



THE STATE OF ECOLOGICAL CAMPUS LAND MANAGEMENT ACROSS THE U.S.



BY: SHEINA CRYSTAL, BRIDGET GUSTAFSON,
ROSE WILLIAMSON, SEAMUS MASTERSON,
AND THE HFC TEAM

ABOUT THIS REPORT



Colleges across the nation are waking up to the harms of conventional land care, which relies heavily on toxic synthetic pesticides. Motivated by personal and institutional concern as well as widespread student pressure, institutions of higher education are transitioning to organic land care. Through cultivating soil health and eliminating toxic synthetic inputs, organic land care fosters biodiversity; protects the health of students, groundskeepers, and campus communities; supports pollinators; and has the potential to mitigate climate change.

In an effort to establish a cost-benefit analysis of such a transition, research fellows at Herbicide-Free Campus conducted interviews with groundskeepers and sustainability professionals at eight different universities, all of which have made or are currently making efforts to reduce synthetic pesticide use on their campuses and transition to organic land care. Schools interviewed were Harvard University; Cascadia College; University of Washington, Bothell; Seattle University; University of California, Berkeley; Reed College; University of Colorado, Boulder; University of Texas, Austin; and Willamette University. In addition to the interviews, Herbicide-Free Campus conducted a survey to assess current land management norms, the results of which are also discussed in this report.

Through three detailed case studies and six data summaries, this report sheds light on the state of ecological campus land management across the nation and shows that transitioning to organic land care can result in water and cost savings. Although every school interviewed had data to share, research findings indicate that there is a general lack of consistent and longitudinal record-keeping of the costs associated with land management. The lack of consistent data calls attention to the need for longitudinal studies of the costs and benefits throughout the transition to organic land care. Findings also indicate that there is much to be learned from the on-the-ground experience of facilities managers, groundskeepers, and sustainability officers spearheading the transition to organic land management.

Note: This report details the impacts, costs, and benefits of attempting to go synthetic pesticide-free. Synthetic pesticides are often significantly more toxic than organic pesticides and are made from non-natural substances. FIFRA 25B exempt and OMRI-certified pesticides are allowed in an organic land-care system (although organic land-care principles discourage the use of any pesticides). While some of these campuses still use both synthetic and organic pesticides, all are making efforts to drastically reduce and ultimately eliminate the use of synthetic pesticides.

CASCADIA COLLEGE AND UNIVERSITY OF WASHINGTON BOTHELL

After observing the success of herbicide-free campus landscape maintenance at Seattle University, the leadership at both Cascadia College and University of Washington Bothell (which are co-located and share key services) decided to ban the use of synthetic herbicides and fertilizers. From that day forward, the facilities management (FM) team committed to toxin-free landscaping and transitioned to more environmentally sustainable land care methods with no additional funding in their budget.

The primary cost the FM team first encountered was the increase in labor hours necessary to manage the land organically. They compensated for the change in labor needs by "critically reviewing how we were spending our time and eliminating inefficient, unnecessary or counter-productive work," reported Tyson Kemper, head gardener, in an interview with HFC. Grounds staff also took a zoned approach to landscape management to focus efforts on the most high-profile areas on campus.

Additional changes included: reducing the use of chemical fertilizers to slow lawn growth; decreasing mowing frequency and identifying small portions of lawns to stop mowing; halting the shearing of shrubs into shapes and allowing them to grow naturally; leaving perennials to stand until late fall or winter when there was a lessened workload; letting leaf litter accumulate in nearly all shrub beds and act as weed cover; and encouraging bed plantings to become much denser to greatly reduce weed growth.

Factoring in both time and inputs, UW Bothell and Cascadia College are spending **one-tenth the amount on their organic lawns as they once did on their conventional lawns**. This does not take into account the long-term environmental benefits and cost savings of transitioning to an organic system. As Kemper states, "managing lawns with an organic land care mindset will almost always lead to less lawn to manage over time." Facilities staff have **reduced fertilization frequency from four times a year to two**, and now only fertilizes one-quarter of the lawns.

Kemper noted that it is not only the inputs that change when a campus goes toxin-free, but that there must also be a cultural shift in how the landscape is treated and managed.

To the facilities team at Cascadia College and UW Bothell, this meant managing the landscape as an ecologically sound, closed system.

Due in large part to their limited budget, the FM team found cost-saving ways to rebuild the campus ecosystem. They replaced the beauty bark they had been using to mulch with arborist wood chips they were able produce themselves or acquire for free. They stopped paying to dispose of the vast majority of their garden waste, instead composting it themselves on-site and using the resulting compost in their planting beds. Kemper also reported that they "stopped buying annual plants every year in favor of transitioning our plantings to perennials and are now even propagating a large portion of our own plant material on campus through seeds, cuttings, and division."

Building upon organic land management, in 2015 Cascadia College created a Food Forest. With over 30 fruit trees, it is a living laboratory and provides healthy food for the community, exemplifying what can be achieved when going above and beyond in sustainable land care.

"All these practices not only saved or allowed us to reallocate labor hours, but created many positive feedback loops that improved ecosystem function, lowered costs and efforts elsewhere, elevated the landscape experience for the campus community, allowed space for wildlife and pollinators, and engaged the gardeners in ways the landscape had not before, which led to greater job satisfaction and a more committed and efficient team."

-Tyson Kemper, Cascadia College and UW Bothell Head Gardener

SCHOOL PROFILES

Enrollment:

- **Cascadia College:** 4,887 students
- **UW Bothell:** 6,000 students

Acres: 135

Type: Public

Location: Bothell, Washington

Status: Herbicide-free since 2006



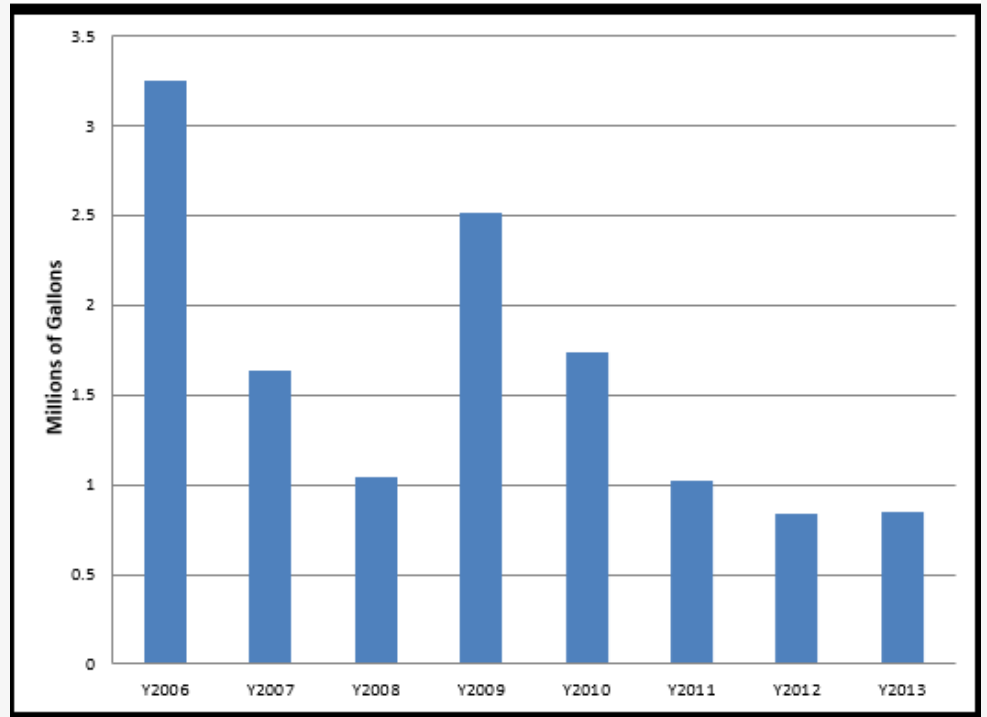
Photo Credit: Cascadia College



Photo Credit: University of Washington Bothell

THE DATA EXPLAINED

WATER USAGE 2006-2013



This graph depicts Cascadia College and UW Bothell's irrigation water use from 2006 — the year the co-located institutions started the journey to organic land management — to 2013, when their organic practices were institutionalized. Between 2006 and 2013, **water use was reduced by 26%**. Tyson Kemper, head gardener, attributes this reduction to new mulching practices, the development of the soil food web, and increased soil structure as a result of herbicide reduction. When the school stopped killing all the soil microbes off with herbicides and pesticides, the soil's structure and organic matter improved, which increased the soil's ability to retain water and moisture. Improved mulching practices helped to reduce the amount of water lost through evaporation.

Other strategies employed to further reduce water usage included the elimination of high-input annual plantings in favor of lower-input perennials and the decision to not irrigate over half of the lawn areas, allowing them to turn golden and go dormant in the summer. These strategic practices resulted in a landscape that required less water inputs for similar aesthetic results.

Original art by Annie Lu

Since 2007, Willamette University has managed **90%** of their 60-acre campus using organic land-care practices. The transition was initiated and led by Willamette's grounds manager, Jim Andersen, after a fellow grounds crew member began to suffer physical reactions every time he used a particular synthetic herbicide on campus lawns. Andersen also reported that the transition was further inspired by growing concern for his young son, who often played and ran on the lawns they were treating with synthetic herbicides. Before the transition, the school was using 59 different pesticides.

When first transitioning, the campus tried to swap synthetic products for organic ones. This proved to be expensive and ineffective. The grounds team began using compost teas and experimenting with different compositions of organic fertilizers, which proved to be much more effective and cost-efficient.

Andersen participated in a course through Oregon Tilth (which no longer exists) to become accredited in organic landscaping. Through this program, he and his team received the educational and technical support they needed to make the transition to organic land management.

Before the organic transition, Willamette University was spending significant amounts on synthetic pesticides and fertilizers, estimated at \$6,000 per year on synthetic chemicals alone. When the campus transitioned to organic land care, costs initially increased to an estimated \$8,000 per year. Once the team established their methods, landscaping costs were cut in half to an estimated \$4,000 per year. **Now, Willamette is saving approximately \$2,000 per year managing their landscape organically.**

They attribute a portion of their financial savings to replacing non-native plants with native perennials and drought-tolerant shrubs, thereby reducing the need for external inputs, such as water and campus maintenance.

Like Cascadia College and UW Bothell, the grounds team also reduced the amount of topiary (shaping) done on plants. This allowed the plants to grow into their natural shapes and saved labor costs.

To eliminate weeds, the grounds team turned to weed whackers and flame weeding. Andersen told HFC that the biggest tool against weeds is students, and that student workers and student groups have worked with his team to pull weeds. The presence of weeds on campus has increased slightly since transitioning, and the grounds team had to work with the administration to alter aesthetic expectations. To distract from the slight increase in weeds, the grounds team planted more ornamental plants and focused weeding efforts on the most visible parts of campus.

Beyond cost savings, the transition also resulted in water savings. These savings have been achieved by letting some lawns go dormant in the summer and reducing irrigation overall. Now that many plants are less water-intensive, less irrigation is necessary. **After going organic, water use for landscaping has been reduced by approximately 25–30%.**

"We've found that being an organic campus has made our campus really attractive to potential students who value a safe living and learning environment."

- Jim Andersen, Grounds Manager at Willamette

SCHOOL PROFILE

Enrollment: 3,700 students

Acres: 61

Type: Private

Location: Salem, Oregon

Status: 90% organic since 2007



Harvard began to transition away from synthetic pesticides in 2008, inspired by the first University-wide climate goals adopted that year, the creation of the Harvard Office for Sustainability, and the University's vision of creating a sustainable, healthy campus environment. The motivation to integrate leading sustainability practices into the University's operations was driven by senior leadership working to make sustainability a priority. In addition, the Harvard Landscape Services team was committed to aligning their work to address human health and sustainable development.

Landscape Services and the Office for Sustainability met with Harvard Graduate School of Design Loeb Fellow Eric "T" Fleisher and learned about the Battery Park City (BPC) synthetic herbicide-free program in New York City. With research and benchmarks like BPC, Landscape Services successfully made the case to University leadership to pilot organic land management as the future of sustainable landscaping, while also using Harvard's campus as a test bed for scaling landscaping practices without the use of synthetic chemicals throughout the rest of campus and beyond. Landscape Services, with support from the Office for Sustainability, also engaged Harvard schools' and units' facilities and operations leaders to gain their buy-in and partnership.

Associate Manager of Landscape Services Paul Smith shared with HFC that, like most grounds managers, he previously saw any weed growth as an indication that he was not doing his job properly. He reported that having leadership support in accepting a different landscape aesthetic was key. Working with the Office for Sustainability and Harvard faculty to understand the research and impact of pesticides on health resonated with him. Smith embraced the challenge to implement synthetic herbicide-free methods.

Smith and the Harvard Landscape Services team began paying attention to the soil, increasing its health and vitality so it could naturally defend itself against pests without the need for synthetic chemical additions. Starting with a one-acre pilot plot, Harvard tested the soil and created an amendment plan using natural compost teas to balance the soil biology and restore its natural nutrient cycling.

Since transitioning to organic landscaping, Harvard has seen a range of both financial and environmental benefits. The campus now requires significantly less water -- **irrigation needs dropped 30%, saving 2 million gallons of water each year.** To further reduce cost and waste, Harvard invested in a composting system. Harvard spent \$35,000 annually before 2008 to remove landscape waste from the campus grounds. As part of the transition, Harvard began composting landscape waste instead of paying for its removal.

Once Harvard began composting grass clippings, leaves, and branches that were previously thrown away, Landscape Services was able to **use the resulting compost as a natural fertilizer, which saved the University an additional \$10,000 per year.** Now, they utilize their landscape waste and food scraps from the dining halls to make on-site compost.

Other practices employed by Harvard Landscape Services to improve soil health and aid in the transition away from synthetic chemicals include:

- proper moisture maintenance, which helps plants to be less susceptible to pests and diseases
- compost tea applications to suppress powdery mildew
- beneficial insect introduction to prey on pests
- manual weed and diseased-limb removal

Harvard has also become much more intentional about their plant placement and selection, ensuring that plants are pruned to maximize photosynthesis and placed in areas where they receive adequate sunlight. This helps to enhance the health of the plant and reduces the need for additional inputs, such as water or fertilizer. Furthermore, placing plants in areas where natural size and shape will be uninhibited reduces future work for grounds crews.

Harvard's final objective with its transition was knowledge-sharing and training. The University hosted a two-day technical training with its facilities management staff so the practices used on the one-acre test plot could be implemented and sustained throughout all of Harvard's campus and shared beyond the campus as a replicable model.

Harvard has had Sustainable Site Maintenance (Landscaping) Standards since 2020. The Office for Sustainability developed these University-wide standards in close partnership with Paul Smith and his team, as well as other experts, and their adoption would have been challenging at best without the demonstration pilots and formal program that Harvard Landscape Services successfully created and continues to run today.

"Its okay if the place does not look like Pebble Beach; we are not worried about it. All we want is a safe, healthy environment."

- Paul Smith, Associate Manager of Landscape Services at Harvard

SCHOOL PROFILE

Size: 23,731 students

Acres: 5,000

Type: Private

Location: Cambridge, Massachusetts

Status: 90% organic since 2010



Photo Credit: Stephanie Mitchell/Harvard University

UNIVERSITY OF TEXAS, AUSTIN

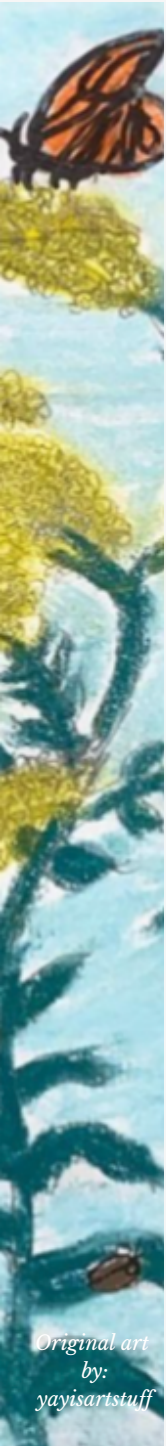
- A large public university (51,832 students, 480 acres), located in Austin, Texas
 - Glyphosate-free since 2020, a transition initiated by a supervisor who was concerned for the health of staff, students, faculty, and guests.
 - Dell Medical School campus was the first SITES v2 Gold-certified project in Texas in 2017.
 - Uses organic fertilizer, aeration, homemade compost/compost tea, and mulch.
 - Conducts spot treatments of synthetic chemicals for emergencies and invasive species.
 - Outcompetes weeds with native plants, shade considerations, concentrated torching, and prescribed burning.
 - Landscape Services utilizes a centrally controlled irrigation system; since 2011, they have **reduced irrigation water usage by approximately 66% (more than 100 million gallons annually)**; they also use rainwater and municipal reclaimed water for irrigation and greenhouses.
 - Landscape Services works with students through internships, Tree Campus USA, the Office of Sustainability, and various public speaking engagements.
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REED COLLEGE

- A small private liberal arts college (1,429 students, 116 acres) located in Portland, Oregon
 - Local leaves and wood waste are utilized as a deep mulch that inhibits weeds, builds soil fertility, and reduces debris-management costs.
 - Drought-tolerant designs incorporate storm-water conveyance and infiltration features, which further reduce irrigation needs. Maintaining a dry surface suppresses weed seed germination and growth.
 - A systems-based approach enables caretakers to curate polyculture plantings that integrate resource cycling, disturbance and succession regimes, and companionable weeds as allies and informants.
 - Thoughtful organization of work processes and the diligent, daily use of basic tools achieve large landscape goals. Hand-scraping three sidewalk cracks per day to remove weeds helps to reduce pesticide use.
 - Landscape professionals engage in continuing education and partner with community members to build the bridge toward organic land care. Paid student-employees invest over 100 hours per week assisting and learning from staff mentors, while the annual Canyon Day volunteer event pulls together the whole community to remove invasive weeds and plant natives.
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SEATTLE UNIVERSITY

- Small private urban university (7,000 students, 50 acres) located in Seattle, Washington
- The entire campus has been **fully organic and pesticide- and herbicide-free since 1986**.
- The campus attracts students and athletes because of the innovative and pesticide-free land care.
- The grounds crew employs tactics including hand weeding, mulching, cardboard mulching, and the use of arborist tree chips.
- The team works with students, 11 of whom worked full time in the summer of 2021, as the most costly component of the transition is the labor.
- Has seen a **5% reduction** in water use.



UNIVERSITY OF CALIFORNIA, BERKELEY

- A large public university (45,000 students, 1232 acres) located in Berkeley, California
 - Since 2017, 95% of the UC Berkeley campus has been transitioned to organic land management.
 - The transition was the result of pressure from the students who founded Herbicide-Free Campus and began with an organic pilot project conducted by Beyond Pesticides on the two largest green spaces on campus.
 - Soil test results show that there is **22 x the amount of flagellate** (microorganisms) in the soil than two years ago due to the transition, indicating an increase in biodiversity and soil health.
 - An additional organic test project on a different site on campus, conducted by a grounds manager, saw a 22% reduction in water consumption, important savings for a school in a region that is prone to drought.
 - Invested in a compost tea brewer.
 - Research showed that investing in in-house composting infrastructure would save an estimated **\$100,000 annually and benefit the soil.**
 - Works with students (predominantly Herbicide-Free Campus) through regular weeding days.
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UNIVERSITY OF COLORADO, BOULDER

- A large public university (35,897 students, 600 acres) located in Boulder, Colorado
- Integrated pest management (IPM) policy was implemented in 2002. Chemical pesticides may be approved when organic or alternative control methods are unavailable or ineffective.
- Chemical pesticides are currently being used to control an invasive pest (emerald ash borer) and some noxious and/or invasive weeds.
- Pesticide-free turf program implemented in 2011. This program was developed by campus grounds managers, sustainability staff, and student government representatives.
- New funding included \$100,000 for additional aeration and overseeding equipment, \$90,000 to add compost tea brewers to the centrally controlled irrigation system, and \$80,000 per year for temporary labor to hand pull dandelions in high priority areas before graduation.
- A decade of following this program has demonstrated it is **possible to grow high-quality cool-season turf without pesticides**. Species selection and good cultural practices are important, but the program is not significantly more labor-intensive than traditional turf management. CU Boulder has found that pesticide-free turf requires **less irrigation and fertilizer**. Soil health has also improved, with one recent soil test showing the **highest level of organic material** ever measured by the testing facility.
- The steam weed control program started in 2016. Grounds crews stopped using chemical herbicides around residence halls five years earlier, in response to graduate students' concerns about glyphosate, but had not found an effective alternative. Steam provides excellent control and is now the primary method of killing weeds on campus.

BACKGROUND

To better understand the current trends in collegiate land care, HFC created and distributed a survey. The survey was spread through social media, emails, and professional networks. Over 30 schools, ranging in size, type, and land-care ethos, filled out the survey. The results are discussed below.

SURVEY RESULTS

- Of the 30 schools that filled out the survey, only six schools, or **20% report being mostly organic or fully organic** (synthetic pesticide-free) in their land care practices. Eight schools, or **27% of schools, report being either fully conventional or mostly conventional** in their land care.
- Thirteen schools, or **43.3%, indicate using an integrated pest management plan (IPM)** to care for grounds.
- **76.7% of schools would consider going organic/significantly reducing synthetic pesticide usage**, and only 1 school out of the 31 indicated they would never consider going organic/significantly reducing synthetic pesticide usage.
- Over 57% of respondents answered "why would you consider transitioning to organic landscaping?" with "other" and gave reasons ranging from "for watershed management, biodiversity protection, and the health and well being of the campus community" to "might consider being fully organic, but would need the additional labor resources to still meet University expectations."
- 32.2% of survey participants indicated that **personal concern was a driving factor** in their consideration of transitioning to organic landscaping.
- The biggest barrier to going organic is a lack of knowledge.
- Over 90% of participants indicated that they were interested in receiving further education and resources. Interests included access to regional experts who manage an organic campus, organic alternatives to synthetic pesticides, tutorials, peer professional groups, communications tools, and support for working with students.

These survey results indicate that with more education on how to manage a campus without synthetic pesticides and with support and resources, colleges can and will begin to transition away from synthetic pesticides.

CONTACTS

Cascadia Community College

- Tyson Kemper, wildhair@uw.edu

Willamette University

- Jim Andersen, janderse@willamette.edu

Harvard University

- Heather Henriksen, heather_henriksen@harvard.edu
- Paul Smith, paul_smith@harvard.edu

UT Austin

- Jim Carse, Jim.Carse@austin.utexas.edu

UC Berkeley

- James Sanner, wintergates@sbcglobal.net
- Theron Klos, teklos@berkeley.edu

Reed College

- Shane Kaser, kasers@reed.edu

Seattle University

- Shannon Britton, brittons@seattleu.edu

CU Boulder

- David Lawson, david.lawson@colorado.edu

Herbicide-Free Campus

- hello@herbicidefreecampus.org

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