



# ZERO WASTE REVOLUTION

2015-2016 School Year

## MONTHLY REPORT • MAY

### End-of-School-Year summary

The month of May was spent wrapping up a very busy and productive school year. No new initiatives – just the relentless daily pursuit of Zero Waste, Lanikai-style.

#### Visitors

Principal **Anela Pia** from Sunset Beach Elementary journeyed from the North Shore to spend a day observing our operations in action. Sunset Beach has a paid part-time Sustainability Coordinator on staff, but they are struggling to get both worms and hot composting up to scale. One tough issue the rural schools face is destruction from wild pigs coming down from the hills.

Parent volunteer **Lindsey Pomeroy** from nearby Ka'elepulu Elementary also visited and even pitched in to help. This very manageable Enchanted Lake school has only 184 students and is eager to emulate Lanikai's example. Lanikai 6th graders have been volunteered to assist to conduct a waste audit shortly after school starts up again August 1st.

#### Videos

The mini-video featuring Jack Johnson at Lanikai School is posted on the Sustainable America website and is making the rounds on the mainland.

Gabe Cabagbag showed us the rough cut of our own video that he has been working on. It was very pretty, with gorgeous cinematography and inspiring interviews, but didn't quite capture the Zero Waste Revolution experience, which is not just a dreamy vision but a hard-core fully operational system that utilizes very specific tools to produce measurable results. Only half of the \$15,000 grant has been spent, so we have asked to work with him to provide a more detailed narrative.

HOT COMPOST RECORD											
START: 2/29/16			START: 4/1/16			START: 4/18/16			START:		
Date	Pounds Food	Temp	Date	Pounds Food	Temp	Date	Pounds Food	Temp	Date	Pounds Food	Temp
2/29	140	80°	4/1	184	85°	4/18	209	85°			
3/4	214	150°	4/8	231	156°	4/22	193	162°			
	354			415			402				
3/9	110	162°	4/16	123	172°	4/29	172	168°			
	464			538			574				
3/11	140	165°	4/27	185	168°	5/6	216	166°			
	604			723			790				
3/15	136	170°	5/3	212	158°	5/19	219	168°			
	740			935			1,009				
3/26	78	170°	5/27	195	160°	5/27	145	172°			
	818			1,130			1,154				
	Pau!			Pau!			Pau				
HARVEST: 9/24/16			HARVEST: 11/27/16			HARVEST: 11/27/16			HARVEST:		

Green and Vermilion, the last two hot compost piles completed in May, processed well over 1,000 pounds of food waste each.

## Bottom line for May & more

This report completes the school year with the addition of the period between May 1 and May 31, 2016. There were 19 school days during this month, packed with May Day celebrations, Awards and 6th Grade Promotion ceremonies, numerous field trips hither and yon – everyone was eager to close out the year. All remaining garden crops were harvested, beds cleaned out and mulched to rest over the summer.

During this interim **1,550 pounds** of food waste was collected and processed via vermicomposting and hot composting technologies, adding up to of **7,477 pounds** this semester, and totalling **14,568 pounds** for the 2015-2016 school year. **Landfill diversion rate: 100%**.

- 100% of all HI-5 cans and bottles were collected. Average HI-5 count is 20 per day or 100 items per week. Many mahalos to custodian Jeff Mizuno who cleans, crushes, and transports the cans and bottles for redemption at the Waimanalo recycling station, a humbug, time-consuming task far more valuable than the 5¢ he gets to keep for every can. Uncle Jeff's service is much appreciated.
- Only 75% of all paper and cardboard waste was collected and processed. Clearing out files and classrooms at the end of the year generates a tsunami of workbooks, notebooks, bulletin board art and other items beyond current processing capacity. Lamination is rampant – none of this can be reclaimed. Because Sort-It-Out Sam has been collecting paper daily, paper piles were noticeably smaller than last year. Paper accumulated but not processed will be shredded over the summer.
- 100% of all green waste was recovered. The tumbler technology is working very well. Two more tumblers have been approved although delayed because Amazon will not ship them here and they are sold out at Costco (one of the few persistent disadvantages of life in Hawaii). The pile of palm fronds, corn stalks, branches and other big chunks will be chipped when the tree trimmers come over the summer. The eleven truckloads of mulch dumped at the beginning of the school year have nearly all been used for composting and mulching bald muddy spots around the campus.



*Our composting worm Perionyx excavatus is well-known as a traveler, taking advantage of rainy nights to set out to seek new sources of food. These guys showed up in the tumblers, 200 feet from the nearest worm bin.*

## Sales of recovered products

In addition to the health and environmental benefits of landfill diversion, mountains of rich soil and fertilizer for gardening and landscaping, and abundant educational opportunities, Resource Recovery also raises revenue. Sales of surplus worms, worm bin bedding, vermicast, compost, bokashi starter, and vermicast tea totaled **\$3,070.60** this school year. This can potentially double, now that a base of repeat customers has been established. The stated goal was \$6,000 for 2016 – can do! All monies raised support the garden.

## Recovery: 2nd semester and 2015-2016 data

<u>Week of</u>	<u>Vermicomposting</u>	<u>Hot Compost</u>	<u>Bokashi</u>	<u>Weekly Total</u>
1/11/2016	176 pounds	294 pounds	0 pounds	470 pounds
1/18/2016	108 pounds	155 pounds	0 pounds	263 pounds
1/25/2016	149 pounds	243 pounds	0 pounds	392 pounds
<b>TOTAL January</b>	<b>433 pounds</b>	<b>692 pounds</b>	<b>0 pounds</b>	<b>1,125 pounds</b>
2/1/2016	137 pounds	283 pounds	0 pounds	420 pounds
2/8/2016	170 pounds	241 pounds	0 pounds	411 pounds
2/15/2016	114 pounds	258 pounds	0 pounds	372 pounds
2/22/2015	186 pounds	198 pounds	0 pounds	384 pounds
<b>TOTAL February</b>	<b>607 pounds</b>	<b>980 pounds</b>	<b>0 pounds</b>	<b>1,587 pounds</b>
2/29/2016	159 pounds	354 pounds	0 pounds	513 pounds
3/7/2016	168 pounds	250 pounds	0 pounds	418 pounds
3/14/2016	0 pounds	136 pounds	0 pounds	136 pounds
3/21/2016	64 pounds	78 pounds	0 pounds	142 pounds
3/28/2016	108 pounds	184 pounds	0 pounds	292 pounds
<b>TOTAL March</b>	<b>499 pounds</b>	<b>1,002 pounds</b>	<b>0 pounds</b>	<b>1,501 pounds</b>
4/3/2016	128 pounds	231 pounds	0 pounds	359 pounds
4/10/2016	142 pounds	123 pounds	0 pounds	265 pounds
4/17/2016	153 pounds	402 pounds	0 pounds	555 pounds
4/24/2016	178 pounds	357 pounds	0 pounds	535 pounds
<b>TOTAL April</b>	<b>601 pounds</b>	<b>1,113 pounds</b>	<b>0 pounds</b>	<b>1,714 pounds</b>
5/1/2016	160 pounds	216 pounds	0 pounds	376 pounds
5/9/2016	137 pounds	212 pounds	0 pounds	349 pounds
5/15/2016	125 pounds	219 pounds	0 pounds	344 pounds
5/22/2016	141 pounds	340 pounds	0 pounds	481 pounds
<b>TOTAL May</b>	<b>563 pounds</b>	<b>987 pounds</b>	<b>0 pounds</b>	<b>1,550 pounds</b>
<b>TOTAL, Jan. thru May 2016</b>	<b>2,703 pounds</b>	<b>4,774 pounds</b>	<b>0 pounds</b>	<b>7,477 pounds</b>
<b>TOTAL, Aug. thru Dec. 2015</b>	<b>2,264 pounds</b>	<b>4,177 pounds</b>	<b>650 pounds</b>	<b>7,091 pounds</b>
<b>TOTAL, 2015-16 School Year</b>	<b>4,967 pounds</b>	<b>8,951 pounds</b>	<b>650 pounds</b>	<b>14,568 pounds</b>

## Food collection analysis

### Separation Station

Food waste collection improved greatly this year. The lunchtime Separation Station set-up and procedure was tweaked several times to accommodate new washables and to discover the best way to use easily-distracted 6th graders. Mr. Sawyer is always looking for ways to increase efficiency. Since food waste collection is the single most important – and challenging – aspect of Resource Recovery, it deserves continued vigilance.

### Events

While there were some serious slips the first half of the school year (Halloween, Fiesta Friday Dance, Fall Festival), by January consciousness was raised to the point that organizers of ALL special events, classroom parties, performances, etc., properly collected food waste. (A 4th grader on the Big Island field trip was reported to have complained, “What are we supposed to do with these lunch leftovers? There’s no compost buckets here!”) There is much work to be done to eliminate single-use items at events and parties. With a dishwasher on site next year, the time it takes to wash reusable plates, cups, and forks will be minimal. No excuses.

Total food waste collected at lunch and events: **12,748 pounds**,  
88% of the total of **14,568 pounds**.

### Sort-It-Out Sam

Sam still has issues with food waste landing accidentally in his belly but overall he performed admirably, collecting **1,820 pounds** of snack waste, just over 12% of our total.

- Average pounds of food waste processed weekly: 383.4 pounds.  
Last year: 356.6 pounds
- Average pounds of food waste generated daily: 80 pounds.  
Last year: 77.9 pounds

The slight jump of a few pounds daily likely reflects more efficient collection rather than an increase in waste generation. *Our total Resource Recovery activity increased **41%** over the 2014-2015 School Year!*

## Food waste processing analysis

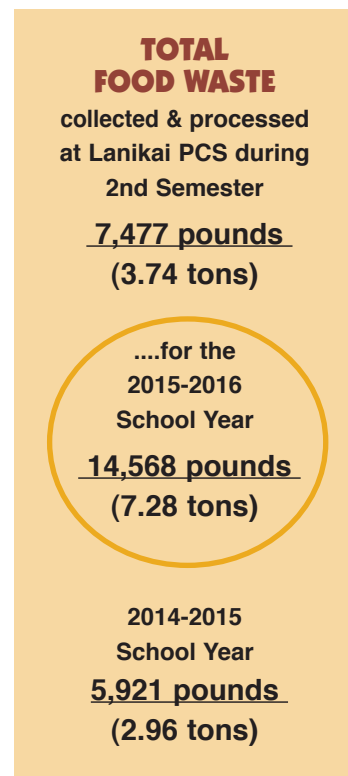
In the second half of the year, we did no bokashi fermentation.

- Worms processed 36% of food waste, primarily kitchen prep.
- Hot composting accounted for 64% of food waste from plate scrapings, home lunch and snacks.

For the entire 2015-2016 school year

- Worms processed 34% of food waste.
- Hot composting processed 62% of food waste.
- Bokashi fermentation processed 4%.

*Although worms process only a third of our total food waste, they break down roughly 75% of all school paper and cardboard.*



# HISTORY of our HOT COMPOST PILES



START DATE: 1/11/16

Date Pounds Food Temp

1/11 152 80°  
1/15 +142 158°  
1/21 294 +155 168°  
1/25 +93 172°  
2/8 542 +90 146°  
2/19 632 +213 148°  
**845**

START DATE: 1/28/16

Date Pounds Food Temp

1/28 150 80°  
2/1 +145 154°  
2/4 295 +138 168°  
2/11 433 +151 168°  
2/19 584 +45 160°  
2/25 629 +198 160°  
**827**

START DATE: 2/29/16

Date Pounds Food Temp

2/29 140 80°  
3/4 +214 150°  
3/9 354 +110 162°  
3/11 464 +140 163°  
3/22 604 +136 170°  
3/26 740 +78 170°  
**818**

START DATE: 4/1/16

Date Pounds Food Temp

4/1 184 85°  
4/8 +231 156°  
4/15 415 +123 172°  
4/20 538 +185 168°  
5/13 723 +212 158°  
5/27 935 +195 160°  
**1,130**

START DATE: 4/18/16

Date Pounds Food Temp

4/18 209 85°  
4/22 +193 162°  
4/29 402 +172 168°  
5/6 574 +216 166°  
5/19 790 +219 168°  
5/27 1,009 +145 172°  
**1,154**

Total food waste hot composted during Second Semester: **4,774 pounds (2.39 tons)**

Total food waste hot composted during the 2015-2016 School Year: **8,951 pounds (4.48 tons)**

HARVEST DATE: 8/19/16

HARVEST DATE: 8/25/16

HARVEST DATE: 9/26/16

HARVEST DATE: 11/27/16

HARVEST DATE: 11/27/16



## What's working and what needs work

*Lanikai Learners are the only students on Oahu who sort and separate their waste so that it can be returned to the cycle of life rather than be burned or buried.* This exemplary daily habit is now part of the culture of Lanikai School. Student participation will continue to be finessed. Some of this year's Zero Hero Service Activities worked better than others. The limiting factor is **time**, both as it eats away the hours in a school day and defines a child's attention span. We will continue to explore practical, fun, meaningful ways for kids to take an active part in Resource Recovery operations and to build their understanding and appreciation of Zero Waste practices and principles.

Collecting and processing resources has settled into a ho-hum routine. The technologies are tried and true, the results consistent and predictable. After a year and a half, our Zero Waste ecosystem is firmly established and running exceptionally well.

Composting worms continue to be abundant, quiet and industrious, absorbing literally tons of food, paper and cardboard. There were two harvests this school year, each yielding 550 pounds of rich, valuable vermicast, a total of 1,100 pounds.

Hot compost piles continue to cook away like clockwork. This year 4th graders harvested nine piles, about one per month, with an average yield of 1.5 cubic yards each, approximately 13.5 cubic yards of beautiful premium compost. The amount of food waste in each pile was increased from 500 pounds to 800+ pounds, with the last two piles of the year topping off at over 1,100 pounds just for fun. With this increase, we can pare down to eight piles – rather than ten – saving burlap costs, time and effort.

With the high demand for our vermicompost and compost, bokashi fermentation was temporarily abandoned this semester. At Pearl City High, where massive amounts of meat waste were generated in a single meal, bokashi was an absolute necessity. At Lanikai it's an option since animal protein is used sparingly and can easily be folded into hot compost. Because Lanikai is the model school, however – and it's important to show all technologies in action – bokashi will be demonstrated but likely cut back to only one or two batches a year.

Same with the Tinman and biochar production – this is a wonderfully educational technology but optional. Perhaps during the school year the Tinman will be fired up once as a demo and to create a batch of biochar for science experiments, but biochar is too complex, messy, and time-consuming for routine use.

Lanikai School's treatment of organic waste is commendable, and thanks to One Love Cafe with the support of the LSO, food service single-use items will soon be history. The weakest area is snack policy. One can debate the health, cultural, or social implications of the incessant sweets and treats that are an entrenched feature of modern school life, but strictly from a waste management perspective, snacking is out of control. While it may be inappropriate to question parents' right to feed their kids any way they choose, if you have committed to a Zero Waste campus, some restriction of packaging (zap the Ziplock, RIP rigid plastic) might be acceptable. Hopefully, some action in this area can be addressed in the next school year.



*Mylar (above) may be up-cyclable, but soft and rigid plastics must be trashed and will remain in the environment causing damage forever. Can students and parents accept a voluntary ban on these items?*

## Summary of accomplishments

*The following list summarizes program highlights from January 7 – the first day of Second Semester – through May 26, 2016, the last day of the 2015-2016 School Year.*

### **100% food waste diversion achieved**

Food waste collection maxed out at 100%; student participation well-established. Submitted collection data and project narrative to EPA's Food Recovery Challenge.

### **100% food waste recovery achieved**

Processing food waste via hot compost and vermicomposting maxed out at 100%. Sales of surplus recovered products initiated.

### **100% green waste diversion achieved**

Activated and expanded green waste collection and processing operation.

### **January planting of AINA gardens & more**

Record crop vigor and productivity with 100% campus-produced inputs. No issues with pests or diseases. LC Papaya Orchard, Hawaiian Native Plants Garden, & Sunflower Patch established.

### **Soil restoration continues**

Added 2nd layer of mulch – six tons – to front schoolyard. Two more layers to go. Sheet mulched several smaller bald areas.

### **Events, tours and workshops**

- Hosted Oahu Food Waste Summit, facilitated by Wendi Shafer, EPA District 9.
- Lanikai Teacher's Tour, developed *A Teachers' Guide to the Zero Waste Revolution*.
- Tour with State House Representative Chris Lee and Surfrider Foundation.
- Tour with Green House founder Betty Gearen and compost sensei Evelyn Giddings.
- Workshop with GoFarm Hawaii participants.
- Tour with Kyle Comforth from Edible Schoolyards.
- Tour and training with Marlen Sommers of Ho'omau Ke Ola, Waianae.
- Tour with Anela Pia, Principal of Sunset Beach Elementary School.
- Tour and training with Lindsey Pomeroy from Ka'elepulu Elementary.

### **Video projects, presentations**

- Sustainable America produced a video distributed on mainland websites featuring Jack Johnson's visit to Lanikai School.
- Gabe Cabagbag produced and submitted rough cut of Lanikai's Zero Waste video.
- Green Team members presented "How Zero Waste Creates Magnificent Gardens" at the We Grow Hawaii School Gardening Conference.

### **Community outreach**

- Organized and implemented "Zero Waste Event courtesy of Lanikai School" for the Windward District Spelling Bee and Hawaii Public Radio's Spring Pledge Drive.
- Assisted Kailua Intermediate School, Kainalu Elementary, Palolo Elementary, and Kaimuki Middle School to resolve worm bin problems and hot composting issues.

### **Funding**

- Oahu Resource Conservation and Development Council was awarded a \$40,000 private gift from Steve and Marilyn Katzman for staffing the Zero Waste Revolution January through December of 2016.
- LSO approved \$6,000 to fund the purchase and installation of a commercial dishwasher.
- A grant of \$1,000 was awarded by Kokua Hawaii Foundation for the purchase of a greenhouse.
- Two full scholarships were awarded for Mr. Sawyer and Ms. Espie to attend 5-day Edible Schoolyard Academy in Berkeley this summer. Kokua Hawaii Foundation kicked in additional funds to cover travel expenses.

## Ms. Mindy's To-Do List for June & July

- Present *Food Waste Reduction in Schools Webinar* – national! – on June 15th, a peer-to-peer exchange facilitated by the U. S. Environmental Protection Agency.
- Continue near-daily nurturing of worm colonies, compost piles and green waste breakdown operation. Cull surplus worms from Big Blue to wholesale to Kokua Worms. Harvest Mulberry Gang bins in late July.
- Meet with Representative Chris Lee, Farm-to-School Coordinator Robyn Pfhal, Surfrider Foundation and others in positions of influence who can provide guidance for financing and expanding this program into the future. Follow all leads.
- Work with Ed Souza to modify the Tinman (no smoke) and produce several batches of biochar at Ed's Waimanalo site. Vermicast tea inoculated biochar will go into the next layer of mulch on the front schoolyard.
- Recycled water is used to irrigate the lawn at Ewa Makai Middle School. Explore the possibility of finding expertise and funding for a gray water system to recycle water from the kitchen to underground irrigation pipes installed under all the new soil.
- Contact tree trimmers to dump six more tons of mulch to spread in front schoolyard.
- Sheet mulch and prepare the far makai strip of campus for a pumpkin patch to be planted in mid-July in time for Halloween!
- Sheet mulch the final few areas not completed over the school year.
- Write, develop, and print *A Parents' Guide to Zero Waste at Lanikai School*. Also prepare an online version.
- Harvest compost piles Red and Pink, due mid-June. Recruit harvest team among those from other schools learning our methods.
- Assist Friends of the Library to Zero Waste their Book Sale at McKinley High.
- Advise St. Andrew's Schools on vermicomposting system. Prep site and install Pipeline bin and donated worm colony.
- Set up new Pipeline bin at Kainalu Elementary and help transfer their box bin worms late July.
- Work with cinematographer Gabe Cabagbag to tighten up the narrative on the video.
- Finish shredding all the paper backlogged in the library.
- Print a giant-sized poster of the Lanikai School Campus Ecosystem and create a display including information on collection on the corkboard on the back wall of the cafeteria.
- Meet with Marsha Hee of Recycle Hawaii to share ideas when she visits Oahu from the Big Island in July.
- Research the possibility of upcycling mylar locally. TerraCycle collects mylar from 83,000 schools on the mainland, so this material is a valuable resource for someone, somewhere. Can we weave it to make trick-or-treat or gift bags? Can the shiny side be used to make a solar oven, a windshield heat reflector?

**Monthly Reports will not be prepared for June and July.  
A Summer Summary will appear in the August edition.**