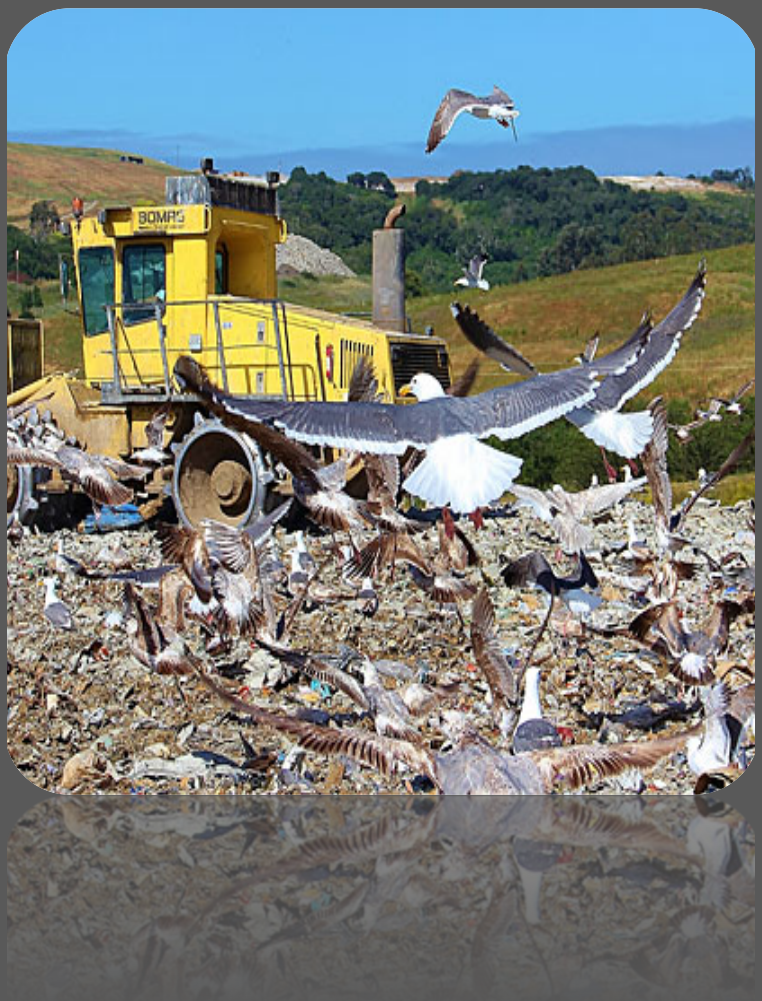
University of California, Santa Cruz

Landfill & Solid Waste Task Force Report and Waste Diversion Plan



July 31, 2012

ZERO WASTE

Acknowledgments

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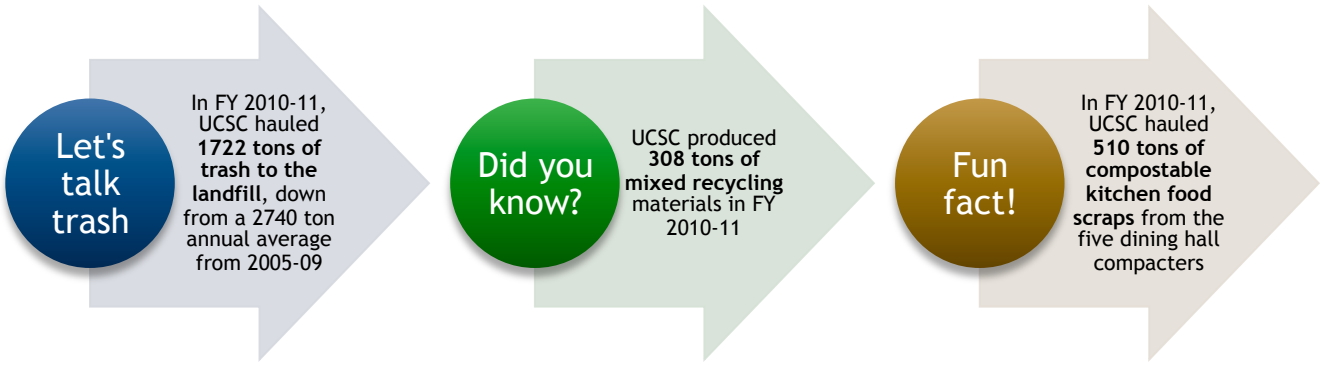
Executive Summary

A Landfill and Solid Waste Diversion Task Force was charged by Executive Vice Chancellor Galloway in September 2011 to identify initiatives to reach the system-wide waste diversion policy goals of 75 percent diversion by 2012 and Zero Waste (100 percent diversion) by 2020. In Fall and Winter 2011-12, the Task Force worked with SAIC Consulting to conduct a campus-wide waste assessment and identify early action items to reduce waste both in the short and long term. In order for UCSC to achieve system wide policy goals, the campus will need to focus on several areas as outlined below.

Waste Process and Study Data

UCSC self-hauls 90-95% of its landfill waste, recycling, green waste and compost. SAIC performed a waste analysis to understand the contents of UCSC's waste stream and review campus refuse and recycling operations. These results were combined with a 2010 Ecology Action assessment of the residential solid waste stream in order to determine action item recommendations for increased waste diversion.



Fiscal Year 2010-11 figures represent a 74% diversion rate, which includes construction waste diversion. As major capital construction slows down on campus, overall campus diversion rates will be lower.

The waste analysis of 49 out of 150 campus dumpsters found three potentially divertable materials on a volume basis: food scraps, compostable paper and mixed recyclable paper. These materials constituted nearly half of the volume of discards overall, with the residential facilities potentially the largest target.

Additionally, several inefficiencies in operations were identified that could potentially increase diversion for the campus:

- UCSC does not have a dedicated Waste Reduction Coordinator who focuses on ways to reduce the generation of discards, whether in the form of recyclables, compostables, or trash.
- UCSC's recycling operations site has been moved repeatedly leaving inefficiencies in operations.

- UCSC has not identified a vendor or site for a composting system that could process a substantial portion of the campus' discarded organics outside of the dining halls, such as food scraps and compostable, non-recyclable paper.
- The current refuse fee structure and funding model for waste collection are in direct conflict with the university's long-term Zero Waste goals.
- Conflicting recycling labeling on bins convey multiple mixed messages, creating confusion for the users.

Top 7 Recommended Action Items

- **Staffing:** Hire a full-time campus-wide Waste Reduction Coordinator by FY 2013-14.
- **Education:** Develop a waste reduction educational program as a requirement for all new students, staff and faculty campus-wide that is consistently implemented across all colleges and units. Message the campus more comprehensively about zero waste through a well-designed marketing campaign. Bolster existing education and outreach efforts at the ten largest waste generators to increase diversion.
- **Funding Model and Fee Structure**: Develop a model to transition the solid waste and recycling program to an economically sustainable cost and revenue model. Make strides toward the fuller inclusion of major cost components in the rates.
- **Compost:** Focus new waste reduction efforts on diverting food scraps and compostable paper towels from the waste stream. Continue to explore alternatives to our current dependency on an off-site compost facility. Expand compost collection campus-wide.
- **Paper Towels:** Re-evaluate supplying paper towels in residence halls, academic and administrative buildings. Implement alternative methods for hand drying and encouraging good hygiene for transmissible disease reductions.
- **Purchasing policies**: Promote and implement purchasing practices that encourage waste reduction of packaging and specific material types, such as styrofoam. Discourage or ban the purchase of single-use plastic or bio-plastic water bottles.
- **Expand indoor recycling service to administrative and academic buildings:** Increase staff capacity to accommodate additional recycling pick-up duties for classrooms and offices.

Highlights of 2011-12 Accomplishments

- Grounds Services standardized all outdoor recycling containers and labeling across campus.
- Grounds Services acquired a recycling conveyor belt system that helps maximize material value.
- Capital equipment costs were incorporated into the recharge rates.
- Residence hall trash chutes were either closed or converted into recycling chutes.
- Several student-initiated pilot programs were developed: removal of paper towels in the residence halls, offering re-usable dish wares for campus events, creation of a Zero Waste Event Planning Guide, styrofoam recycling collection from labs, and offering recycling sorting as an educational sanction for judicial violations.
- Forklift scales and load tracking software were installed on all front-loader refuse trucks.

Background and Purpose of UCSC Waste Task Force Report and Waste Diversion Plan

In April 2011, the Office of the Campus Provost and Executive Vice Chancellor (EVC) approved "… a one-time allocation of $100,000 for the landfill and solid waste diversion initiative. In order to make further progress toward the system-wide policy of 75 percent diversion by 2012 and 100 percent diversion by 2020, an assessment of campus solid waste is needed to assist in strategic decision-making. Improvement of waste diversion infrastructure and development of outreach, education and behavioral change initiatives will be included in the recommendations." [1] As of fiscal year 2010-11, UCSC figures represented a 74% diversion rate, which includes construction waste diversion. As major capital construction slows down on campus, overall campus diversion rates will be lower.

The Landfill and Solid Waste Diversion Task Force (Task Force) was officially charged by EVC Galloway in September 2011 to focus on reaching the systemwide waste diversion goals. In Fall and Winter 2011-12, the Task Force worked with SAIC Consulting (SAIC) to conduct a campus-wide waste assessment and identify early action items. The purpose of this Report is to provide an update on the extensive and ongoing campus-wide waste reduction efforts by members of the Task Force. This Report focuses on sharing the overall picture of our current waste infrastructure and challenges, current educational programs and student-initiated pilot projects, new initiatives that have been implemented this year based on SAIC's early action item recommendations, key SAIC Report and waste assessment findings, and recommendations for implementation and further research.

Additionally, in Spring 2011 the UC Office of the President (UCOP) requested a Waste Diversion Plan from all 10 UC campuses by Summer 2012. **This document serves as the Landfill and Solid Waste Diversion Task Force Report, as well as the UCSC Waste Diversion Plan.**

Policy

UCSC's primary guiding document regarding waste reduction practices is the UCOP Sustainable Practices Policy (UCOP Policy), updated in August 2011 (see Appendix F for full policy). According to the UCOP Policy, under Section III. F. Recycling and Waste Management: "1. The University prioritizes waste reduction in the following order: reduce, reuse, **then** recycle. 2. The University adopts the following goals for diverting municipal solid waste from landfills: 50% by June 30, 2008; 75% by June 30, 2012; ultimate goal of zero waste by 2020." It is the responsibility of the Vice Chancellor of Business and Administrative Services (BAS) to ensure that BAS units strive towards achieving this goal.

Figure 1: Logo designed by Ecology Action Fall 2010

Additionally, in 2010, UCSC published the Campus Sustainability Plan 1.5, which outlines specific goals and objectives for the campus to work toward in support of the UCOP Policy (see Appendix D for full Waste topic section of Campus Sustainability Plan 1.5).

[1] UCSC Landfill and Solid Waste Diversion funding letter, Santa Cruz Office of the Provost and Executive Vice Chancellor, April 2011.

Operations: Existing Waste and Recycling Practices

Description of Services and Operations

UCSC self-hauls 90-95% of its waste, recycling, green waste and compost. Physical Plant / Grounds Services (Grounds Services) provides the following services to the main campus (with the exception of faculty and staff housing facilities, which are serviced by the city of Santa Cruz), 2300 Delaware, and the Marine campus: trash collection, recycling collection, green waste collection, food scrap compactor collection from the dining halls for transportation to a composting site off-campus. This service is provided to all recharge units as well as state-funded (OMP) buildings. Additionally, Grounds Services works closely with Housing Facilities and Environmental Health & Safety (EH&S) to collect and divert a variety of electronic and hazardous waste materials. All of these services are closely tailored to meet customer needs, with route schedules developed over many years of operation. Grounds Services can also accommodate special requests, unusual schedules, and emergencies as needed.

Additionally, there is also a drop-off area to collect waste from capital construction projects and other specific material types. UCSC has well-defined guidelines regarding construction waste management written into contracts. Construction projects are required to divert a minimum of 75% of materials by weight from the landfill waste stream.

Finally, Grounds staff receive professional training development on an as-needed basis, including attending conferences and safety trainings for sorting through commonly found contaminants. In FY 2011-12, the Superintendent of Grounds was able to attend a conference on organics diversion options.

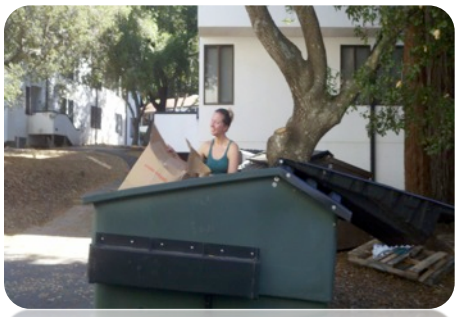


Figure 2: Residential Move-In waste reduction efforts, Fall 2011

Dumpster Collection: Trash and Partial Recycling

Grounds Services maintains a fleet of four front-loader refuse trucks to service 150 trash dumpsters, 75 cardboard dumpsters, and 25 mixed recycling dumpsters across campus. The dumpsters are serviced at various frequencies depending on the typical rate at which they fill.

For **trash pick-up**, the dumpster collection routes are five days a week, Monday through Friday. The driver will typically haul one truckload of trash per day to the Santa Cruz Landfill and Resource Recovery Center (SCLRRC) on Dimeo Lane. **Cardboard** is hauled to vendors where market value can be recovered for the material. The 25 **mixed recycling dumpsters** located throughout campus are serviced by a front loader truck typically three days a week and hauled to the SCLRRC recycling center. These dumpsters include a mixture of paper, glass, plastic, and metal containers. Grounds Services hauled 308 tons of mixed recycling material during FY 2010-11.

Let's talk trash

In FY 2010-11, UCSC hauled **1722 tons of trash to the landfill**, down from a 2740 ton annual average from 2005-09

Did you know?

There are approx. 800 outdoor recycling carts and 400 indoor office paper bins across campus serviced by the Recycle Crew

Fun fact!

During Fall 2011 Residential Move-In alone, UCSC recycled nearly 200 tons of cardboard - **that's 330 trees!**

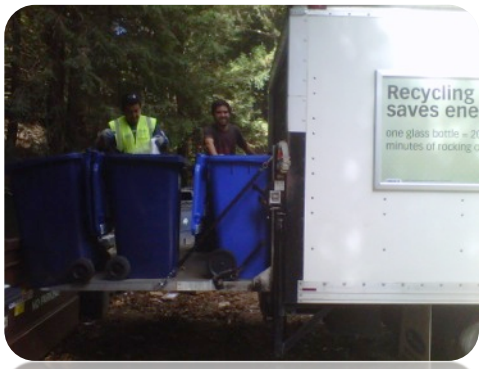


Figure 3: Recycling Crew staff and students in action, Fall 2011

Recycling Collection: Rolling Carts and Roll-Off Boxes

Three Recycling Crew staff members provide service using three box trucks and routinely collect several categories of recyclable materials: containers (glass, plastic, and aluminum), cardboard, mixed paper, and white office paper. This crew also collects the following materials on an as-needed basis: scrap metal, styrofoam, batteries, various fiber grades, and more. The Recycling Crew hauls each of these materials as strategically as possible by streamlining collection routes according to bin types and material type for indoor office paper collection.

In addition to rolling carts (pictured in Figure 3), recycling is collected into several 10-40 cubic yard roll off boxes and picked up by a special roll-off truck. These boxes are mainly used for collection of specific material types: aluminum CRV, PET CRV, glass CRV, scrap metal, construction debris, styrofoam, green waste, and compost (see details in next section). These materials are all collected, processed to varying degrees by Grounds Services staff, and hauled to vendors for further processing and marketing.

Figure 4 UCSC Dining Services compost logo

Compost

Dining Hall Compactors

Grounds Services, in conjunction with EH&S and Dining Services, initiated a kitchen food scraps organics diversion program in 2005-06. By 2010, all five of the UCSC dining halls and a few campus cafes diverted both the pre- and post-consumer food scraps out of the refuse stream. Each dining hall has a compactor for collecting food scraps, which Grounds Services collects and hauls to the industrial composting facility at the Monterey Regional Waste Management District, located in Marina, CA, where it is processed into certified-organic soil. In FY 2011-2012, UCSC Grounds Services hauled 494 tons of compostable food scraps from the five dining hall compacters.

Housing Cold Compost Program

Many of the housing areas located at the Colleges have local gardens that accept cold composting-specific food waste. The gardens are managed as collectives by students, organized by faculty for academic instruction and by the UCSC farm for food production and skills training. Making the connection to these gardens, residents in the housing areas at all 10 residential colleges are offered food waste collection education and infrastructure. There has historically been a high participation rate. Housing and Dining Facilities student staff are responsible for the education, collection infrastructure and food waste drop off to the gardens. Although hard numbers are not currently available for how much food waste is composted by housing residents, it is estimated at several hundred pounds per week.

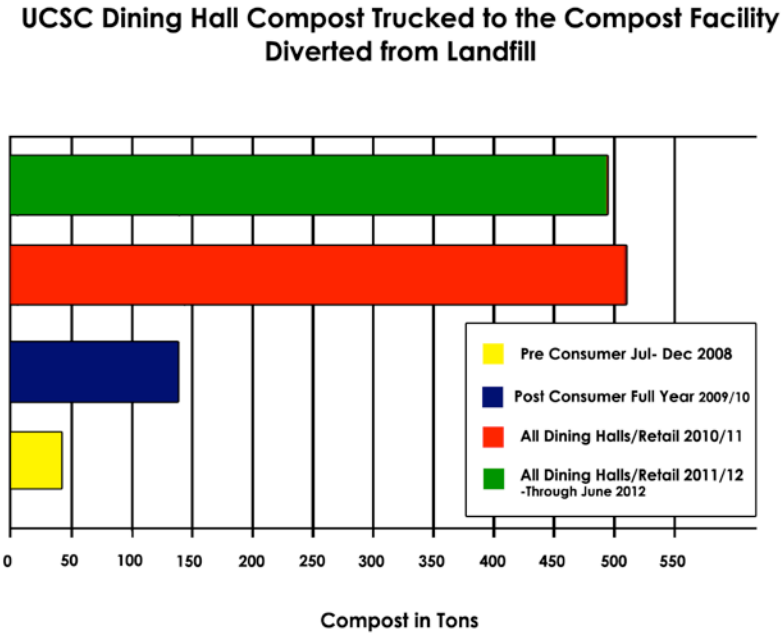


Figure 5 College 8 Freshmen assist with cardboard collection during Move-In, Fall 2011

Commodity Market Overview

In recent years, there has been a growing commodity market developing for waste, recycling and compost items that previously had no value. The industry is new, and technologies and processes change quickly. Grounds Services keeps up with market commodities by collecting and separating specific high-value materials as appropriate. An estimated total of $52,000 was recovered from the sale of various commodity materials in FY 2011-12.

Paper is currently sorted into three main grades as well as several other minor categories. Through knowledgeable collection and focused sorting of the recycled paper, the Recycling Crew maximizes the value of the material collected from both the outdoor and indoor office bins. Currently, the paper vendor picks up material on campus, resulting in no additional off site transportation costs to the campus. During Fiscal 2010-2011, 60 tons of various grades of office paper were recycled.

Cardboard value depends on how clean it is. Collecting cardboard and keeping it clean of styrofoam and plastic packaging in order to be sold at market value can be a challenge. The market value for cardboard fluctuates widely, and there is a transportation cost to haul the cardboard to vendors. Grounds Services recently found vendors that accept the quality of our cardboard stream. In Fall 2011, to help defray some of the costs associated with transporting cardboard to vendors, Grounds Services purchased a high volume front loader truck that makes the transportation of cardboard more economical.

CRV (California Redemption Value) materials include beverage containers worth 5 cents for containers less than 24 ounces, and 10 cents for containers 24 ounces or larger. While mixed recycling materials have a low market value, the strategy in this area is to remove the high value CRV materials from the mixed recycling for hauling to select competitive vendors, then haul the lower value materials to the SCLRRC recycling center. UCSC has been certified by the State of California CalRecycle to recover the value of these items. During FY 2010-11, the Recycle Crew extracted 11,000 lbs. of PET (clear plastic) CRV beverage containers and 3,200 lbs. CRV Aluminum beverage containers from the mixed container recycling material stream. Approximately $18,000 was recovered from collection of CRV materials in FY 2011-12.

Figure 6 SEC students staff Zero Waste stations at OPERS Fall Fest during Welcome Week 2011

Education and Outreach

Over the past couple of decades, there have been several educational waste-reduction initiatives taken on by Grounds, Housing and Dining Facilities, student organizations, individual Colleges, and the Sustainability Office. However, very few programs have successfully been implemented on a consistent, campus-wide scale.

In recent years, there has been an increased interest in hosting “Zero Waste” events on campus. To cite a few successful examples, Summer Orientation Resource Fairs, OPERS Fall Fest, commencement ceremonies, and College Programs Office events at all 10 colleges have offered composting in addition to recycling and trash for the past several years. This has been made possible through collaborative efforts with Dining Services to add the compost waste to their compost stream. Zero Waste events serve as a key educational tool and communicate a strong message to attendees about how the campus values waste reduction.

In addition to Zero Waste events, Dining Services has taken the lead in many areas of food waste reduction education by creating logos and signage for campus-wide use to “brand” zero waste events, conducting food waste audits in the dining halls, and offering discounts to coffee drinkers who bring their own mugs to various vending locations on campus. Recent Dining educational campaigns include “Be a Taster, Not a Waster” and

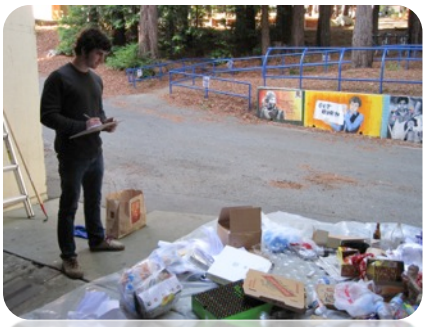


Figure 7 The student Zero Waste Team conducts a waste assessment at the Merrill residence halls

"Love Food, Hate Waste!" All five dining halls and several cafes have earned the Monterey Bay Green Business Certification, which includes waste reduction as a key criteria point.

Housing Facilities, Physical Plant and the Sustainability Office have facilitated the process of reducing waste during residential Move-In and Move-Out at the colleges by offering styrofoam and packaging recycling areas, hosting Swap Meets at the end of the year and offering various donation opportunities. Several energy, water and waste reduction competitions have been facilitated by many student organizations campus-wide and at the colleges, with varying levels of successful participation and student buy-in. Organizations such as the Student Environmental Center (SEC), Path to a Greener Stevenson (PTAGS), and the Sustainability Office Zero Waste Team have conducted several pilot projects across campus to further explore ways to reduce the university's waste stream (see Appendix B for a full list of Zero Waste Team pilot projects).

Finally, there are also several successful models for training students and staff on campus. The Purchasing department provides ongoing training and has accountability for sustainability incorporated into all staff job descriptions. Dining Services offers a day long annual training called "Dining University" which strongly emphasizes waste reduction practices. The green office certification service offered by the Sustainability Office's student PROPS team (Programs Recognizing Offices Practicing Sustainability) conducts waste assessments and hosts educational workshops for offices, teaching them how to manage their waste. Since Fall 2008, the Landfill Waste Reduction Working Group (guided by the Campus Sustainability Plan) has conducted a "Greening Your Programs" training workshop for all of the Residential Life and Programs professionals plus student staff. This program is a 2-hour interactive workshop focusing on waste reduction at events.

Figure 8 A team of students, staff and consultants conduct a campus-wide waste assessment

Waste Assessment Results

Waste Assessment Methodology

"Three days spread over a two-week period [in Fall 2011] were allocated for the conduct of visual waste assessments. The chosen dates (Monday, November 7th; Monday, November 14th; Tuesday, November 15th) were intended to be reasonably representative of two typical weeks on campus. Two Mondays were selected in order to increase the likelihood of having trash dumpsters that contained adequate samples; Monday is the day of highest trash collection volume. SAIC staff trained four students [of the Sustainability Office student Zero Waste Team] to provide assistance as needed; in addition, field-level logistical assistance provided by Physical Plant staff helped the work to proceed at maximum efficiency.

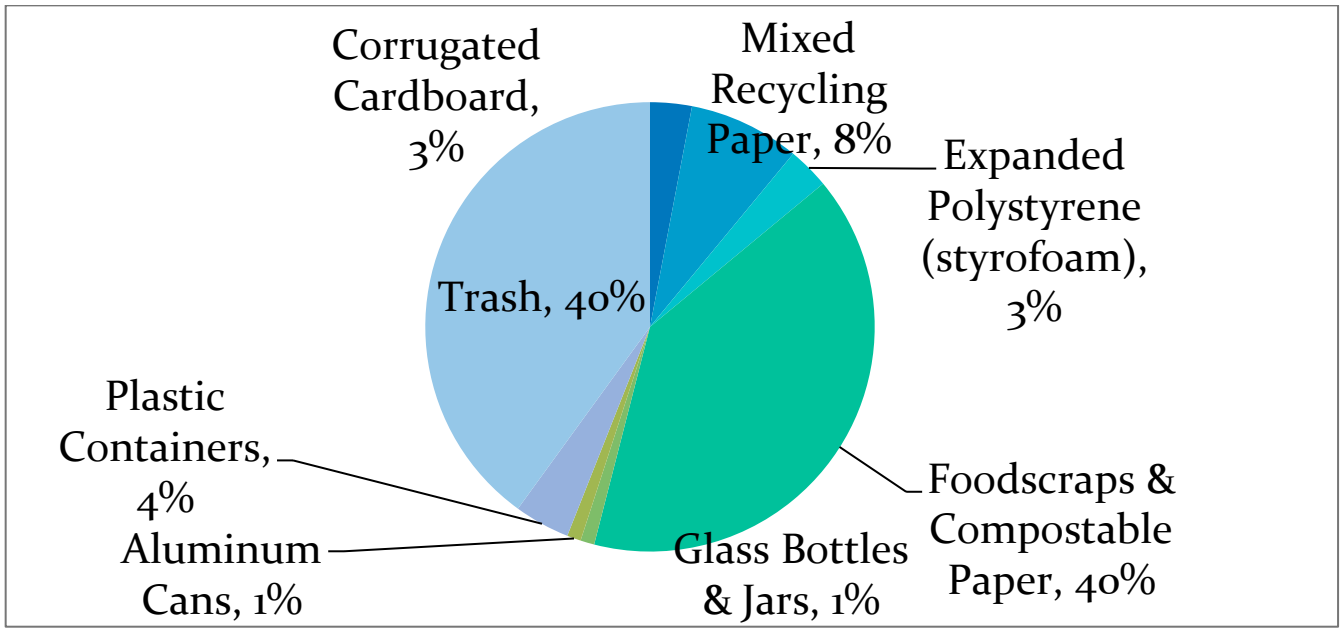
The waste assessments sought to identify broad categories of recoverable materials found within discarded trash, on a volumetric basis by percentage. Samples were categorized as follows:

- Recyclable corrugated cardboard
- Recyclable mixed paper
- Expanded polystyrene [eg: styrofoam]
- Landscape trimmings
- Food waste and non-recyclable but compostable paper
- Recyclable glass containers
- Recyclable aluminum containers
- Recyclable ferrous metal containers
- Recyclable plastic containers
- Trash

The sample consisted of a broad range of generator types ("building functions") thought in advance to offer a reasonable opportunity for greater diversion, such as: dining, student housing, academic buildings, science labs, administration, and others. Campus-wide, there are approximately 150 trash dumpsters that are serviced by Physical Plant. SAIC sampled the contents of 49 dumpsters, spread approximately equally over the three days. The sample was skewed toward larger trash generators, which were determined based on Physical Plant records of trash volumes collected in the previous academic year.

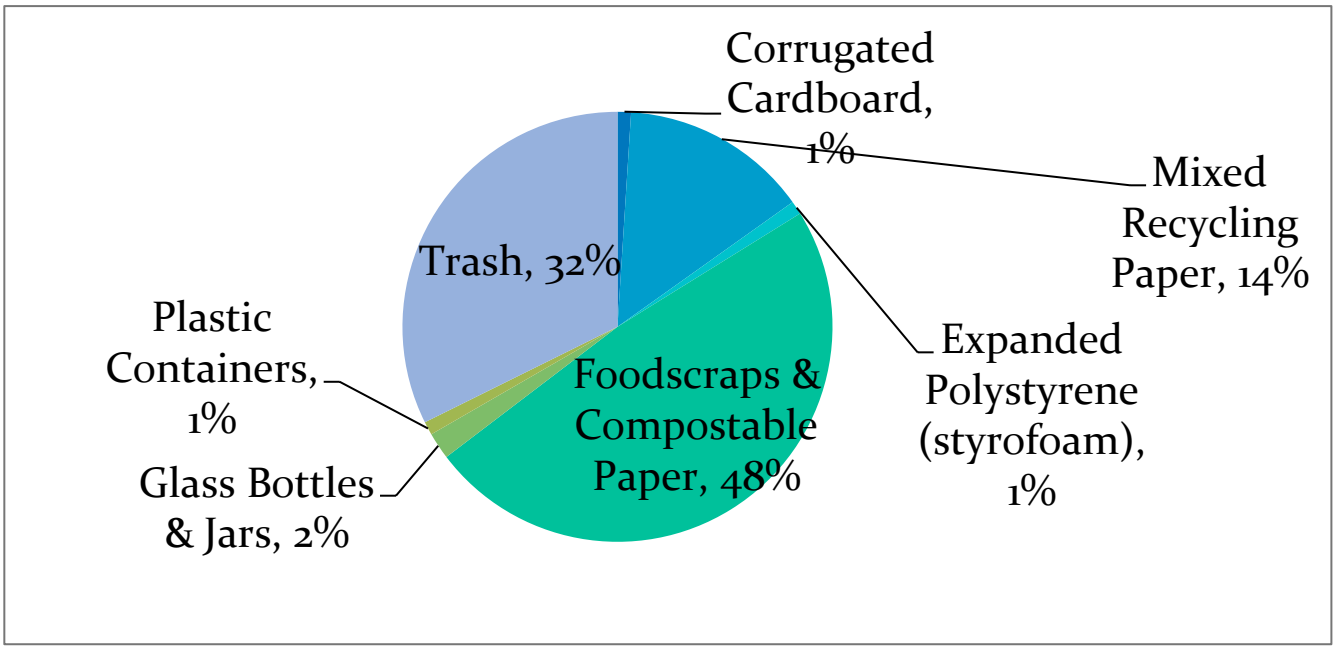
To sample the contents, bags were sliced open and materials were spread around to observe well at least a two-foot layer of the contents of the dumpster. Visual estimates were then made and recorded of the volume of targeted materials present in the sample, on a percentage basis. These volumetric-based data were converted to weight-based data." [2]

Material Category Percentages in Sampled Trash Dumpsters (by Volume) [3]



[2] Solid Waste Assessment and Early Action Items Report, Section 1.3, SAIC, February 2012.
[3] UCSC Early Action Report Presentation, SAIC, March 2012.

Material Category Percentages in Sampled Trash Dumpsters (by Weight) [4]



[4] UCSC Early Action Report Presentation, SAIC, March 2012.

Table 1-3
Volume of Discards, by College Affiliation

COLLEGE	Uncoated Corrugated Cardboard	Mixed Recyclable Paper	Expanded Polystyrene	Landscape Trimmings	Food Scraps + Compostable Paper	Glass Bottles & Jars	Aluminum Containers	Ferrous Containers (tin cans)	Plastic Containers	Trash
	MATERIAL CATEGORIES % of Total Waste (vol)									
No Affiliation	3%	9%	3%	0%	38%	0%	1%	0%	3%	42%
College 8	2%	4%	0%	3%	22%	1%	2%	0%	6%	61%
College 9	1%	9%	3%	0%	40%	2%	1%	0%	8%	36%
College 10	2%	14%	7%	0%	43%	0%	1%	0%	9%	25%
Cowell	1%	4%	2%	0%	41%	0%	3%	0%	3%	45%
Crown	5%	8%	2%	0%	46%	0%	1%	5%	3%	30%
Kresge	5%	7%	0%	0%	38%	3%	2%	0%	10%	35%
Merrill	1%	2%	1%	0%	83%	0%	0%	0%	2%	11%
Oakes	0%	5%	0%	0%	60%	0%	2%	0%	7%	26%
Porter	2%	10%	1%	0%	35%	0%	2%	0%	6%	45%
Stevenson	5%	10%	0%	0%	33%	2%	7%	0%	11%	32%
TOTAL	3%	8%	3%	0%	40%	1%	1%	0%	4%	40%

Totals may not sum to 100 percent due to rounding.

"Analysis: The top three recyclable materials, on a volume basis, were food scraps and compostable paper (40 percent) (two materials counted together) and mixed recyclable paper (8 percent). These materials constituted nearly half of the volume of discards overall. Trash (excluding expanded polystyrene) was an estimated 40 percent of total discards by volume container, relative to the results at other building functions."[5]

[5] Solid Waste Assessment and Early Action Items Report, Table 1-3, SAIC, February 2012.

Table 1-5
Volume of Discards by Building Function

BUILDING FUNCTION	Uncoated Corrugated Cardboard	Mixed Recyclable Paper	Expanded Polystyrene	Landscape Trimmings	Food Scraps + Compostable Paper	Glass Bottles & Jars	Aluminum Containers	Ferrous Containers (tin cans)	Plastic Containers	Trash
	MATERIAL CATEGORIES % of Total Waste (vol)									
Student Housing	2%	11%	2%	0%	43%	1%	2%	1%	7%	31%
Family/Faculty Housing	0%	8%	0%	0%	28%	0%	1%	0%	6%	57%
Enterprise	3%	8%	5%	0%	30%	2%	0%	0%	0%	53%
Dining Service	1%	1%	1%	0%	29%	2%	1%	2%	4%	59%
Academic/Administration	2%	7%	3%	0%	47%	0%	1%	0%	3%	37%
Science Labs/Medical	5%	5%	3%	1%	32%	0%	0%	0%	4%	48%
Semi Public Location	7%	8%	0%	0%	62%	0%	0%	0%	8%	14%
TOTAL	3%	8%	3%	0%	40%	1%	1%	0%	4%	40%

Totals may not sum to 100 percent due to rounding.

"Analysis: For each type of building function, food scraps and compostable paper constituted the largest single category of recyclable material by far, on a volume basis. The range for this material type was from 28 percent (Family/Faculty Housing) to 62 percent (Semi-Public Location), with an average of 40 percent overall.

On a material-by-material basis, the highest concentrations by volume were found at the following building functions: uncoated corrugated cardboard, Semi-Public Location (7 percent); mixed recyclable paper, Student Housing (11 percent); expanded polystyrene, Enterprise (5 percent); landscape trimmings, Science Labs/Medical (1 percent); food scraps and compostable paper, Semi-Public Location (62 percent); glass bottles and jars, Enterprise and Dining Service (2 percent); aluminum containers, Student Housing (2 percent); tin cans, Dining Service (2 percent); plastic containers, Semi-Public Location (8 percent); trash (excluding expanded polystyrene), Dining Service (59 percent). Counter-intuitively, higher percentages of trash by various building functions (e.g., Dining Service, 59 percent; Family/Faculty Housing, 57 percent) means that there was

a lower percentage of recyclable and compostable materials by volume incorrectly discarded in the sampled trash container, relative to the results at other building functions." [6]

Challenges

The following issues identified by SAIC and the Task Force describe the current challenges and obstacles to the successful achievement of the university's Zero Waste goals. For several of these issues, the Task Force has been able to identify and implement solutions during FY 2011-12 (see "Key 2011-12 Accomplishments" text boxes below for details).

Existing Conditions and Data Needs

- **"The gathering, analysis and reporting of waste diversion data is a cumbersome and time-consuming task for UCSC staff. The resulting diversion figure is fraught with challenges, such as information gaps and methodological inconsistencies from year to year.** Indeed, this effort inhibits the ability of the few professional staff at Physical Plant who work on recycling to concentrate squarely on advancing program implementation and engaging with other departments in strategy and policy development, and education and outreach. Unlike local governments and special districts throughout the state, UCSC (and the university system overall) does not use the State of California's updated methodology, which has shifted from diversion-based estimation to disposal-based accounting.

- **UCSC does not have a Waste Reduction Coordinator who focuses on ways to reduce the generation of discards, whether in the form of recyclables, compostables, or trash.** The act of generating materials that require collection and processing tends to signify an inefficient use of financial and material resources. As the goal is to reduce, reuse, then recycle, a Waste Reduction Coordinator focuses on ways to prevent waste through proactive education and outreach to reduce or reuse, rather focusing on how to collect and market recoverable components of solid waste. Frequently, these distinct functions are combined in a single job, but not always.

- **UCSC does not have a waste reduction coordinator who focuses on education and outreach for greater student and staff engagement. The duties that are typically associated with such a position are spread in an overlapping, disjointed, and frequently informal manner amongst several staff in several departments.**

- **UCSC's recycling operations site has been moved repeatedly.** There is no permanent or semi-permanent location for it.

- **UCSC has not allocated a site for a composting system that could process a substantial portion of the campus' discarded organics, such as food scraps and compostable, non-recyclable paper."** [7]

[6] Solid Waste Assessment and Early Action Items Report, Table 1-5, SAIC, February 2012.
[7] Solid Waste Assessment and Early Action Items Report, Section 1.2, SAIC, February 2012.

- **Collection Service Fee Structure** – UCSC's current fee structure and funding model for waste are in direct conflict with the university's long-term Zero Waste goals. According to the SAIC Report, "UCSC's waste collection and recycling program does not operate on a clear fee-for-service basis. Some services have fees, while others, such as collecting recyclables in carts, do not…at the operations level, the cost model does not ensure the program's economic sustainability." [8] Changes in the refuse / recycling recharge structure will be required in coming years to recover operating costs as material collection shifts from waste to recycling and composting. A future cost recovery model will likely include a cost incentive structure promoting recycling and composting as well as accounting for volume.

- **Trucks -** Keeping up with ongoing maintenance costs while maintaining services levels to the campus is a major challenge. Several trucks within the fleet are over 25 years old.

- **Recycling**

  Custodial - According to the SAIC Report, **"At several buildings, Physical Plant materials haulers [eg: Recycling Crew staff] spend considerable time aggregating materials from inside buildings, a task typically done by custodians in large commercial facilities rather than by haulers."** [9] Custodians currently do not pick up recycling from inside buildings, classrooms, or offices, although this is typically a custodial duty on college campuses. This puts the responsibility on individual faculty and staff to come up with a system for providing and servicing their own interior recycle bins and transporting them to the outdoor rolling carts or dumpsters. Providing campus-wide education about this is a challenge, and in practice many faculty, staff and students in classrooms may choose not to recycle to avoid the hassle.

  Staffing - The Recycling Crew is currently working at full capacity. Increased recycling volumes and/or new programs will require additional staff to accommodate increased workload. Increased staff will also require additional vehicles and likely additional processing equipment.

- **Compost**

  Food compactors - The current capacity only allows for dining hall composting. The university needs at least one more compactor to allow program growth and the possibility of including the cold compost stream from Housing. Dining Services currently foots the bill for hauling all composting, including some compost from events for other units on campus.

  Maintaining a clean compost stream – Educating students and other Dining customers on what is allowable in the compost is challenging. Contamination issues arise from items put in the compost that are actually trash or recycling.

  Housing cold composting - Tracking and capturing diversion numbers is a challenge. Staffing is a challenge.

[8] Solid Waste Assessment and Early Action Items Report, Section 1.2, SAIC, February 2012.
[9] Solid Waste Assessment and Early Action Items Report, Section 1.2, SAIC, February 2012.

- **Collection Bins and Bin Labels -** Since the inception of the Recycling Program in 1989, the types of materials collected and the degree of separation of materials into designated bins has varied widely. The configuration of the bins, the colors, and the labeling on the bins has not evolved as quickly as the collection philosophy. As a result, the look of the bins currently in the field and the labeling on them convey multiple mixed messages, which causes confusion for the users.

- **Outreach and Education -** There is currently no campus-wide consistency in the implementation of messaging to new and returning students, faculty and staff about waste reduction practices and the university's Zero Waste 2020 goals.

Early Action Item Recommendations and Key 2011-12 Accomplishments

Early action items are defined as steps that UCSC has a reasonable chance of beginning during FY 2012-13 that are consistent with the system wide Zero Waste policy and 75 percent waste diversion goal. The following recommendations stem from the foregoing data analysis and waste assessments.

UCSC's adoption of the following recommendations identified by the Waste Task Force and SAIC would have the highest potential impact on the achievement of the university's Zero Waste goals. Nearly all of the recommendations are interdependent with the first recommendation for the creation of a campus-wide Waste Reduction Coordinator position.

Please note that the projected "Potential Cost" estimates not based on formal cost analyses. This information is only to be used in terms of setting decision-making priorities. Implementation of recommendations would require further cost-benefit analysis.

Additionally, several recommendations outlined below have a 2011-12 Accomplishments description attached, which gives a brief overview of how the university has already started addressing the issue this year.

Top 7 Early Action Item Recommendations

Staffing: Hire a full-time campus-wide Waste Reduction Coordinator by FY 2013-14.

UCSC does not have a Waste Reduction Coordinator who focuses on the implementation of infrastructural improvements to waste reduction, or education and outreach for greater student and staff engagement. The duties that are typically associated with such a position are spread in an overlapping, disjointed, and frequently informal manner amongst several staff in several departments. A comprehensive job description for a full-time staff position needs to be drafted and approved. **Implementation of the recommendations below will require sophisticated coordination between departments by a committed full-time staff person.**

Potential Diversion Impact

Ease of Implementation

Potential Cost

* Annually

Education: Develop a waste reduction educational program as a requirement for all new students, staff and faculty campus-wide that is consistently implemented across all colleges and units. Message the campus more comprehensively about zero waste through a well-designed marketing campaign. Bolster existing education and outreach efforts at the ten largest waste generators to increase diversion.

Potential Diversion Impact

Ease of Implementation

Potential Cost

2011-12 Accomplishments in Education: The Colleges, Housing & Educational Services division is developing an educational plan to implement within Residential Life and Programs at the colleges, including development of a job description for a student position focused on providing peer to peer education on sustainability issues.

Funding Model and Fee Structure: Develop a model to transition the solid waste and recycling program to an economically sustainable cost and revenue model. Make strides toward the fuller inclusion of major cost components in the rates.

Potential Diversion Impact

Ease of Implementation

Potential Cost

2011-12 Accomplishments: Grounds Services received approval from the Direct Costing committee to utilize the non-federal model in its 2012-13 recharge packet: capital equipment expenses for operations may now be recovered within the recharge rate. This is a small first step toward creating a fiscal model that is more in harmony with the university's ability to achieve its Zero Waste goals.

Compost: Focus new waste reduction efforts on diverting food scraps and compostable paper towels from the waste stream. Continue to explore alternatives to our current dependency on an off-site compost facility. Expand compost collection campus-wide.

Potential Diversion Impact

Ease of Implementation

Potential Cost

None | < $25K | < $100K | **< $250K** | > $250K

2011-12 Accomplishments: UCSC Dining partnered with the McHenry Library Global Village Cafe and summer productions of Shakespeare Santa Cruz to add their food scraps to the compost stream.

Paper Towels: Re-evaluate supplying paper towels in residence halls, academic and administrative buildings. Implement alternative methods for hand drying and encouraging good hygiene for transmissible disease reductions.

Potential Diversion Impact

1 - Low | 2 | 3 | 4 | **5 - High**

Ease of Implementation

1 - Difficult | 2 | **3** | 4 | 5 - Easy

Potential Cost

None | < $25K | < $100K | **< $250K** | > $250K

2011-12 Accomplishments: The student organization Path to a Greener Stevenson and the Sustainability Office Zero Waste Team worked with the Associate Vice Chancellor of Colleges, Housing & Educational Services to pilot the removal of paper towels in a Stevenson College residence hall in Spring 2012. Prior to the removal of paper towels, each student in residence used an average of 6.5 paper towels per day.

Purchasing policies: Promote and implement purchasing practices that encourage waste reduction of packaging and specific material types, such as styrofoam. Ban the purchase of single-use plastic or bio-plastic water bottles.

Potential Diversion Impact

Ease of Implementation

Potential Cost

2011-12 Accomplishments: UCSC obtains 95% of its office supplies from two suppliers. Contracts were amended with both suppliers to reduce campus deliveries from five to three days per week. This has resulted in order consolidation, creating less packaging waste overall. UCSC has also realized reduced greenhouse gas emissions.

Expand indoor recycling service to administrative and academic buildings: Increase staff capacity to accommodate additional recycling pick-up duties for classrooms and offices.

Potential Diversion Impact

Ease of Implementation

Potential Cost

* Annually

Equipment Needs

The Loadman on board fork scale system is needed for all four front loader trucks. These units weight and record each dumpster pickup by location and populate a spreadsheet. This will allow accurate data regarding trash and recycling materials generated by location, as data currently gathered is very general. Two more trucks will remain to be fitted with the on board scale system at approximately $15,000 each.

2011-12 Accomplishments: Grounds installed two of the four front-loader refuse trucks with the Loadman on board fork scale system. This is a significant step toward accurately tracking the volume of waste at various dumpster locations across campus,which will help in determining target areas for educational initiatives.

Styrofoam Densifier: The campus community shows great interest in recycling styrofoam. Styrofoam is cumbersome to store due to it's bulky nature and light weight. We typically store loose diverted styrofoam until we have enough to justify transportation. A densifier compacts and compresses styrofoam into cubes which take up much less room in storage. With electrical installation cost could be $50,000 - $75,000.

Walking floor roll off boxes. Currently, bulk recycle materials collected by the recycle crew are dumped into a roll off box and held for sorting on the sort line to harvest CRV PET plastic, CRV aluminum cans, and CRV glass for high value marketing. Bulk recyclables are delivered in these roll off boxes to the sorting line. At the sorting line, the recyclables have to be raked off the back of the truck by hand. A "walking floor" roll off box has a hydraulically powered floor mechanism that moves the load rearward to dump the material onto the sort line hopper. Two or three walking floor roll off boxes @ $25,000 each plus hydraulic pumps for each of the two roll off trucks @ $7,000 each. Total project: $90,000.

Additional Recommendations for Future Consideration

- **Illegal Dumping**
  Explore options for discouraging illegal dumping on campus by outside community members and enforcing associated municipal code fines.

- **Purchasing**
  Develop a lifecycle cost analysis tool to be used consistently by all UC campuses.

  Create consistent standards for evaluating strategically sourced suppliers. Require ISO14001.

Give sustainability a minimum of 20% in a competitive bid evaluation. Develop strong and consistent attributes about sustainability that will translate to measurable, auditable contract language.

Work with an industry partner to research alternatives to styrofoam packaging.

Phase from 30% PCW (post-consumer waste) office paper to 100%. Define that this paper standard would only apply for office use and black and white printing. Use alternative paper fiber sources.

Education regarding sustainable purchasing: offer brown bag lunches and other training events to educate staff with purchasing power. Create a Learning Management System (LMS) program for sustainability to educate staff.

- **Policy**
  "Require all solid waste and recyclables transfer to Santa Cruz Landfill be done by Physical Plant. Doing so will reduce UCSC's liability for off-site transport of materials to the landfill, will result in greater logistical efficiency, and will allow UCSC to keep track of disposal and diversion more fully.

- **Program**
  Conduct pilot programs, including dorm chute closures, fee for single-use hot beverage containers at one or two coffee kiosks or other food service area (to promote waste reduction), and explore the potential to expand on-site composting in a decentralized manner. While these programs might not result in substantial diversion, they can help to encourage waste reduction."[10]

2011-12 Accomplishments: The trash chutes in the residence halls at Crown and Merrill Colleges were closed in Summer 2011 as a pilot program monitored by the Sustainability Office's Zero Waste Team students, and Porter College converted one of two trash chutes into a recycling chute.Waste assessments conducted by the students demonstrated positive results at all three colleges and Porter College will be expanding the dual-chute program to all of its residence halls in 2012-13.

- **Top 5 Education and Outreach Recommendations**
  Within the five recommendations outlined below, the Task Force would like to emphasize the importance of branding Zero Waste by creating consistent logos for use across campus, making the most of social marketing tools, and incorporating peer to peer education models where possible.

  1 – Move to dual-stream recycling: Educate the campus on how to properly use the two types of recycling bins for UCSC's dual stream recycling system ("Paper" and "Container").

  2 – Consistent messaging to new students during Welcome Week: Create an educational program or tool as a requirement for all new students campus-wide that is consistently implemented across colleges and units.

  3 – Residential Move-In and Move-Out: Educate new residents and their families on the best

[10] Solid Waste Assessment and Early Action Items Report, Section 2.2, SAIC, February 2012.

ways to reduce waste before coming to campus and upon moving out. Create consistent communication documents from all the colleges so that everyone receives the same message.

4 – Educating administrative, academic and lab buildings as well as summer Conference Services: Teach staff and faculty what the resources are for recycling on campus. Use Staff HR's Learning Management System software (LMS) as training tool.

5 – Compost: Educate about the impact of compostable materials on the campus waste stream and advertise the available composting resources on campus.

- **Metrics**
  "Review the California Department of Resources Recycling and Recovery's (**CalRecycle's**) accepted methodology for disposal-based accounting for local governments; enacted by statute, this newer methodology moves beyond the diversion-based accounting approach that the UCSC system still uses.

  Decide whether to use CalRecycle's current methodology. If yes, (a) calculate results in terms of total disposed waste and disposed waste per capita; (b) recommend that UCOP's reporting requirements reflect CalRecycle's accepted methodology.

2011-12 Accomplishments: After UC campuses meet the 75% waste diversion goal, UCOP will be moving toward using the disposal-based per capita (pounds of waste disposed per person) metric system.

Collect and analyze data regarding trash and recycling collection efficiency, in terms of cost per cubic yard of service capacity provided and cost per ton collected.

Collect and analyze cost/benefit data regarding pre-processing steps taken to produce commodities with higher market value.

- **Infrastructure**
  Upgrade rudimentary paper sorting system, to increase worker safety and operating efficiency. At the low end of the capital investment spectrum, the sorting system could use a large stationary sorting table or a basic moving sort line.

2011-12 Accomplishments: Grounds Services, with some assistance from a CRV funded grant, acquired a sorting conveyor belt system to increase the efficiency and capacity for separating and sorting CRV containers from the recycling stream to maximize material value.

Develop a schedule for replacing non-standardized exterior and interior collection containers, university-wide.

Articulate the need for a permanent location for materials aggregation and processing, including for recyclables and possibly organics (e.g., food scraps and compostable paper)."[11]

- **Staffing**

"Evaluate and propose ways to hire more student employees and involve more student volunteers in waste reduction and recycling outreach, operations, and research (including the feasibility of centralized on-site processing of food scraps; and an evaluation of a rental program for re-usables, a la UC Davis' "Aggieware").

2011-12 Accomplishments: The Student Environmental Center (SEC) and the Sustainability Office's Zero Waste Team teamed up with the Ethnic Resource Centers to pilot the use of re-usable dishware for all of their events and programs. Dining Services will be providing dishwashing services in support of the program. Full roll-out of this program is anticipated for Fall 2012.

2011-12 Accomplishments: A Zero Waste Event Planning resource was co-created by the student Zero Waste Team and the Student Environmental Center, which is available as a resource for stakeholders campus-wide on the Sustainability Office webpage at http://sustainability.ucsc.edu/zero-waste-event

- **Communications**

Develop consistent signage (stickers, posters, signs, etc.) for use campus-wide.

Re-sticker all bins." [12]

2011-12 Accomplishments: Grounds Services has standardized containers across campus and re-designed sticker labeling to include consistent messaging and graphics. The bin lids were replaced to conform to a color-coding of blue for glass, plastic and aluminum containers and gray for paper. It is anticipated that all of the outdoor bin lids and stickers will be updated by Fall 2012 Residential Move-In to coordinate clear messaging to the new student population.

"Maintain and review annually the recycling website to reflect the most current list of reusable or recyclable materials accepted and their proper preparation. Link the site to appropriate pages on the Office of Sustainability's website. Consider using recycle@ucsc.edu as a link, rather than using an individual's email, to help with brand identification and to avoid having outdated contact information. Encourage users to call the telephone number that appears on the recycling stickers.

[11] Solid Waste Assessment and Early Action Items Report, Section 2.2, SAIC, February 2012.
[12] Solid Waste Assessment and Early Action Items Report, Section 2.2, SAIC, February 2012.

Develop clear responsibilities and protocols for responding to waste reduction and recycling inquiries campus-wide, and communicate the content through the Office of Sustainability's website and via the establishment of a recycling hotline (using the telephone number printed on recycling stickers).

Developing an overall vision, strategy, and plan for effective communications about waste reduction and recycling will help UCSC to approach its zero waste and broader sustainability goals. While this work could be developed over the summer, early action items (a) through (d) above should be developed sooner." [13]

Conclusion

UCSC has made great strides in working towards the UC systemwide goal of Zero Waste by 2020. As capital construction on campus slows down, it will be more difficult to achieve high waste diversion rates. The university has reached the point where additional resources are needed for advancing strong waste reduction practices and diverting materials from the waste stream. In order for the university to continue to reduce the contents of its landfill waste and eventually achieve the Zero Waste goals set by UCOP, the administration will seriously consider implementing the infrastructural and staffing recommendations outlined within this report.

[13] Solid Waste Assessment and Early Action Items Report, Section 2.2, SAIC, February 2012.

References

SAIC. Solid Waste Assessment and Early Action Items Report, February 2012.

SAIC. UCSC Early Action Report Presentation, March 2012.

UCSC Office of the Provost and Executive Vice Chancellor. Landfill and Solid Waste Diversion funding letter, April 2012.

Appendices

See Accompanying Documents

Appendix A - Landfill & Solid Waste Diversion Task Force Charge Letter
Appendix B - Zero Waste Team Student Pilot Projects Summary 2011-12
Appendix C - SAIC Solid Waste Assessment and Early Action Items Report
Appendix D - Ecology Action UCSC Residential Recycling Implementation Plan
Appendix E - UCSC 2010-13 Campus Sustainability Plan
Appendix F - UC Sustainable Practices Policy