



University of Colorado  
Boulder

# CASE STUDY: UNIVERSITY OF COLORADO BOULDER, HOME OF THE BUFFALOES

CAMPUS FACTS

LOCATION:  
Boulder, Colorado

FOUNDED:  
1876

TYPE:  
Public

TOTAL STUDENT POPULATION:  
29,894 (24,757 undergraduates)

STAFF:  
8,932

PRIMARY ATHLETICS CONFERENCE:  
Pacific 12 (Pac-12)

PRIMARY ATHLETICS DIVISION:  
NCAA Division 1

NUMBER OF VARSITY TEAMS:  
16 (9 women's, 7 men's)

NUMBER OF SPORTS FACILITIES:  
26 (16 athletic, 10 recreational)

ENVIRONMENTAL CENTER FOUNDED:  
1970

AASHE STARS RATING:  
Gold, 2010

SPORTS GREENING WORK STARTED:  
2007

SPORTS FACILITY LEED CERTIFICATIONS:  
Basketball Training Facility LEED Platinum  
Certification for New Construction, 2011;  
Recreation Center LEED Platinum Certification  
for New Construction (pending)

## THE BUFFALOES' GREENING STORY: MOTIVATIONS, CHALLENGES, AND LESSONS

The University of Colorado Boulder (CU-Boulder) has one of the most diverse and effective collegiate sports greening programs in the United States, addressing recycling and composting, energy efficiency, green building design, and turf management across both athletics and recreation. CU-Boulder has converted its stadium to a “zero waste” venue, implemented an organic turf management program for all fields, and achieved LEED Platinum certification at its basketball training facility. CU-Boulder is currently working toward achieving net-zero energy use at its expanded Student Recreation Center.

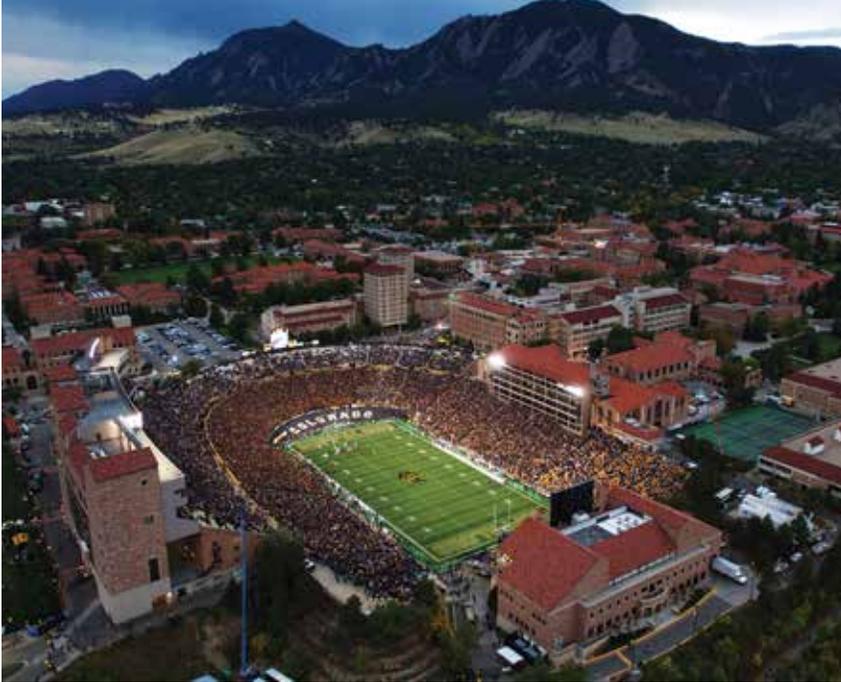
## WHY IS CU-BOULDER GREENING SPORTS?

“CU-Boulder has for decades pursued innovative sustainability efforts ranging from one of the nation’s first collegiate recycling programs to the nation’s first student-mandated renewable energy fee,” says the director of CU-Boulder’s Environmental Center, Dave Newport. “Expanding sustainability efforts into sports and recreation was seen as a way to highlight the positive impact of sustainability to nontraditional stakeholder groups. This work is more important than ever for all departments on campus as a 2013 survey showed that more than 41 percent of incoming students say they chose CU-Boulder in part because of leadership in sustainability.”

Newport says student support for more sustainable practices is the driving force behind greening efforts across the university. Students played an important role in bringing together the athletics department, recreation services, the Environmental Center, and Facilities Management, among other campus departments, to green sports facilities and operations at CU-Boulder. “Key to our sports greening collaboration is the clear desire of students to move in this direction,” says Newport.

According to Chancellor Philip DiStefano, the greening of CU-Boulder’s athletics and recreation facilities provides the best opportunity to communicate the university’s deep commitment to sustainability. “Sustainability in sports helps connect the University of Colorado to its fans, supporters, alumni, students, faculty, and staff because we all share the common values of environmental protection, fiscal prudence, and social equity.” Tom McGann, CU-Boulder’s associate athletics director, says, “Athletics is a great springboard for sustainability. We’re reducing our energy consumption and carbon footprint not only because it’s better for the environment and minimizes the money spent on building operations, but also because it leaves an impression on many people, including athletes, students, faculty, staff, and fans.”

“ATHLETICS IS A GREAT SPRINGBOARD FOR SUSTAINABILITY,” SAYS CU-BOULDER’S ASSOCIATE ATHLETICS DIRECTOR, TOM MCGANN. “WE’RE REDUCING OUR ENERGY CONSUMPTION AND CARBON FOOTPRINT NOT ONLY BECAUSE IT’S BETTER FOR THE ENVIRONMENT AND MINIMIZES THE MONEY SPENT ON BUILDING OPERATIONS, BUT ALSO BECAUSE IT LEAVES AN IMPRESSION ON MANY PEOPLE, INCLUDING ATHLETES, STUDENTS, FACULTY, STAFF, AND FANS.”



## WHERE DID CU-BOULDER START?

“Our sports sustainability programs developed as part of our overall ‘zero waste’ program, green building efforts, and our pesticide-free turf management approach,” says Newport.

In 2005, staff from the Environmental Center suggested using the competitive-bidding process to develop innovative ideas from concessionaires. Recycling program development director Jack DeBell worked collaboratively with national trade groups and industry associations to develop a “menu approach” that vendors vying for contracts could use to bolster their proposals. Those early proposals underpin important steps that continue to reduce waste and increase diversion.

With contracts in place, staff and student leaders from CU-Boulder’s Environmental Center and Facilities Management kicked off the first sports greening collaborations in 2007 by partnering with the athletics department and campus recreation. With support from the chancellor, a team began assembling a plan for more sustainable operations within the university’s sports facilities.

“In developing our sports greening plans, we established realistic but aspirational goals,” says Newport. “For example, we needed to clarify that ‘zero waste’ and ‘carbon neutral’ are not literal targets. Rather, they represent goals for continuous improvement.” This helped the athletics and recreation staffs become comfortable in achieving greening goals gradually.

In 2008, the athletics department teamed up with White Wave Foods Inc. to launch the “Ralphie’s Green Stampede” waste diversion program, named in honor of the school’s mascot, a live buffalo named Ralphie. White Wave was attracted to the sports greening concept, says Newport, because it was looking for a way to reach a broad and diverse audience with information about its organic food products. “An organic and natural food company is an ideal sponsor because its products line up with the ideals of the sports greening program,” Newport explains. In 2009, the athletics department acquired hybrid vehicles by engaging Boulder Toyota as a transportation sponsor. The department then brought on a manufacturer of compostable food serviceware, Eco-Products Inc., as a sponsor and supplier.

“We marketed the sports greening program to sustainability-oriented organizations that are not normally part of sports sponsorships,” says Newport. “We explained that athletics provide a unique point of entry into a big market that supports sustainability—like the environmentally minded CU-Boulder community—which has not seen sustainability-oriented marketing at sports venues. Likewise, sports and rec bring together fans from all segments of society, so this is a great place for exposure to diverse market demographics.”



Photos courtesy of University of Colorado Boulder.

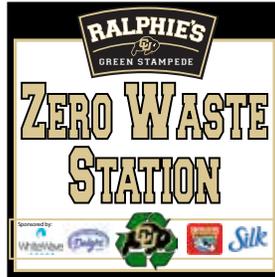
## RALPHIE’S GREEN STAMPEDE SUCCESSES

- Folsom Field was the first major collegiate sports stadium (NCAA Div. 1-FBS) in the nation to adopt a “zero waste” goal.
- In 2012, Folsom achieved a 78.5 percent waste diversion rate across all six home games (up 48.5 percentage points since the beginning of the program in 2008).
- The athletics department’s Coors Events and Conference Center was also converted to a “zero waste” facility during the 2009-10 basketball season.
- In 2012, the Green Stampede program resulted in the collection of more than 69,000 pounds of recyclable and compostable materials.
- From 2008 to 2012, the program collected more than 394,000 pounds of recyclable and compostable materials. This included more than 100,000 pounds of cans and bottles and 151,000 pounds of compostables from inside the stadium.
- Folsom Stadium’s total-season waste generation dropped by roughly 38 percent from 2008 to 2012.
- CU-Boulder achieved a single-game high of 88 percent waste diversion at the game against the University of Oregon on October 22, 2011.
- In 2012 fans helped to reduce total waste generated by more than 47 percent in the Franklin Field tailgate area.
- In the EPA’s National Game Day Challenge in October 2011, Folsom Field took first place in two of the five categories in NCAA Div. I-FBS. The two categories were “highest diversion rate” (88 percent) and “highest per capita composting” (0.153 pound per person).
- The Folsom Field “zero waste” effort could reduce as much as 455 million BTU of energy (using recovered materials in manufacture reduces energy compared with production using virgin materials).

## “ZERO WASTE” PROGRAM IMPLEMENTATION AT FOLSOM FIELD

- CU-Boulder worked with Centerplate and other vendors to switch virtually all packaging used in the stadium to refillable, recyclable, or compostable materials.
- CU-Boulder and Centerplate trained staff in proper materials use and disposal.
- All public trash containers were replaced with 30 stations that have only recycling and composting containers.
- CU-Boulder procured plant-based compostable bags to collect compostable materials.
- Student volunteers are assigned to monitor all 30 waste stations and advise patrons about proper separation of materials.
- ROTC units perform recycling and compost removal during stadium cleanups on a weekly basis inside and around the stadium.
- A post-game sorting process at the campus recycling facility removes any non-recyclable or non-compostable materials brought into the stadium and discarded by fans into the stadium’s recycling containers.
- All campus tailgate lots have recycling receptacles for cans and bottles on game days.

Another early source of funding for sports and recreation sustainability efforts was student fees. “Many campuses, including ours, assess a sports or recreation fee on students,” says Newport. “With the strong student support for sustainability, implementing greener efforts in sports and recreation enhanced the perceived value of the student fee. Students appreciate seeing their sports funds going to promote environmentally preferable practices.” From 2008 to 2013, students have financed sports greening projects, including the current \$63 million near “net zero energy” renovation of the Student Recreation Center.



### RALPHIE’S GREEN STAMPEDE PROGRAM

Football tailgate areas at CU-Boulder have had a recycling collection program since 1993. However, it wasn’t until 2008 that the athletics department partnered with the Environmental Center and Facilities Management to implement a “zero waste” system at Folsom Stadium. Athletics branded the effort “Ralphie’s Green Stampedo” to market the program to potential corporate sponsors and it worked: White Wave Foods, Boulder Toyota, Eco-Products Inc., and the stadium concessionaire,

Centerplate, all signed on. Newport notes that while sponsorship helped fund the up-front infrastructure and outreach costs, the “zero waste” program had relatively low implementation costs, which he hopes will go down over time as the price of compostable serviceware becomes closer to that of traditional fossil fuel-derived plastic disposables. “The program is also saving money thanks to reduced trash disposal costs,” he says.

It took the CU-Boulder team several months to convert 53,613-seat Folsom Stadium into a “zero waste” venue in time for the Buffs’ 2008 football season. “It was the first ‘zero waste’ effort at a major collegiate or professional sports program in the United States,” says Edward von Bleichert of Facilities Management, lead coordinator of Ralphie’s Green Stampedo. “It was no small task and took a partnership among athletics, recycling services, facilities management, Centerplate, White Wave Foods, and the Environmental Center, as well as coordination with about 10 outside entities, to make the program a success.”

In order to reach the goal of 90 percent waste diversion from landfill, Ralphie’s Green Stampedo combines waste minimization efforts with reuse, recycling, and composting. Many operational and infrastructure changes have been needed to make this possible, including integrating compostable and reusable materials into Centerplate’s operations and training all staff about proper use and disposal of materials (see “Zero Waste Program Implementation at Folsom Field” sidebar for examples of other changes).

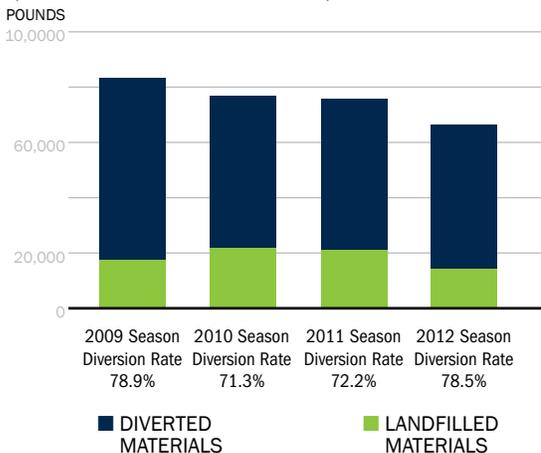
“This is often challenging as it requires coordinating and training a lot of people, including temporary concessionaire and vendor staff, sometimes with some language barriers, and student volunteers who must be recruited, trained, and rewarded,” says von Bleichert. “The athletics department often relies on CU Recycling staff to help with training. We also have to coordinate security, marketing, parking, and custodial staff, as well as skybox docents.”

In 2009, the athletics department expanded the program to all athletic facilities, operations, and events. “We were excited to unveil Ralphie’s Green Stampedo in 2008, and we’re even more excited to extend these recycling steps to all our programs,” said former CU-Boulder athletics director Mike Bohn at the launch of the program expansion. “As with any aspect of what we do, we’re not satisfied merely with success. We want to be the leaders in athletics program sustainability initiatives nationally.”

In 2008, Folsom Field achieved a 30 percent season-long landfill diversion rate. The athletics department improved this to a 75 percent average stadium waste diversion rate for the sports seasons from 2009 to 2012.

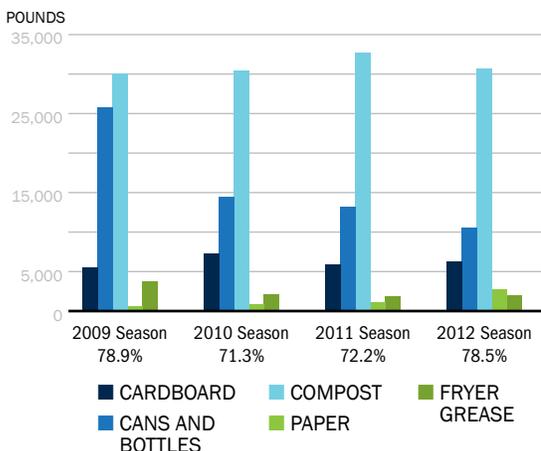
## UNIVERSITY OF COLORADO ENTIRE FOOTBALL SEASON WASTE GENERATION

(INSIDE STADIUM SECURITY PERIMETER)



## UNIVERSITY OF COLORADO FOOTBALL SEASON TOTAL DIVERTED MATERIALS

(INSIDE STADIUM SECURITY PERIMETER)



“Over time, our sports greening work is helping CU-Boulder get closer to our campus-wide goal of diverting 90 percent of all waste with recycling and composting by 2020,” says Newport. “While we expand Ralphie’s Green Stampede, what we have learned from the football program is helping inform plans for a ‘zero waste’ campus in the next few years, and athletics’ leadership on this issue has made that possible.”

## GREEN BUILDING LEADERSHIP

Sustainable building initiatives at CU-Boulder have enjoyed strong student support for many years. According to Newport, “Starting in 2003, student-led initiatives spurred the adoption of a green building standard for all campus facilities. As of 2013, CU-Boulder will only build or renovate to at least a LEED Platinum standard campus-wide, a bar that has been set higher over the past decade to help mitigate the environmental footprint of our buildings.”

From 2002 to 2007, the athletics department worked with Facilities Management to implement an energy conservation program at all athletic facilities, seeking to cut energy consumption by 30 percent per square foot, at a rate of 5 percent per year. This collaboration helped reinforce the value of efficiency upgrades to the athletics department and encouraged staff to consider broader sustainable building efforts.

In 2009, the athletics department began designing a new 44,000-square-foot practice facility to meet LEED Platinum standards. Opened in August 2011, the building hosts two basketball courts shared by the men’s and women’s basketball programs and women’s volleyball.

The practice facility is approximately 40 percent more energy-efficient and 30 percent more water-efficient than other recent buildings of similar size and function. The building is cooled with an evaporation system that uses less energy than traditional mechanical systems. It is outfitted with low-flow water fixtures, high-performance insulation and windows, efficient lighting, and heating and lighting controls that optimize energy use. It also features rooftop solar panels that are capable of providing up to 12 percent of the building’s electricity.

“We have built more sustainable and very energy-efficient academic, research, residential, and dining spaces,” says Facilities Management’s associate director of engineering and sustainability, Moe Tabrizi. “The athletic facility adds to the sustainability learning opportunities and experiences for our students throughout campus, no matter where they are.”

Another green building project is CU-Boulder’s expanded Recreation Center, which, according to Tabrizi, “will exceed LEED Platinum and approach net-zero energy use despite the presence of two energy-intensive indoor pools and a hockey rink.” The renovation will include many new features—including an outdoor aquatics facility, an indoor turf gym, and a climbing gym—that will be unveiled during its grand opening, scheduled for April 2014.

The CU-Boulder Recreation Center expansion uses a variety of strategies to implement net-zero energy use while meeting university-wide sustainable building goals and reducing operating costs. A “net-zero energy” building has zero net energy consumption and zero carbon emissions (referring only to the carbon emissions associated with energy needed to operate the facility). The building’s energy-saving features include skylights that provide interior daylighting and roof-mounted photovoltaic panels that generate electricity. Both of these features reduce electricity costs.

The building also reuses waste heat from the ice rink to heat the indoor pools and other areas of the building, further reducing the building’s energy demand and annual operating costs. The architect of the project, Davis Partnership Consulting (working with Cannon Design), completed elevation studies to determine the most efficient size and location of windows and to suggest ways to minimize the building’s lighting and mechanical cooling needs.



Photos courtesy of University of Colorado Boulder.

## THE BASICS OF CU-BOULDER'S TURF MANAGEMENT SYSTEM

### COMPOST TEA:

- CU-Boulder invested roughly \$30,000 to install seven 250-gallon brewing tanks across campus.
- A total of 70 pounds (10 pounds per tank) of premium vermicompost (compost from worm bins) is brewed to yield 1,750 gallons of compost tea, which is then applied over roughly 70 acres.
- The “tea” is injected directly into irrigation mainlines to avoid the need for manual boom or backpack sprayers.
- Compost tea is applied during an eight-hour irrigation window, four to six times per growing season, or roughly once every month.

### OTHER NATURAL FERTILIZERS:

- CU-Boulder injects fish emulsion, seaweed extract, and humic acids on recreation sports fields using the irrigation system (“fertigation”).
- Up to 14 tons of dry organic fertilizer are applied five times each year.

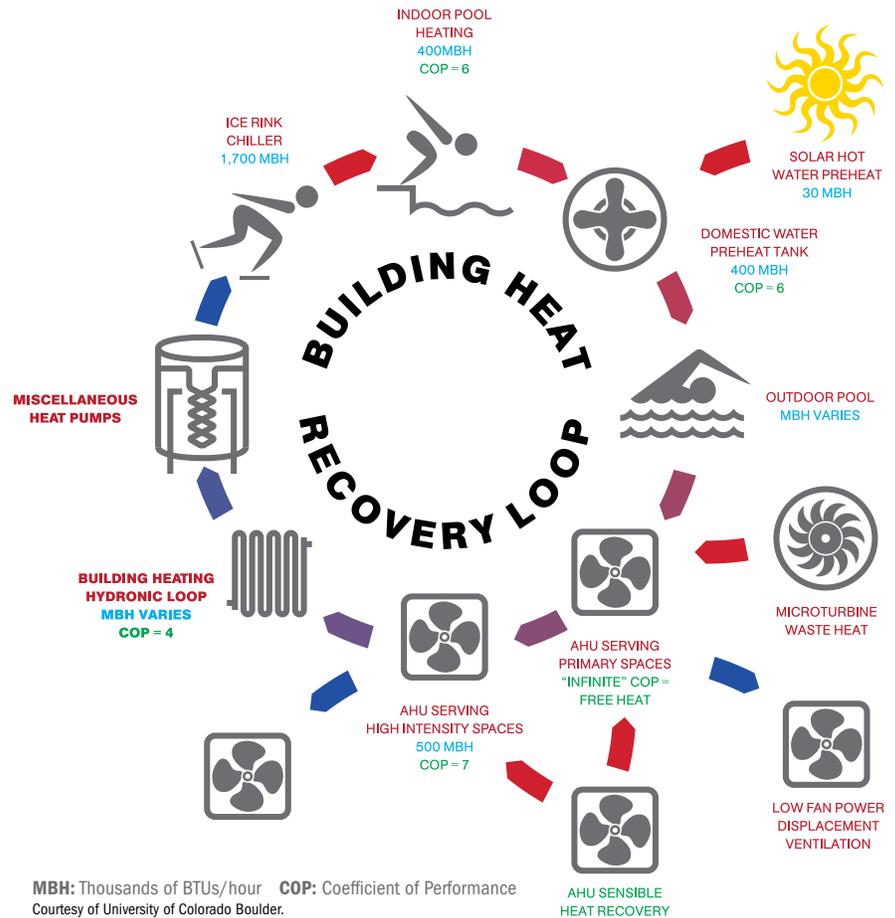
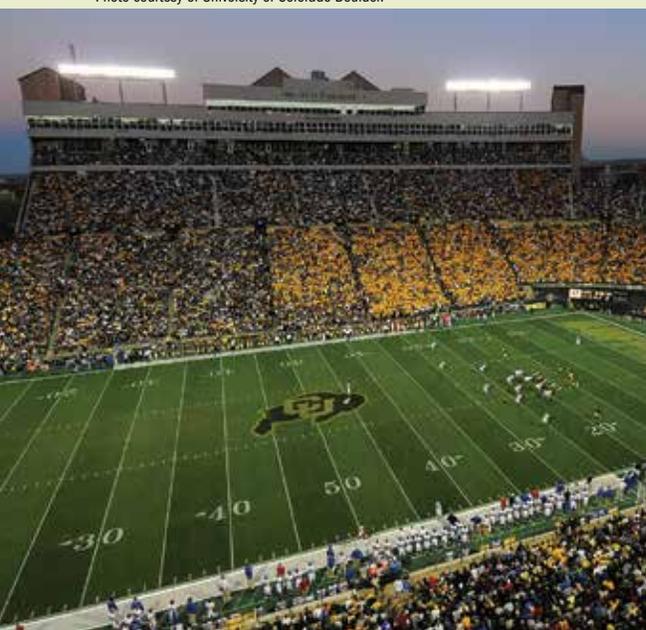
### SYSTEM FEATURES:

- Three weather stations covering multiple campuses help monitor weather patterns to maximize resource efficiency.
- 18 soil moisture sensors throughout the campus monitor moisture content, soil temperature, and salinity to help track and verify baseline watering needs.
- Pump station monitoring software helps track resource use.
- All components are tied into the central irrigation computer system to integrate tracking of resource use across all operations.

### BENEFITS TO FOLSOM FIELD:

- The system allows for easier manipulation of microbial and bacterial levels in sand-based sports turf.
- Use of the irrigation system reduces the need for manual applications of fertilizers.

Photo courtesy of University of Colorado Boulder.



## ORGANIC TURF MANAGEMENT

Years of planning by the Environmental Center and the facilities management grounds crew led CU-Boulder to implement a pesticide-free, organic fertilizer management system for all campus turf, including most sports and recreation fields. Starting in 2011, CU-Boulder began to spray “compost tea,” a biologically active organic liquid fertilizer, through the campus-wide sprinkler system. This addition to CU-Boulder’s turf maintenance program allowed the school to maintain campus aesthetics while reducing the use of pesticides. The first phase of the pesticide reduction program cut the use of herbicides on turf areas in 2011 by 45 percent compared with 2009, and by 93 percent by the end of 2012.

“Our innovative, campus-wide compost tea irrigation system is one of the first of its kind in the country and possibly in the world,” says Newport. “Our athletics and recreation sports fields are benefiting from this system as we use it across Folsom Field and other sports turf with great success.”

The benefits of using this organic fertilizer and pest management system on campus sports fields include improved drainage, higher oxygen levels, and less compaction. These benefits lead to faster recovery after intensive use, which means the fields can be used more often with fewer adverse impacts to the quality and density of the turf. “Compost tea acts as a catalyst for bacterial and microbial agents to increase and diversify, thereby reducing the need for chemical fertilizers,” says von Bleichert. “The benefit of compost tea is that it helps to speed Mother Nature along by providing added beneficial microbes, nematodes, bacteria, and fungi, which help to break down existing soil organics for plant absorption.”

According to Ryan Heiland, CU-Boulder turfgrass manager and Outdoor Services assistant manager, it was a challenge for grounds crews to build a system that worked to spray the solution across 70-plus acres of grass. “The common belief was that you couldn’t put compost tea through a sprinkler system because the particulate matter would clog the system. It took some time, but we were able to figure out how to make it work.”

The solution, says Heiland, involved a simple change of sprinkler head filters as well as a trial-and-error approach to the plumbing of seven 250-gallon compost tea brewers set up in three separate pump stations. “We started using the organic fertilizers and methods as an experiment. Then we used them on the entire quad for two years before we told anyone about it,” says Heiland. “That way, no one would tell us that it didn’t work. You stand there and look at the grass and it speaks for itself.”

The use of compost tea provides financial as well as practical benefits, according to Jason DePaepe, assistant athletics director of facilities and manager of Folsom Field. “As with any sand-based sports turf, Folsom Field presents challenges in maintaining good levels of organic matter,” says DePaepe. “The use of compost tea allows us to fine-tune microbial and bacterial levels without the need for manual applications of other types of fertilizers. It’s an effective tool that saves us time and money. A real win-win.”

## CHALLENGES: OVERCOME AND ONGOING

### RESISTANCE TO CHANGE

According to Newport, the greatest challenge for sports greening projects is typically related to developing support for change. “Ideally, we seek to build support through an inclusive process where all relevant parties are invited to discuss next steps before plans are firm and before funds are identified. However, this is not always followed perfectly, and mistakes are made.” The key, says Newport, is reinforcing this collaborative approach as often as possible. “Efforts like twice-yearly sustainability roundtables with all relevant departments can reinforce team building and information sharing.”

### FAN ENGAGEMENT

A commitment to sustainability can strengthen the bond between a university and the public. “We want to increase fan engagement through outreach during the sports events and increased community partnerships, such as community gardens fertilized with stadium compost,” says Newport. “Fan support offers an opportunity to build greater support for athletics and the campus—even if your team doesn’t win every game. We are just beginning to scratch the surface of sports greening as a fan engagement tool. Many pro sports teams have figured this out already. However, in a town with Boulder’s consciousness about sustainability, many fans see these efforts as baseline, not extraordinary. Engaging these more knowledgeable fans will require unique leadership.”

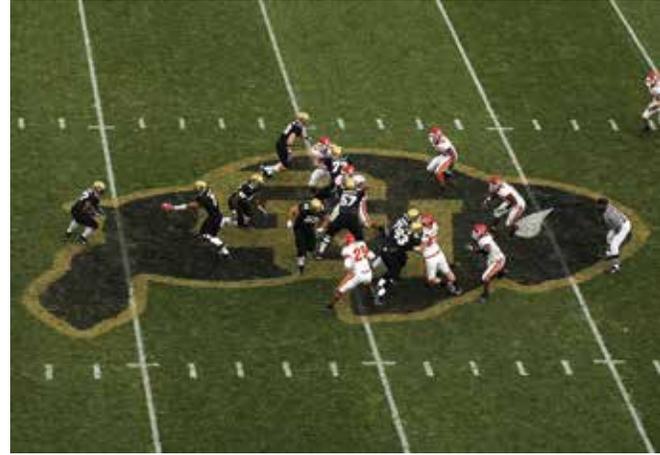
## LESSONS FROM THE FIELD

### USE POSITIVE FEEDBACK AS A CATALYST FOR IMPROVEMENT

“It was rewarding how positive our fans were about the ‘zero waste’ efforts throughout athletics,” McGann notes. “And we are very proud of the positive reactions from vendors and others as well. It’s good to know we are working with people who value environmental stewardship—and the reaction from our community affirms the value of our work,” he adds. “The positive reception empowered athletics to pursue sustainability, particularly when there was no PR downside, only a strong upside for sports greening efforts.”

### ESTABLISH CLEAR PROJECT GOALS

“Winning support for goals like ‘zero waste’ requires some finesse. We first articulated a ‘zero waste by 2015’ goal. However, some partners didn’t think that was practical,” says Newport. “‘How can we have literally no waste in just a few short years?’ they asked. But by reframing the goal as an aspirational, continuous-improvement goal akin to a zero-accident goal on a construction site, a level of comfort was established that people supported.”



Photos courtesy of University of Colorado Boulder.

Photos courtesy of University of Colorado Boulder.



### **TAKE TIME TO LEARN AS YOU ROLL OUT YOUR PROGRAM**

“At first these new efforts were hard and a little scary because there were no cookbooks on it,” says Newport. “We learned how to optimize operations by experimenting and figuring things out as we went, so the hurdles are lower for next time. New programs still require significant effort, but so does anything worth doing.”

### **CHANGE THE MATERIALS IN THE SYSTEM, NOT JUST THE PROCESSES FOR MANAGING THEM**

“‘Zero waste’ is easier if you switch all the materials in the system to reusable, recyclable, or compostable. However, changing everything is not easy,” says von Bleichert. “The first 75 to 90 percent of materials can be changed pretty easily, but be aware of the little stuff, like coffee cup lids, potato chip bags, candy wrappers, and so forth, that are difficult to remove from the system.” Likewise, “involving campus recycling reps as early as possible in the planning process for vending contracts is key,” recommends Jack DeBell of the Environmental Center.

### **CONSIDER WAYS TO LIMIT NON-RECYCLABLE MATERIALS THAT ENTER SPORTS FACILITIES**

“The bane of ‘zero waste’ is filmy plastics. Filmy plastics show up everywhere: plastic bags, shrink wrap, food wrappers, pallet wrapping, etc.,” says von Bleichert. “We cannot close the gap from 88 percent diversion to 95 percent diversion without finding ways to limit the amount of non-recyclable plastic entering the system—and then finding cost-effective ways to separate and recycle the plastic that does make it in.”

### **REALIZE THAT SPORTS GREENING IS A CAMPUS-WIDE EFFORT; SPORTS DEPARTMENTS CAN’T DO IT ALONE**

“It takes a campus to green sports and recreation. All that we have accomplished in sports and recreation is the result of a campus-wide commitment to sustainability,” explains Newport. “It would be unfair and impossible to expect the athletics department to make all these improvements by itself without the campus supporting it.”

### **DEVELOP A ROBUST TRAINING AND OUTREACH PLAN FROM THE OUTSET**

“Training is one thing I would prioritize more if I could start again. It would help move our programs to greater efficiency more quickly,” says von Bleichert. “However, we had to learn as we went along, so it was difficult to have a definitive training and outreach plan when we were changing tactics sometimes every week.”

### **USE GREENING TO BUILD GREATER FAN LOYALTY**

“Greening our athletic facilities offers an opportunity to build greater fan loyalty and enhance support for our athletics department and the campus more broadly,” says Newport.

