Shilling
Eldridge
Eicher
Ackley
Harrison
LeFevre
Hadley
Stinson
Britton
Valley Dining Center
Goldsworth Valley Apts.
Key
Academic buildings
Sports facilities
Streets
Parking
Student housing
Find major routes
Visitor parking
Student services
Visit wmich.edu/broncotransit for route information.
Visit wmich.edu/disabilityservices for information about building accessibility or call (269) 387-2116. At wmich.edu/maps, click on layers on the right and scroll down to Accessibility to view information such as accessible parking, mobility routes, curb cuts, electronic doors, ramp entrances and accessible buildings.
TO W. MAIN
Intramural Fields
Main Campus
Intramural Field
Lower Tennis Courts
Sorensen Tennis Courts
Public Safety
TO DOWNTOWN KALAMAZOO
Schneider Hall
Business
Sindecuse Health Ctr.
Western Heights
Parking Structure 1
Henry
Bernhard Ctr.
Ellsworth
Kanley Track
Waldo Stadium
Sangren Hall
Education and Human Development
Hyames Field at Bobb Stadium
Student Recreation Center
Ebert Field
Rood
Everett
Lee Honors College
Admissions Welcome Ctr.
Read Fieldhouse
Hugelkultur
Faunce Student Services
Haenicke
Wood
Computer Ctr.
Waldo Library
Siedschlag
Zimmerman
Davis
French
Draper
Graduate College
Aviation Advising
Chemistry
Parking Services
Arts and Sciences Advising
Kohrman
Knauss
Moore
Ernest Burnham
Friedmann
Dunbar
Dalton
Smith Burnham
Sprau
School of Medicine Clinics
Unified Clinics
Western View Apts.
South Kohrman
Fine Arts
Richmond
Brown
Health and Human Services
ROTC
East Campus
Parking Structure 2
Elmwood Apts.
TO U.S.-131
Stadium Dr. Apts.
Lawson Ice Arena and Gabel Natatorium
(Ice Rink and Pool)
TO I-94
Go to wmich.edu/maps for additional areas and access to an interactive map.

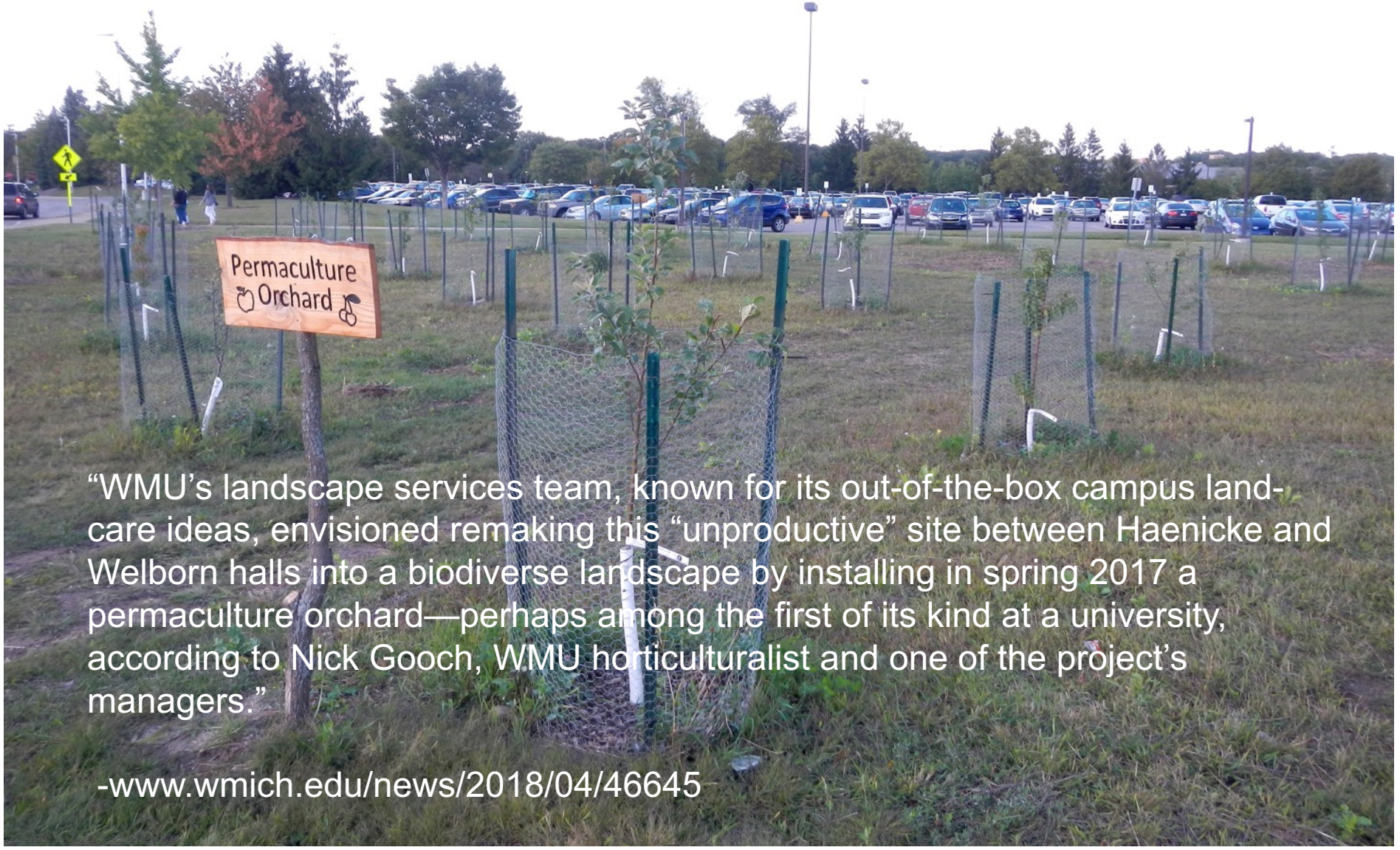
CHHS Forest Garden

Located within the beautiful grounds of CHHS, the Forest Garden provides a multitude of educational and passive recreation opportunities. Elderberries, Paw Paw, and Serviceberry are the beginnings of a dynamic forest garden that will provide food/medicine/habitat/ and many other ecological services.

CHHS Forest Garden

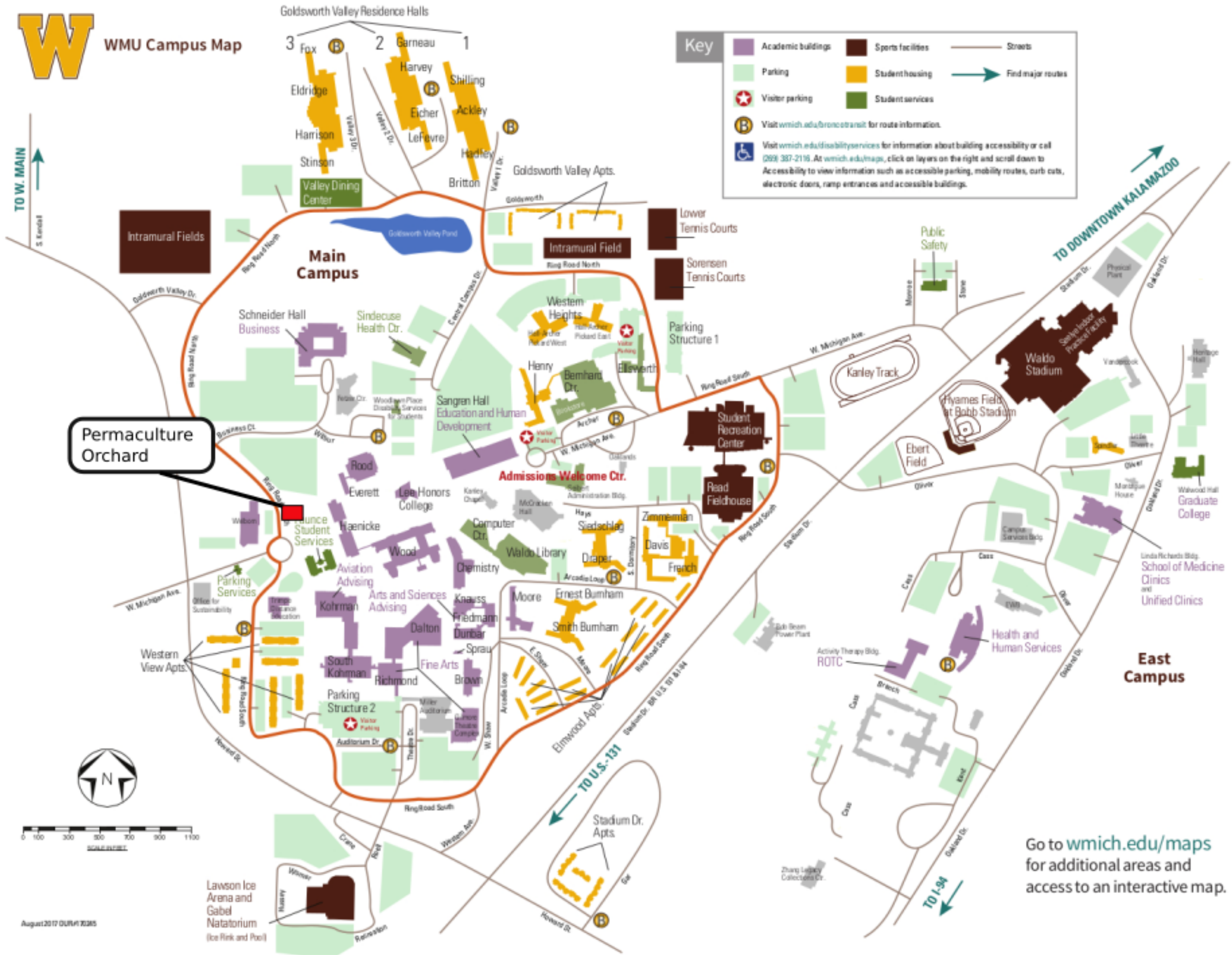

WMU Campus Map
Goldsworth Valley Residence Halls
3
Fox
2
Garneau
1
Harvey
Shilling
Eldridge
Eicher
Ackley
Harrison
LeFevre
Hadley
Stinson
Britton
Valley Dining Center
Goldsworth Valley Apts.
TO W. MAIN
S. Kendall
Intramural Fields
Goldsworth Valley Pond
Main Campus
Intramural Field
Lower Tennis Courts
Sorensen Tennis Courts
Public Safety
TO DOWNTOWN KALAMAZOO
Schneider Hall Business
Sindecuse Health Ctr.
Western Heights
Parking Structure 1
Kanley Track
Waldo Stadium
Hyames Field at Bobb Stadium
Henry
Bernhard Ctr.
Ellsworth
Sangren Hall Education and Human Development
Student Recreation Center
Admissions Welcome Ctr.
Read Fieldhouse
Forest Garden
Ebert Field
Rood
Everett
Lee Honors College
Faunce Student Services
Haenicke
Computer Ctr.
Waldo Library
Zimmerman
Davis
French
Graduate College
Parking Services
Aviation Advising
Wood
Chemistry
Draper
Arts and Sciences Advising
Kohrman
Knauss
Moore
Ernest Burnham
Smith Burnham
Friedmann
Dunbar
Dalton
Sprau
Fine Arts
South Kohrman
Richmond
Brown
Western View Apts.
Parking Structure 2
Elmwood Apts.
School of Medicine Clinics and Unified Clinics
East Campus
ROTC
TO U.S.-131
Stadium Dr. Apts.
TO I-94
Lawson Ice Arena and Gabel Natatorium
(Ice Rink and Pool)
Key
Academic buildings
Sports facilities
Streets
Parking
Student housing
Find major routes
Visitor parking
Student services
Visit wmich.edu/broncotransit for route information.
Visit wmich.edu/disabilityservices for information about building accessibility or call (269) 387-2116. At wmich.edu/maps, click on layers on the right and scroll down to Accessibility to view information such as accessible parking, mobility routes, curb cuts, electronic doors, ramp entrances and accessible buildings.
Go to wmich.edu/maps for additional areas and access to an interactive map.
August 2017 DURAFT0265

Permaculture Orchard



"WMU's landscape services team, known for its out-of-the-box campus land-care ideas, envisioned remaking this "unproductive" site between Haenicke and Welborn halls into a biodiverse landscape by installing in spring 2017 a permaculture orchard—perhaps among the first of its kind at a university, according to Nick Gooch, WMU horticulturalist and one of the project's managers."

-www.wmich.edu/news/2018/04/46645



WMU Campus Map
Goldsworth Valley Residence Halls
Fox
Garneau
Harvey
Eldridge
Shilling
Eicher
Ackley
Harrison
LeFevre
Hadley
Stinson
Britton
Valley Dining Center
Goldsworth Valley Apts.
Key
Academic buildings
Sports facilities
Streets
Parking
Student housing
Find major routes
Visitor parking
Student services
TO W. MAIN
Intramural Fields
Main Campus
Intramural Field
Lower Tennis Courts
Sorensen Tennis Courts
Public Safety
TO DOWNTOWN KALAMAZOO
Schneider Hall
Business
Sindecuse Health Ctr.
Western Heights
Parking Structure 1
Henry
Bernhard Ctr.
Ellsworth
Kanley Track
Waldo Stadium
Sangren Hall
Education and Human Development
Student Recreation Center
Hyames Field at Robb Stadium
Permaculture Orchard
Rood
Ebert Field
Admissions Welcome Ctr.
Everett
Lee Honors College
Read Fieldhouse
Student Services
Haenicke
Computer Ctr.
Siedschlag
Zimmerman
Davis
Graduate College
Wood
Waldo Library
Draper
French
Chemistry
School of Medicine Clinics
Unified Clinics
Aviation Advising
Parking Services
Arts and Sciences Advising
Moore
Ernest Burnham
Knauss
Kohrman
Friedmann
Dunbar
Smith Burnham
Dalton
Sprau
Health and Human Services
Western View Apts.
South Kohrman
Fine Arts
ROTC
East Campus
Richmond
Brown
Parking Structure 2
Elmwood Apts.
TO U.S.-131
Stadium Dr. Apts.
Lawson Ice Arena and Gabel Natatorium
(Ice Rink and Pool)
TO I-94
Go to wmich.edu/maps for additional areas and access to an interactive map.

WMU Goats

This pilot project began with Nick Gooch, WMU horticulturist, who proposed bringing goats to campus to test their viability for helping to control invasive plant species infesting campus woodlots, particularly buckthorn, honeysuckle, oriental bittersweet and poison ivy.

"The current management practice to combat these species using labor, machinery and chemical herbicides is labor- and capital-intense and fails to improve the site to allow the native community to achieve balance and restore the ecosystem"

-https://www.wmich.edu/news/2017/06/40334

The Island School and Cape Eleuthera Institute

Tilapia Aquaponics

Black Water Waste Garden

University of Massachusetts

Facts and benefits of Umass Permaculture

- Converted a 12,000 s.f. grass lawn to permaculture garden
- Moved over 500,000 pounds of organic matter by hand, using 250 volunteers
- Hands-on education for campus and local community
- Involved Big Brothers Big Sisters organization, numerous schools and summer campus
- Producing food for Umass Dining Services
- Featured in dozens of print, TV, radio, online publications
- Receiving international media attention
- Nominated for a Real Food Challenge Award

University of Massachusetts Amherst Franklin Permaculture Garden

Franklin Garden

Want cool housemates?

We might want you, too!

Amherst. House!

Permaculture.

1 bedroom avail.. 3 already full
@ $450 + utils

MORE GREATNESS!

*Swimming hole next door
*Bike trail, bus stop, and walking trails all nearby

APPLY IF YOU'RE ALL ABOUT:

* Growing your own food
* Living cooperatively
* Cooking / eating good food with cool folks
* Working to live, rather than living to work!

University of Michigan Permaculture Garden

Zone 1—North

Raised Keyhole Gardens:
A keyhole garden is a circular garden with a small central path that allows the gardener access to every inch of growing space without walking on the soil or trampling smaller plants. They are useful ways to illustrate the permaculture principles of "Using Edges" and "Obtaining a Yield". A raised keyhole garden can be made simply using mulch materials and landscaping stones as a retaining wall. Raised beds offer their own advantages as well, such as making gardening more accessible to older gardeners that might not want to bend over for hours each day.

Keyhole beds often include a compost pile in the center which can be easily watered from the center path. This design adds "make no waste" and "integrate rather than segregate" to the list of permaculture principles illustrated.

Entrance Pergola
Maypop—Passiflora incarnata
Hardy Kiwi—Actinidia arguta

Flower Tower
Nasturiums—Tropaeolum spp.
Beans—Phaseolus vulgaris

Raised Keyhole Gardens

Signage

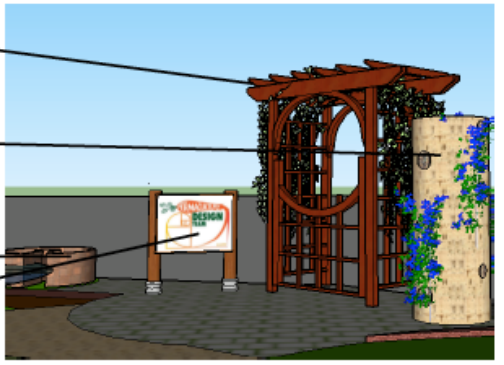


Figure 7

Flower Tower:
A flower tower is simply a 6' column of chicken wire, lined with burlap, with a 6.5' PVC pipe running through the center. This column is filled with soil and holes are cut into the wire/burlap so that flowers can be planted within. This creates additional growing space and provides a trellis for climbing plants. The visual aesthetic of seeing trailing nasturtiums fallings from the upper holes while lower-planted beans climb up is a compelling argument for why interplanting systems are preferable to monocultures. The PVC pipe has holes drilled into it, so that watering the tower is simple process of leaving a hose in the central PVC pipe for a couple minutes each day.

Fruit Tree Guild (Paw Paw tree)

Nut Tree Guild (Hickory tree)

Kitchen Garden

Swale (on contour)

Rose/Seaberry Hedge

Wildflower Buffer

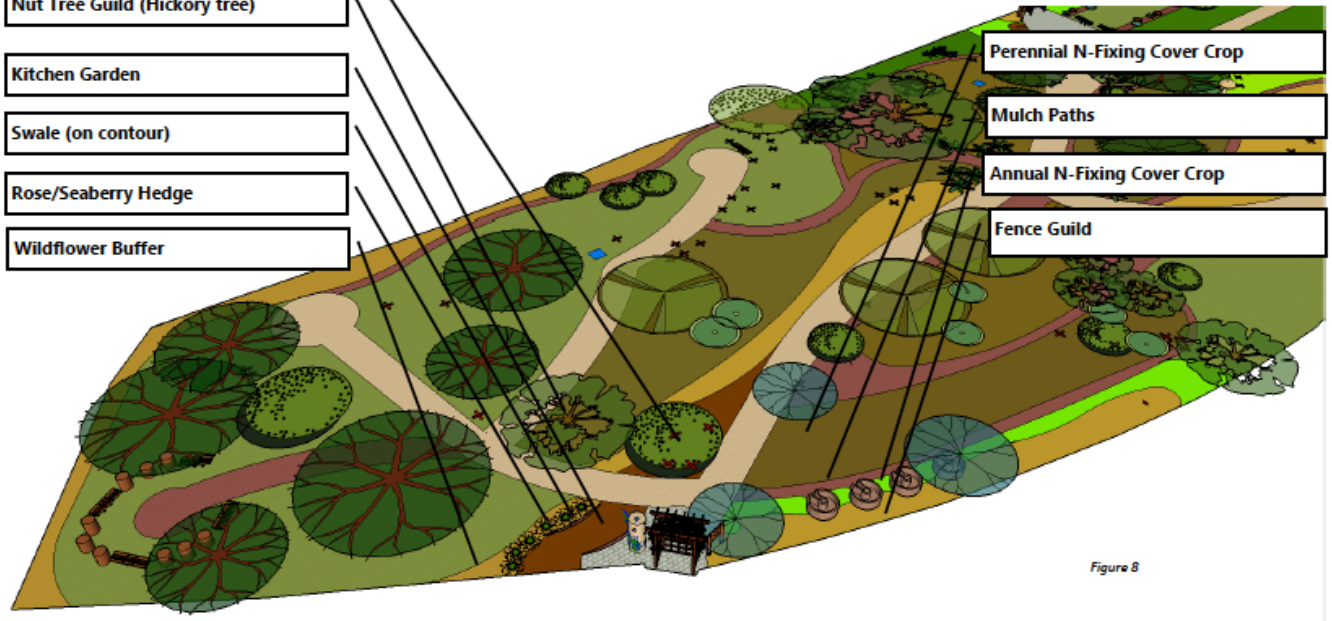


Figure 8

UoM Permaculture Food Forest

Grand Valley State University Sustainable Agriculture Project (SAP)


GVSU SUSTAINABLE
AGRICULTURE PROJECT

Schools with PDC's - Intensive

THE INTENSIVE

Most common way to fit PDC into 1 academic course.

Span from 12 full days to 7 weeks in academia; 15 days over 2-3 weeks is most common
Historically how PDCs usually taught

On campus or involves travel/ residential immersion on a farm

Prescott College
Env. Studies
University of Vermont
Env. Studies
Indiana University
Collins Living-Learning Centre
Maharishi University
Sustainable Living
University of British Columbia
Land & Food Systems
CU Boulder
Env. Studies
Paul Smith's College
Env. Studies
St. Michael's College
Env. Studies
Sterling College
Applied Sciences

https://universitypermaculture.com/pdcs-summary-of-formats/

Schools with PDC's – One Semester

ONE SEMESTER-BASED COURSE

Full PDC fit into one course on campus

Oregon State University
Horticulture
Pacific University
Art & Env. Studies
UC Santa Cruz
Kresge College
Cornell University
Horticulture
Colby-Sawyer College
Env. Studies
Greenfield Community College
Science

https://universitypermaculture.com/pdcs-summary-of-formats/

Schools with PDC's – Two Semester

TWO COURSE SERIES

PDC spread over two semester-long courses on campus

Naropa University
Env. Studies
Santa Barbara City College
Env. Horticulture
North Carolina State University
Horticulture
University of Vermont
Env. Studies
UMass Amherst
Agriculture

https://universitypermaculture.com/pdcs-summary-of-formats/

Schools with PDC's - Hybrid

HYBRID

Often involves a semester-long course plus a 5-7 day intensive course

University of Victoria
Env. Studies
Plymouth State University
Env. Planning
Appalachian State University
Sustainable Development

https://universitypermaculture.com/pdcs-summary-of-formats/

Schools with PDC's - Certificate

ACADEMIC CERTIFICATE

PDC earned through accumulation of several courses

Bastyr University
Holistic Landscape Design
Merritt College
Landscape Horticulture
UMass Amherst
Agriculture
Lorain County Community College
Sustainable Agriculture

https://universitypermaculture.com/pdcs-summary-of-formats/

Schools with PDC's - Distance

DISTANCE COURSE

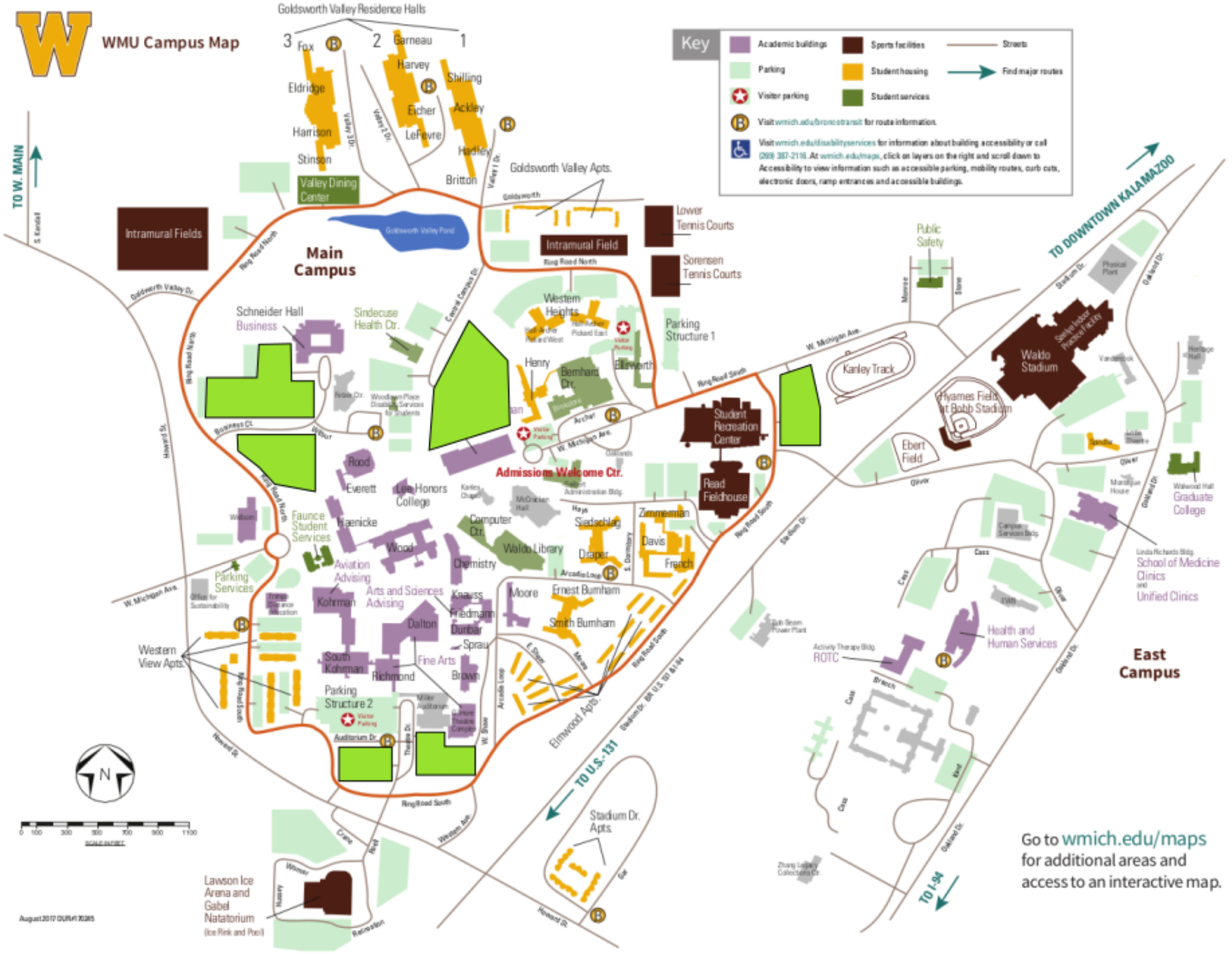
Courses taken at a distance, usually online
Often offered via Extension/ Continuing Studies

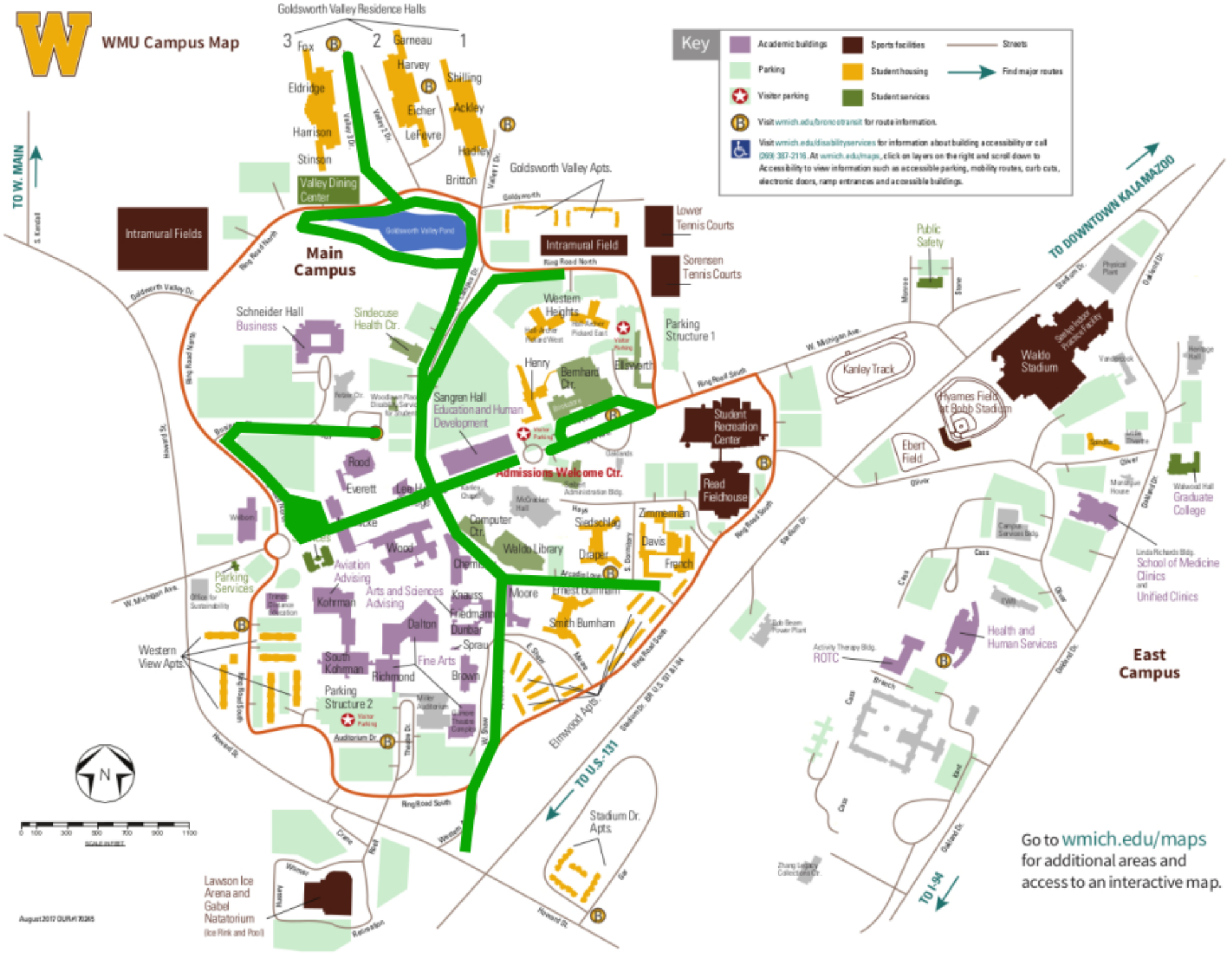
Goddard College
Oregon State University
UMass Amherst
Prescott College
Cornell University
North Carolina State University
Gaia University (UK)

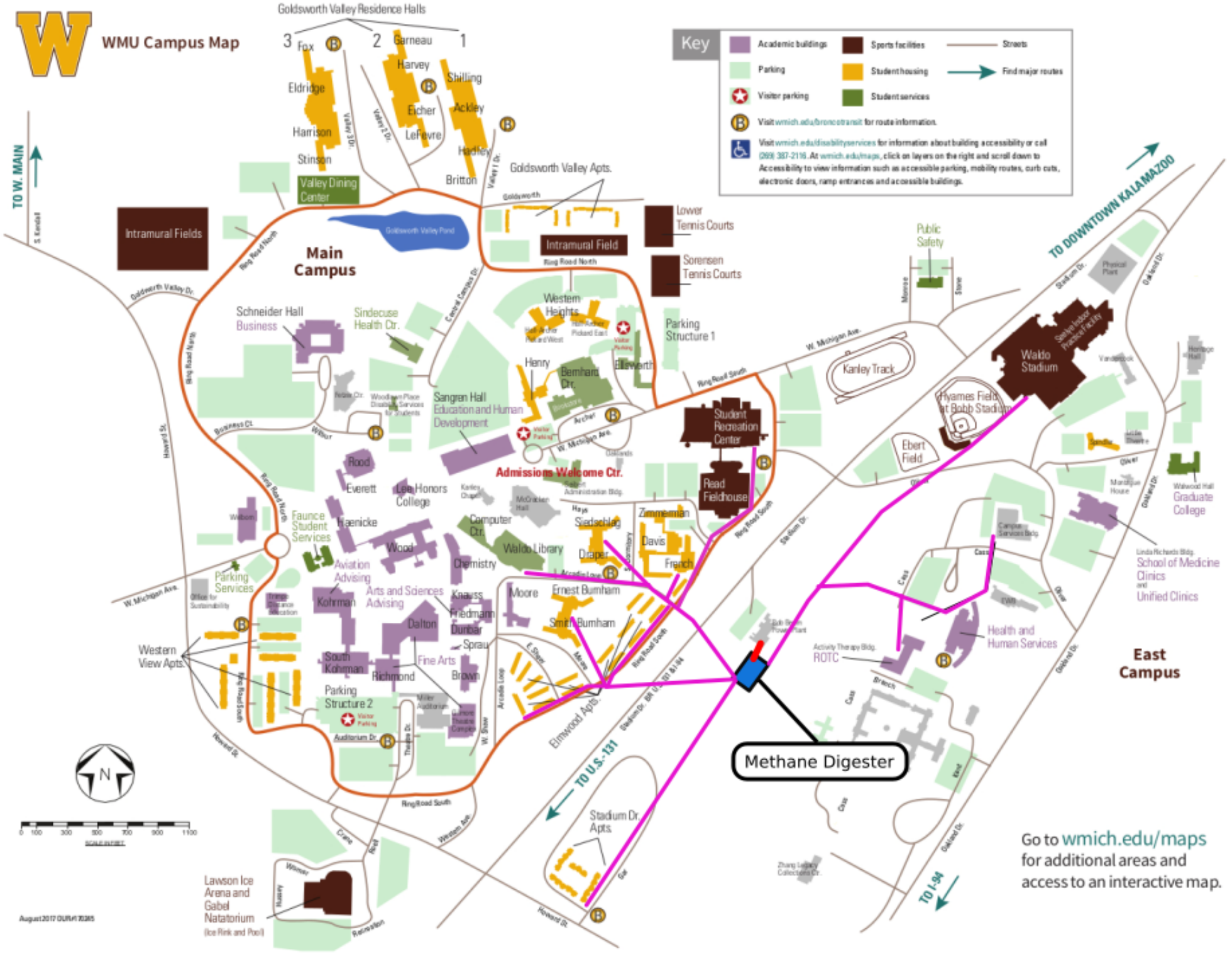
https://universitypermaculture.com/pdcs-summary-of-formats/

Permaculture Ideas for WMU

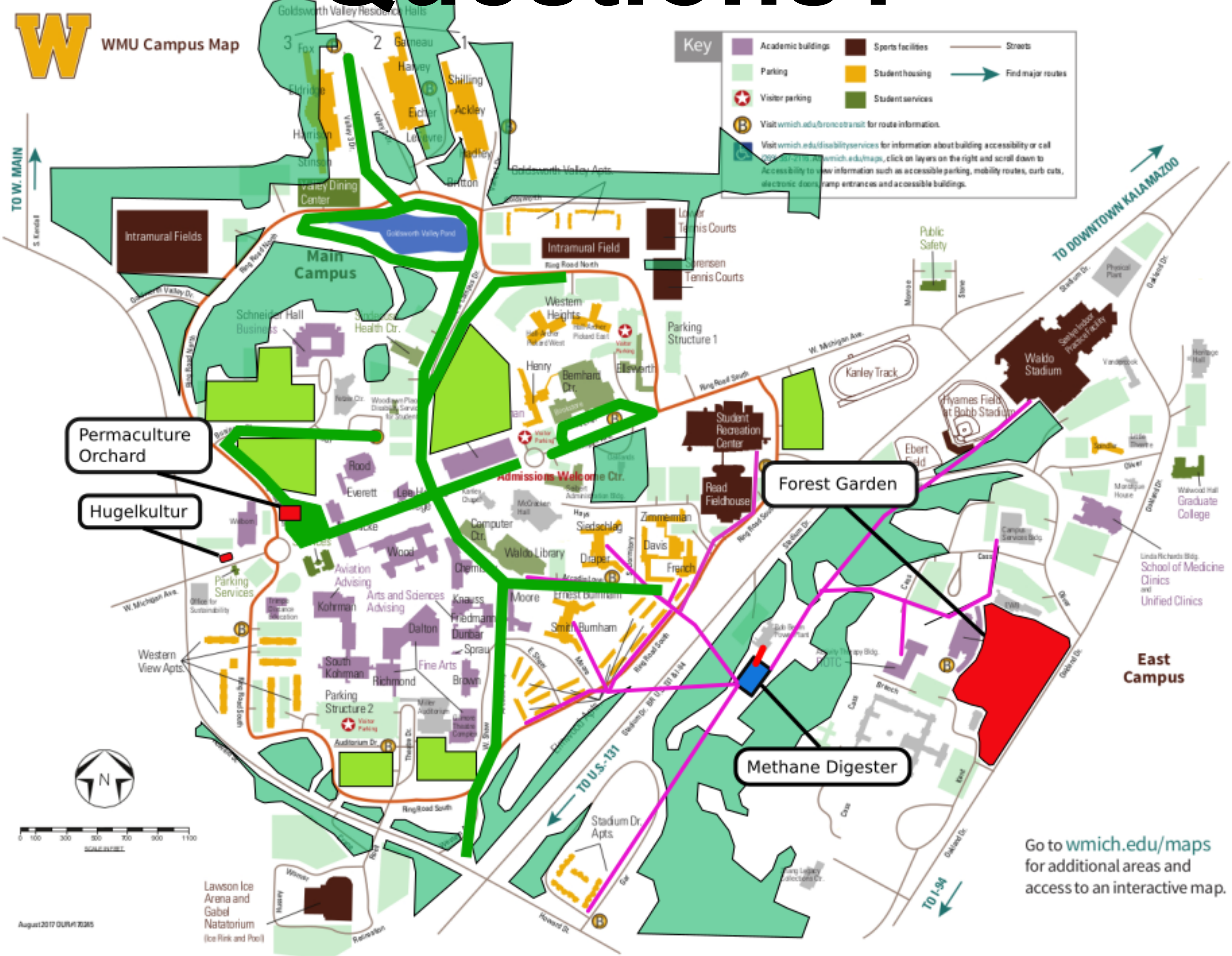
- Food waste recycling for compost for landscaping and food
- Rainwater cisterns for water management and freshwater security (PFAS, lead, PCB's)
- PDC for Landscape Services and students
- Edible landscaping near dormitories and main walking paths
- No/low mow landscaping with native flowers and grasses
- Goats and sheep for managing forested areas and sloping landscapes
- Gardens for students and staff
- Separation of gray water to biodigester to power plant
- Less energy intensive storm water management (swales, ponds, terraces)
- All slopes over 15 degrees returned to forest (goats) or terraced


WMU Campus Map
Goldsworth Valley Residence Halls
3
Fox
2
Garneau
1
Harvey
Shilling
Eldridge
Eicher
Ackley
Harrison
LeFevre
Hadley
Stinson
Britton
Valley Dining Center
Goldsworth Valley Apts.
TO W. MAIN
S. Kendall
Intramural Fields
Goldsworth Valley Pond
Main Campus
Intramural Field
Lower Tennis Courts
Sorensen Tennis Courts
Public Safety
TO DOWNTOWN KALAMAZOO
Schneider Hall Business
Sindecuse Health Ctr.
Western Heights
Parking Structure 1
Henry
Bernhard Ctr.
Ellsworth
Kanley Track
Waldo Stadium
Hyames Field at Bobb Stadium
Ebert Field
Student Recreation Center
Admissions Welcome Ctr.
Read Fieldhouse
Rood
Everett
Lee Honors College
Faunce Student Services
Haenicke
Computer Ctr.
Waldo Library
Zimmerman
Davis
French
Siedschlag
Draper
Wood
Chemistry
Aviation Advising
Parking Services
Kohrman
Arts and Sciences Advising
Knauss
Friedmann
Dunbar
Dalton
Moore
Ernest Burnham
Smith Burnham
Sprau
Fine Arts
South Kohrman
Richmond
Brown
Western View Apts.
Parking Structure 2
Auditorium Dr.
Elmwood Apts.
TO U.S.-131
Stadium Dr. Apts.
Lawson Ice Arena and Gabel Natatorium
(Ice Rink and Pool)
Graduate College
School of Medicine Clinics and Unified Clinics
Health and Human Services
ROTC
East Campus
TO I-94
Key
Academic buildings
Sports facilities
Streets
Parking
Student housing
Find major routes
Visitor parking
Student services
Visit wmich.edu/broncotransit for route information.
Visit wmich.edu/disabilityservices for information about building accessibility or call (269) 387-2116. At wmich.edu/maps, click on layers on the right and scroll down to Accessibility to view information such as accessible parking, mobility routes, curb cuts, electronic doors, ramp entrances and accessible buildings.
N
0 100 300 500 700 900 1100
Go to wmich.edu/maps for additional areas and access to an interactive map.
August 2017 OURVI 70265


WMU Campus Map
Goldsworth Valley Residence Halls
3
Fox
2
Garneau
1
Eldridge
Harvey
Shilling
Eicher
Ackley
Harrison
LeFevre
Hadley
Stinson
Britton
Valley Dining Center
Goldsworth Valley Apts.
TO W. MAIN
S. Kendall
Intramural Fields
Goldsworth Valley Pond
Main Campus
Intramural Field
Lower Tennis Courts
Sorensen Tennis Courts
Public Safety
TO DOWNTOWN KALAMAZOO
Goldsworth Valley Dr.
Ring Road North
Schneider Hall Business
Sindecuse Health Ctr.
Western Heights
Parking Structure 1
W. Michigan Ave.
Kanley Track
Waldo Stadium
Pfaames Field at Bobb Stadium
Henry
Bernhard Ctr.
Ellsworth
Sangren Hall Education and Human Development
Ring Road South
Student Recreation Center
Admissions Welcome Ctr.
Read Fieldhouse
Ebert Field
Rood
Everett
Computer Ctr.
Waldo Library
Zimmerman
Davis
French
Draper
Siedschlag
Wood
Aviation Advising
Parking Services
Kohrman
Arts and Sciences Advising
Knauss
Moore
Ernest Burnham
Smith Burnham
Friedmann
Dunbar
Dalton
Sprau
Fine Arts
South Kohrman
Richmond
Brown
Western View Apts.
Parking Structure 2
Auditorium Dr.
Howard St.
Elmwood Apts.
TO U.S.-131
Stadium Dr. Apts.
Lawson Ice Arena and Gabel Natatorium
(Ice Rink and Pool)
Walwood Hall Graduate College
School of Medicine Clinics and Unified Clinics
Health and Human Services
ROTC
East Campus
TO I-94
Go to wmich.edu/maps for additional areas and access to an interactive map.
Key
Academic buildings
Sports facilities
Streets
Parking
Student housing
Find major routes
Visitor parking
Student services
Visit wmich.edu/broncotransit for route information.
Visit wmich.edu/disabilityservices for information about building accessibility or call (269) 387-2116. At wmich.edu/maps, click on layers on the right and scroll down to Accessibility to view information such as accessible parking, mobility routes, curb cuts, electronic doors, ramp entrances and accessible buildings.
N
0 100 300 500 700 900 1100
August 2017 OURVI 70265


WMU Campus Map
Goldsworth Valley Residence Halls
3
Fox
2
Garneau
1
Eldridge
Harvey
Shilling
Eicher
Ackley
Harrison
LeFevre
Hadley
Stinson
Britton
Valley Dining Center
Goldsworth Valley Apts.
TO W. MAIN
S. Kendall
Intramural Fields
Goldsworth Valley Pond
Main Campus
Intramural Field
Lower Tennis Courts
Sorensen Tennis Courts
Public Safety
TO DOWNTOWN KALAMAZOO
Schneider Hall Business
Sindecuse Health Ctr.
Western Heights
Parking Structure 1
Henry
Bernhard Ctr.
Ellsworth
Sangren Hall Education and Human Development
Admissions Welcome Ctr.
Student Recreation Center
Read Fieldhouse
Kanley Track
Waldo Stadium
Ebert Field
Hyames Field at Bobb Stadium
Everett
Lee Honors College
Faunce Student Services
Haenicke
Wood
Computer Ctr.
Waldo Library
Chemistry
Zimmerman
Davis
French
Siedschlag
Draper
Aviation Advising
Parking Services
Kohrman
Arts and Sciences Advising
Knauss
Friedmann
Dunbar
Moore
Ernest Burnham
Smith Burnham
Dalton
Sprau
Fine Arts
Brown
Richmond
South Kohrman
Western View Apts.
Parking Structure 2
Auditorium Dr.
Elmwood Apts.
TO U.S.-131
Stadium Dr. Apts.
Methane Digester
Graduate College
School of Medicine Clinics and Unified Clinics
Health and Human Services
ROTC
East Campus
TO I-94
Lawson Ice Arena and Gabel Natatorium
(Ice Rink and Pool)
Key
Academic buildings
Parking
Visitor parking
Sports facilities
Student housing
Student services
Streets
Find major routes
Visit wmich.edu/broncotransit for route information.
Visit wmich.edu/disabilityservices for information about building accessibility or call (269) 387-2116. At wmich.edu/maps, click on layers on the right and scroll down to Accessibility to view information such as accessible parking, mobility routes, curb cuts, electronic doors, ramp entrances and accessible buildings.
N
0 100 300 500 700 900 1100
August 2017 OURVI 70265
Go to wmich.edu/maps for additional areas and access to an interactive map.

Questions?


WMU Campus Map
Key
Academic buildings
Sports facilities
Streets
Parking
Student housing
Find major routes
Visitor parking
Student services
Main Campus
Intramural Fields
Intramural Field
Permaculture Orchard
Hugelkultur
Forest Garden
Methane Digester
Admissions Welcome Ctr.
Student Recreation Center
Read Fieldhouse
Waldo Stadium
Kanley Track
Waldo Library
Parking Structure 1
Parking Structure 2
Western View Apts.
Stadium Dr. Apts.
Goldsworth Valley Apts.
Valley Dining Center
TO DOWNTOWN KALAMAZOO
TO W. MAIN
TO U.S.-131
TO I-94
East Campus
Graduate College
School of Medicine Clinics and Unified Clinics
Lawson Ice Arena and Gabel Natatorium
Go to wmich.edu/maps for additional areas and access to an interactive map.