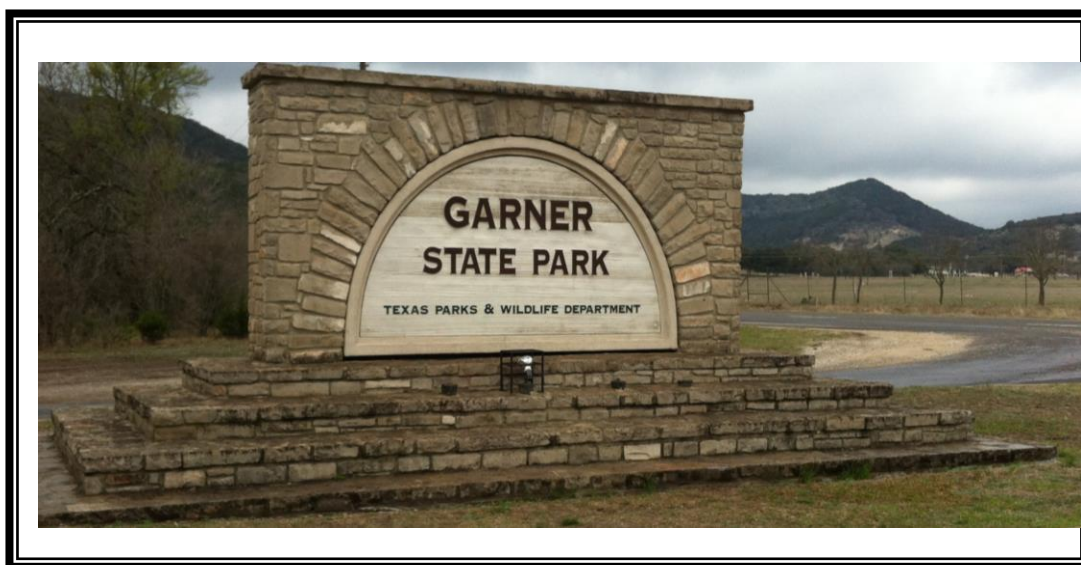


Garner State Park

2014 Spring Break Waste Audit



Garner State Park Waste Audit Pilot Project

March 12-14, 2014

Participants and Contributors:

Friends of Garner (FOG)
 Garner State Park (GSP)
 GeoFORCE, Jackson School of Geoscience, UT Austin
 Keep Utopia Beautiful (KUB)
 Texas Parks & Wildlife Department (TPWD)
 Cooperative Teamwork & Recycling Assistance (CTRA)
 State of Texas Alliance for Recycling (STAR)
 Keep Texas Beautiful (KTB)
 Utopia Independent School District (UISD)



"Helping to make our parks better"

T-Shirts Provided by GeoFORCE
 Photo courtesy of Claudia Rogers, KUB

Objective

The objective of this waste audit was to determine the nature and volume of materials currently going into the landfill that could be recycled using existing or new collection systems at Garner State Park. This project also recorded attitudes, behaviors and beliefs about recycling held by park visitors, staff, and hosts. Each of these groups plays an important role in the success of current or future recycling programs. This report will be used to share information and to make recommendations for optimizing recycling systems at GSP and may be used as a model for future waste audits and recycling program development at other TPWD State Parks, Natural Areas and Historic Sites.

History

KUB helps with recycling at GSP and was asked by FOG to process aluminum for sale as their can-crusher had failed. Subsequently, KUB assisted FOG with submission of a solid waste grant request for a new can-crusher that was not funded. Discussions continued between KUB and FOG to explore best practices for recycling in other state parks. TPWD reported that there is a minimal amount of recycling in other parks. Two state parks making an effort to recycle are in the area served by Utopia Recycles, a drop-off collection center operated by KUB. In the summer of 2013, KUB approached Rick Meyers, Superintendent of GSP and FOG about conducting a waste audit to document the need for recycling at Garner in order to promote recycling efforts and reduce waste hauling as well as to create more sustainable waste management practices and plans for state parks. At the same time, KUB asked CTRA to identify other rural recycling centers near TPWD Parks, Natural Areas and Historic Sites. By linking recycling centers with TPWD sites, recycling could help to support the sustainability goals of TPWD and increase the volumes of recyclables processed by the recycling centers. There is a long way to go to make recycling in rural Texas parks a reality but the model created by KUB, GSP, and FOG could be used to bring more TPWD sites on board with local recycling efforts.

Current Park Recycling Performance

Currently, cardboard from the GSP stores and offices is being transported 15 miles to Utopia Recycles. Plastic and aluminum is being processed from Lost Maples State Park also 15 miles away. All organizations involved in these recycling efforts rely heavily on volunteer labor. FOG volunteers

are responsible for collection of aluminum at GSP. Aluminum cans are collected in 66 wire bins, clearly marked with the recycling symbol and “Aluminum Cans Only” signs. Aluminum cans are hauled two to three times a year by FOG, at personal expense of FOG volunteers, to a metals recycling facility in San Antonio or Uvalde. In 2013 FOG recycled 4,665 lbs of aluminum. FOG uses the recycling revenue to support equipment purchases for use in the park.

At the time of this audit, waste is hauled from the park 3 days a week from seventy 3-yard dumpsters at an expense of \$160K - \$170K a year. Waste is hauled to LaPryor, about 60 miles from GSP. Seasonal adjustments in waste hauling are made, according to park usage, of one, three or five pick-ups per dumpster per week. The seven spring and fall months have pick-ups of three times per dumpster per week; June and July have five pick-ups per week; and December, January and February have only one pick-up per week.

Methodology



Photo courtesy of Sara Nichols - STAR

GeoFORCE University & High School students, under the direction of KUB, performed three audit tasks:

1. Sorted and categorized material from eight dumpsters, slightly more than 10% of total park dumpsters that
 - a. represented seven park areas
 - b. represented five park-user types
2. Interviewed 36 park visitors, staff, Hosts, and FOG volunteers and
3. Observed 25 occurrences of park visitor behaviors related to waste disposal

Table 1. Sorted Dumpsters

Number	Area Name	Area Use
#1	Pecan Grove Site 73	Tent Camping
#2	Oakmont Pavilion	Store, Snack Bar, Dance Floor
#3	Cabins #17	Cabin Camping
#4	Oakmont Rock Beach	Day Use
#5	Rio Frio between Sites 452 and 454	Recreational Vehicle Camping
#6	Shady Meadows Site 108	
#7	Cabins #13	Cabin Camping
#8	Oakmont Site 23	Recreational Vehicle Camping

The dumpsters were selected and tagged prior to arrival of the waste auditors. Dumpster selection was made based on representative locations for usage such as day use, tent camping, recreational vehicle, screened shelter, cabin camping, and the snack bar and store.

Table 2. Waste Sort Material Categories

Category Name	Examples
Aluminum	Beverage cans
Cardboard and pasteboard	Corrugated and pasteboard boxes
Glass	Beverage bottles and food jars
Other Metal	Camp chairs and aluminum foil
#1 Plastic bottles	Water and soda bottles
#2 Plastic bottles	Milk, water and juice jugs
Plastic bags & #3-#7 plastic	Plastic bags, case wraps and #3-#7 bottles and tubs
Steel cans	Food cans
Garbage	Food waste, diapers, unrecyclable packaging, paper and recyclables deemed too dirty to recover

Categories were selected based on most common materials found in a park/camping setting. Recyclable materials were sorted into material types that were easily identified and reasonably clean enough to recycle. Garbage included food waste, dirty materials and diapers.



Photo courtesy of Sara Nichols - STAR

As dumpsters were emptied, each material was sorted with like materials into five-gallon buckets. The number of buckets of each material was tallied per dumpster and then aggregated. This method allows for quick analysis of the materials taking up the most space in the landfill-bound waste stream, see Chart 1a.

Average weights per material per bucket were calculated and, though not significant for purposes of the waste sort study, the total material percentages by weight can be found in Chart 1b.

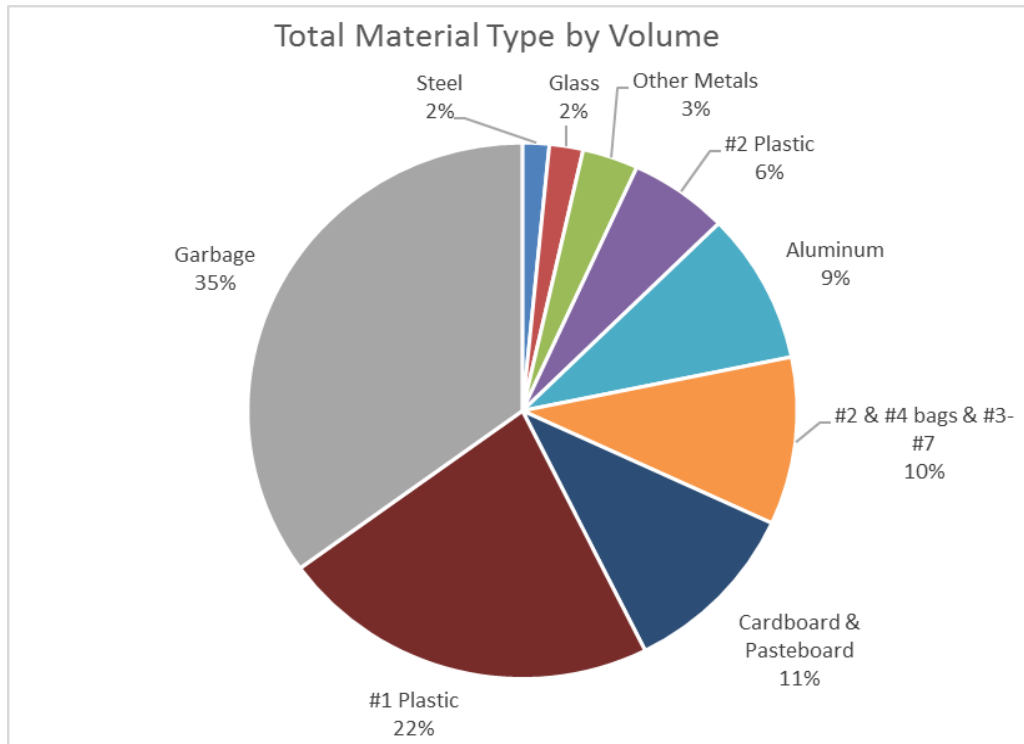
See Appendix I for the Talley Sheet.

Key Findings

By volume, true garbage, material that is not recyclable or not in the condition required for recycling, accounts for 35% of the landfill-bound waste. A majority (65%) of the materials currently headed to the landfill are potentially recyclable.

Results of Waste Sort

Chart 1a.



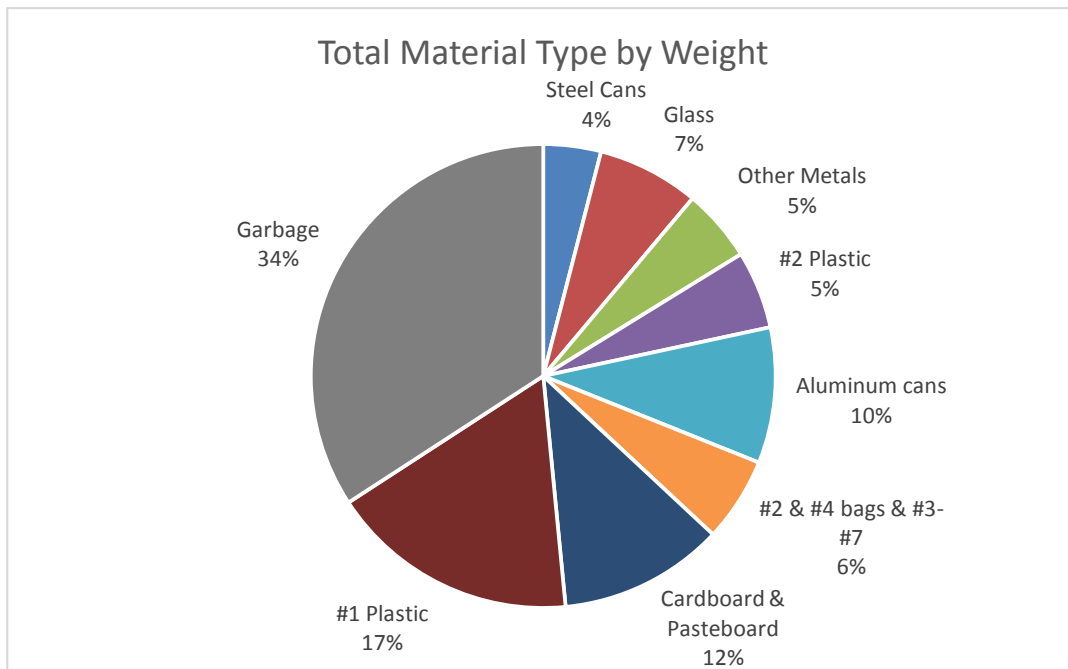
The highest volume of recyclables found was #1 plastic which includes water and soda bottles. This audit occurred in March during Spring Break when the park was host to some 1,600 overnight and 1,000 day-use visitors each day. The daytime temperatures during the audit were in the 60s and 70s with nighttime temperatures dropping into the 30s. Had the audit occurred during the more than six months of the year when there are much higher daytime and evening temperatures, there would have been significantly more plastic beverage containers. The concessionaire reports selling an average of 500 single-use water bottles per day for approximately nine months of the year. This alone sends 135,000 water bottles into the garbage hauled to the landfill and does not take into account the plastic soda bottles purchased in the park or the water and soda bottles brought into the park by visitors.

The dumpsters containing the highest percentages of aluminum were #2 from Oakmont (store, snack bar) and #5 Rio Frio (recreational vehicle camping). FOG currently collects aluminum for recycling, and maintains wire collection bins located next to dumpsters in these two areas as well as all other areas in the park. In all there were twelve and a half 5-gallon bucketsful of aluminum cans recovered by auditors for FOG from the dumpsters. In most cases there were no cans or very few cans in the wire bins next to the tagged dumpsters.

Waste auditors planned to sort and categorize paper before the audit started, however, as the audit got underway, it became clear that paper was present in negligible volumes and was not clean enough to be recycled anyway. All paper found was therefore categorized as garbage.

Chart 1b.

By weight, 66% of the nearly 354 pounds of material sampled is recyclable. Some material types have a lot of variability in weight such as “other metals.” For example, a discarded cooking pot has a significant weight and size difference from pie tins so the average weights are less likely to be consistent bucket to bucket. However, most material types are consistent in size and shape including the highest volume item, #1 plastic bottles.



“As an auditor I was most surprised by the amount of recyclable material just being thrown away as trash. While interviewing park visitors, it seemed as if most believed in recycling and were disappointed that recycling wasn't a top priority.”
Senayda Saucedo, GeoFORCE HS Student

Audited dumpster volumes ranged from 15% to 40% full with the average of the eight dumpsters being 25% full by volume. The average weight was slightly more than 44 lbs. per dumpster. A 3-yd dumpster can hold an estimated weight of 525 lbs. of regular, uncompacted household waste, but at the audited weights, a full dumpster would be only 176 lbs. at GSP.

Regardless of the size of the load in each dumpster, the percentages of garbage and recyclable materials by volume and by weight were surprisingly similar.

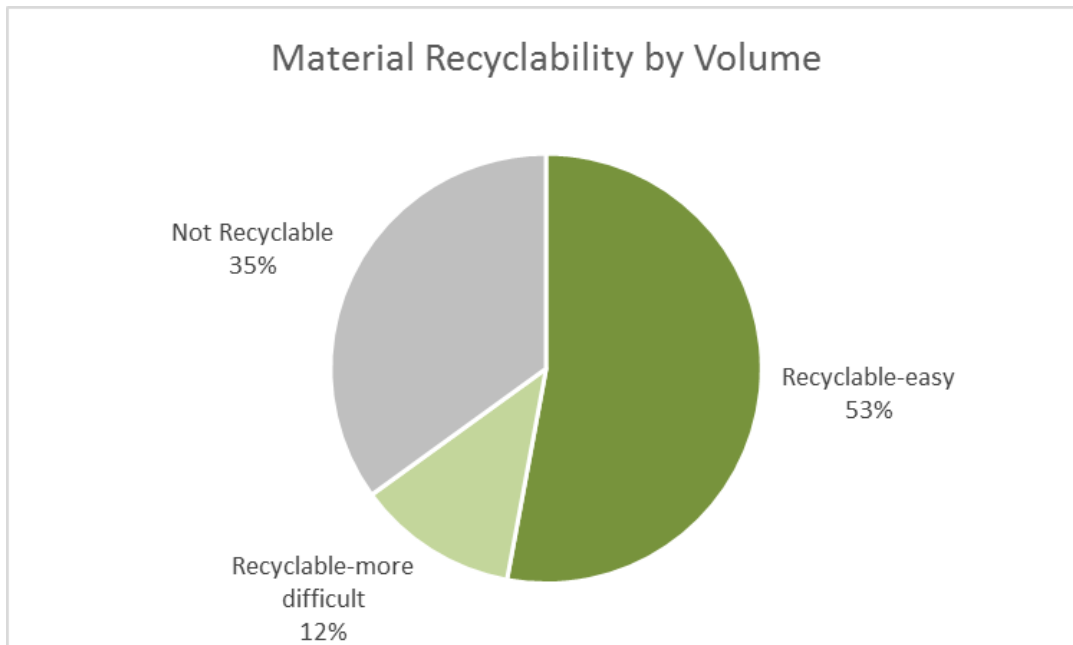


“I found that the park visitors are not using the recycling opportunities to their full potential both because they are unaware of the benefits to the park and even that such opportunities exist.”
Sarah Berlanga
GeoFORCE University
Student - TAMU

Photos courtesy of Claudia Rogers - KUB

Chart 1c.

Easy to recycle items account for 53%, by volume, of all waste in the eight dumpsters. The easy to recycle items include clean cardboard, pasteboard, steel cans, aluminum beverage cans, other scrap metals, and #1 and #2 plastics. These materials are readily recycled wherever a full-service recycling center operates. Non-recyclable or difficult to recycle waste account for 47% by volume sampled.



Some recyclable items are more difficult to recycle given limited recycling markets. For this study, plastic film, #3 - #7 plastic containers/packaging and glass fall into this category. However, these harder-to-recycle items comprise only 12% of the total by volume and about the same percentage by weight.

More than fifty percent of the waste collected in the park is determined to be easily recyclable. There is a recycling center within a few miles of the park that processes these materials. It seems that efforts might be made to divert the easily-recycled materials from the waste stream destined for the landfill and redirect them to the recycling facility.

As Sheriff R.E. Cycle says, "Recycle the trash and turn it into cash"!



Sheriff R.E. Cycle - Recycling Mascot for San Antonio Joint Base (Lackland AFB)
GeoFORCE Waste Auditors
Photo Courtesy of Claudia Rogers – KUB

Results of Interviews

GeoFORCE auditors conducted 36 interviews with park visitors, hosts, staff and volunteers. An overwhelming majority of those interviewed expected state parks to recycle. Even park visitors that reported that they did not recycle at home expected to see recycling containers available at the park.



GeoFORCE Interviewers with GSP Employee and Park Visitors

Photos Courtesy of Rachel Hering – CTRA & Claudia Rogers - KUB



Chart 2a.

When asked, park visitors resoundingly said that they expect state parks to offer recycling.

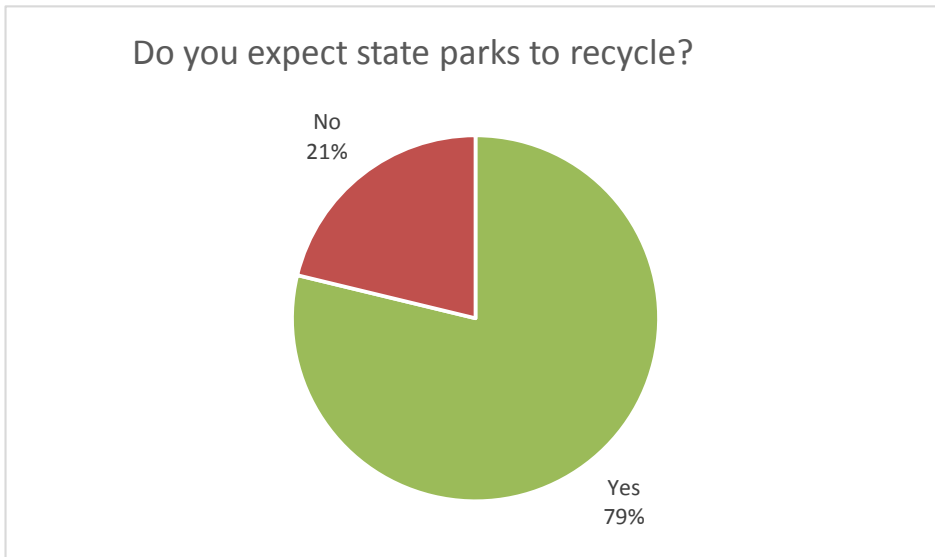
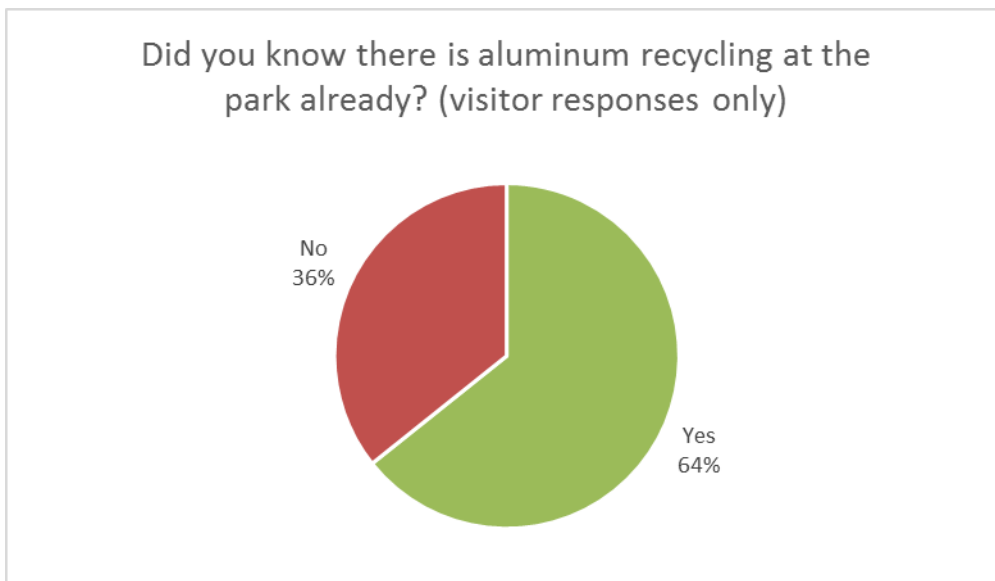


Chart 2b.

When park visitors were asked if they were aware that there is aluminum can recycling in GSP, over one third responded that they were not aware.



"My time at Garner was very interesting, and I really did not expect it to be that fun. I plan to be more aware about recycling and talk more about its importance."

Abreana DeLaGarza
GeoFORCE
University Student -
TAMU

There are 66 wire bins in GSP, each placed next to a dumpster, that are clearly marked with the recycling symbol and a sign that says “Aluminum Cans Only”. The bins, designed for ease of use and to not detract from the natural surroundings, may blend in a little too well.

See Appendix II for a sample Interview Form



This FOG wire recycling bin has been temporarily repurposed as a little dog pen. The sign is clear but the wire bin is nearly invisible.

Photo courtesy of Rick Meyers,
Former GSP Superintendent

Results of Observations

GeoFORCE auditors conducted 25 observations in the mixed-use areas of River Crossing and Oakmont.

These general observations were made:

- Both areas were generally very clean, but in Oakmont birds were seen in the trash where a dumpster was left open.
- Women are more likely to carry refillable water bottles.
- People didn't appear to notice the recycling bins next to the dumpsters. Of the seven observations regarding the FOG aluminum can recycle bins, there were four incidences of men, women or children throwing aluminum cans into the dumpster that was next to a recycle bin or Styrofoam being dropped into the recycling bin. Of these seven observations, there were three observations of women or children putting aluminum cans into recycling bins.
- People didn't seem to notice the recycling bins at Rock Beach or in the camping and cabin areas in Oakmont.

- Recycling bins were badly smashed at Oakmont near site #33.
- Rock Beach had more children and teens than adults, and they were generally in groups.
- Children and women were usually the ones throwing away trash unless the bag was very heavy or there were multiple bags, and then an older boy or a man would go to the trash.
- Recycling bins had no or very few cans in them.
- The majority of trips to the dumpsters and recycling bins were to dispose of very small items including small single items such as a box, a can or a cup.

Observations were informative and revealed some unpredicted behaviors. Observations are merely anecdotal unless they are conducted in larger numbers over a longer period of time. These GeoFORCE student observations do, however, support some of the results of the waste audit sort and interview findings by showing that easily recyclable materials, including aluminum cans, currently end up in the dumpsters destined for the landfill.

See Appendix III for a sample Observation Log

Estimates and Extrapolations

Though the focus of this waste audit is on volumes and ratios of materials sorted per dumpster, and not by weights, it is necessary to make projections by weight because that is the measure of the value of recyclable commodities. The value per ton of each recyclable commodity changes with market shifts and is not easily predictable, but for purposes of this report, commodities are valued at the CTRA contracted rates effective for March 2014.

In 2013 at GSP waste was hauled year round with varying but consistent pick-up frequencies:

March, April, May, the last two weeks of Aug., Sept., Oct., and Nov. (28 weeks) there were 84 total pick-ups. These are done at the rate of 3 pick-ups a week of all 70 dumpsters.
(28 wks x 3 pick-ups/wk = 84 days x 70 dumpsters = 5,880 dumpsters picked up)

June, July and the first two weeks of August (11 weeks) there were 55 total pick-ups. These are done at a rate of 5 pick-ups a week of all 70 dumpsters.
(11 wks x 5 pick-ups/wk = 55 days x 70 dumpsters = 3,850 dumpsters picked up)

Dec., Jan., and Feb. there were 12 total pick-ups. These are done at a rate of 1 pick-up per week for only 33 dumpsters.
(12 wks x 1 pick-up/wk = 12 days x 33 dumpsters = 396 dumpsters picked up)

This results in 139 pick-up days over nine months of all 70 dumpsters for 9,730 dumpsters emptied plus the 12 days of pick-ups over the three slow months of only 33 dumpsters for pick-ups of 396 dumpster loads.

Therefore, there were 151 days of waste hauling of 10,126 dumpster loads at GSP in 2013.

Table 3a. Estimated Annual Weights of Waste Sort Items

If the dumpsters were consistently 50% full by volume, using the weight calculations based on the data from the March 2014 Spring Break Waste Audit Pilot Project, the annual estimates would be as follows:

10,126 dumpsters to be emptied x 88 lbs.
88 lbs. per dumpster (each at ½ full) for 891,088 lbs. per year hauled to the landfill

Percent of each waste item by weight	Annual pounds/ item	Converted to annual Tons/ item
34 % garbage	302,970	151.5
4 % steel	35,644	17.8
7% glass	62,376	31.2
5 % other metals	44,554	22.3
5 % #2 plastic	44,554	22.3
10 % aluminum cans	89,109	44.6
6 % #2 & #4 bags, #3 - #7 plastics	53,465	26.7
12 % cardboard & pasteboard	106,931	53.4
17 % #1 plastic	151,485	75.7
100 %	891,088	445.5

Table 3b. Easily Recycled Items

The tonnages of the easily recycled items from Table 3a, paid at March 2014 CTRA recycling commodity prices, would net the following:

Item	Price/ton	Tonnage	Value
# 2 Plastic	\$310/ton baled rate	22.3	\$6,913
Aluminum cans	\$800/ton loose rate	44.6	\$35,680
Cardboard & pasteboard	\$115/ton baled rate	53.5	\$6,152
#1 Plastic	\$230/ton baled rate	75.7	\$17,411
TOTALS		193 tons	\$66,156

Factors such as increased occupancy and/or increased daily temperatures could significantly impact the estimated baseline values used to calculate these potential volumes and weights of recyclable commodities. During the March 2014 Waste Audit there was an average of 1,600 overnight and 1,000 day-use visitors in the park. During heavy, holiday and vacation days, park occupancy can soar to 4,000 visitors. (From GSP occupancy records for July 5, 2013, there were 2,006 overnight and 1,919 Day-use visitors).

Project Conclusions

Conclusions from this comprehensive waste audit fit into four broad categories: Waste Management, Resource Management, Recycling Education and Future Planning.

Waste Management

1. Much of the contents of the dumpsters was easily recyclable.
 - The waste sort revealed that 9% by volume (10% by weight) of the waste in the eight dumpsters sorted was aluminum cans.
 - The waste sort showed that 22% by volume (17% by weight) of the waste in the eight dumpsters sorted was #1 plastic bottles.
2. Tagged dumpsters for the waste audit were selected based on being representative of specific campgrounds or public areas. All eight dumpsters audited were found to be less full than would warrant the three-day a week waste pick-up. In one case, the tagged dumpster selected was completely empty and was therefore not used for the audit but was replaced with another that was 1/3 full. The overall light usage was likely based on the very cool temperatures for the week and lower campground occupancy in some parts of the park
3. The proximity of dumpsters to campsites invites multiple trips with small or few items to toss into the garbage.

Resource Management

1. Park visitors recycling aluminum cans is not done as frequently as expected and not at the level that would fully benefit FOG. 9% by volume and 10% by weight of each dumpster sorted was aluminum cans. FOG reported collecting 4,665 lbs of aluminum in 2013 but the annual projection based on this waste sort is that there was around 90,000 lbs of aluminum going to the landfill in 2013.
2. The volume of easily recyclable material going to the landfill is over 50%.
3. Visitors state an expectation and a desire to recycle in state parks when interviewed, but they may not seek out opportunities unless they are convenient, obvious and recycling expectations are clearly described to them.

Recycling Education

Recycling education seems to be minimal as evidenced by only a third of the visitors interviewed even knowing that there was recycling of aluminum in GSP.

Future Planning

1. GSP and FOG demonstrated, by facilitating this waste audit, that they are aware of the need for changes in the way waste is handled, and that they understand that there is a need for reduction of costs to the park.
2. The FOG aluminum hauling trailer is nearly full of uncrushed cans. FOG is seeking \$14K for a new can crusher to increase the amount of aluminum that can be hauled by a volunteer to a recycling facility as close as Uvalde or as far as San Antonio. FOG may be aware of the recycling potential for increased aluminum collection and perhaps the addition of other recyclables, but limited resources have not allowed them to plan expansion of their program.

Suggestions and Recommendations

“I would suggest actually trying out some of the suggestions given to us by the park residents and visitors and re-performing the audit after six months or a year to see if people are more willing to recycle in the park.”

Jay’sun Moore, GeoFORCE Eagle Pass HS Student

During the Waste Audit Pilot Project, many suggestions and observations were made by park visitors, GeoFORCE auditors, representatives from CTRA and STAR (the two professional recycling organizations that focus on increasing recycling rates in the state), Keep Utopia Beautiful, Utopia ISD, UT and Lackland AFB. The suggestions fall into the same broad categories as do the project conclusions: Waste Management, Resource Management, Recycling Education and Future Planning

In all categories Garner State Park and Friends of Garner will initiate and take lead roles in assimilating this information and adopting new practices related to waste management. They can receive assistance and support from Keep Utopia Beautiful, the operator of Utopia Recycles, Cooperative Teamwork & Recycling Assistance, State of Texas Alliance for Recycling, Uvalde County, TPWD and others as local planning moves forward.

Waste Management

1. It is highly recommended that KUB conduct an abbreviated waste audit at a high-occupancy point during the summer. This would be a one-day waste sort of three dumpsters (selected from the previous dumpster sites) using the same protocols and methodology as used for the 2014 Spring Break Waste Audit. This would give a snapshot of change in the ratios of volumes and weights relative to increased occupancy and higher temperatures. Scheduling this follow-up would be coordinated by KUB with GeoFORCE student availability.
2. Create programs and processes that reduce the amount of waste hauled to the landfill.
 - Influence what materials come into the park, how they are managed in the park and what happens at the end of their use
 - Reducing the 30+ tons of glass that is left in the park by visitors each year might be managed with suggestions that glass should make a round trip from the hometown store back to the hometown recycling program
 - Identify trigger points that affect the fullness of dumpsters.
 - Daily temperature
 - Park occupancy
 - Identify 3-4 key dumpsters that mirror the average usage in the park.
 - Assign a monitor to check and record fullness of those dumpsters daily
 - Establish a protocol that can call for fewer or more waste hauling trips during a period of extra low/high dumpster usage based on trigger points
 - Authorize a park staff member to order waste hauling services based on a routine survey of key dumpsters, forecast temperatures, park reservations and seasonal shifts in occupancy for each 10- to 14-day period
3. During lower demand periods, have every other dumpster emptied each time in order to cut the hauling cost in half.

Resource Management

1. Analyze factors affecting waste management strategies to include:
 - Weights
 - Volumes
 - Collection
 - Processing
 - Storage
 - Transport
 - Customer expectations – GSP staff, Hosts, FOG, Visitors
 - Labor costs
 - Revenue to be made
2. Improve the separation of aluminum from trash by increasing the visibility of the FOG's aluminum collection wire bins. The signage seems good, but in practice, as reported by visitors during interviews and upon observation, the bins didn't attract adequate attention to have the aluminum cans disposed of properly.
3. Set up cardboard and pasteboard collection sites at the park stores
4. Visitors and GeoFORCE auditors suggested that, due to the high cost of labor that park visitors, especially children, be given low-cost incentives to actively participate in collection of recyclable beverage cans and plastic bottles. Various levels of rewards or bounties could be given for these two valuable commodities:

GeoFORCE auditors suggested:

- Collectible park buttons that change annually, imprinted with the year and a picture of a plant or animal native to the area
- Credits or coupons for a small percentage off at the Visitor Center Store for a number or weight of cans or bottles turned in to bins at the store
- Children given "BINGO" cards for litter on the ground to be picked up and bagged around their campsite or picnic area, with no prizes, just something to do to keep their site clean and to remind all visitors to pick up after themselves and others

Visitors suggested:

- Bags be given at park registration for each of the items to be collected and that there be bins at limited locations throughout the park with replacement bags available at the stores and park office

Waste audit helpers suggested:

- "Banks" be set up at two or three locations that partially compact either cans or bottles in return for coupons or coins – "Big Belly" compactors or traditional "Can Banks" could be used

Recycling Education

1. Education about waste management, recycling practices and collection systems in the park can be included in on-site registration and on-line information about visiting the park.
 - Information about FOG aluminum can collection bins

- Describe collection points for cardboard and pasteboard at the stores to collect soda boxes and water bottle case bottoms
2. Design educational materials and signs to be eye-catching with easy to understand pictures and graphics and, when words are necessary, use English and Spanish.
 3. Reminders to take glass bottles home to be recycled
 4. Create park-centric recycling education materials: handouts, signs, notices on park maps, brochures, etc. that highlight park recycling collection sites, facts, goals and expectations
 5. Match each of the 90 TPWD Parks, Historical Sites and Natural Areas with one of the 60 CTRA rural recycling centers or large city or county-owned and subsidized recycling centers.
 6. Invite to be pro-active recyclers – sign a pledge to recycle at state parks
 7. Create eye-catching containers and signage for all park recycling collection containers
 8. Seek incentives for recycling related to park employees, volunteers and visitors

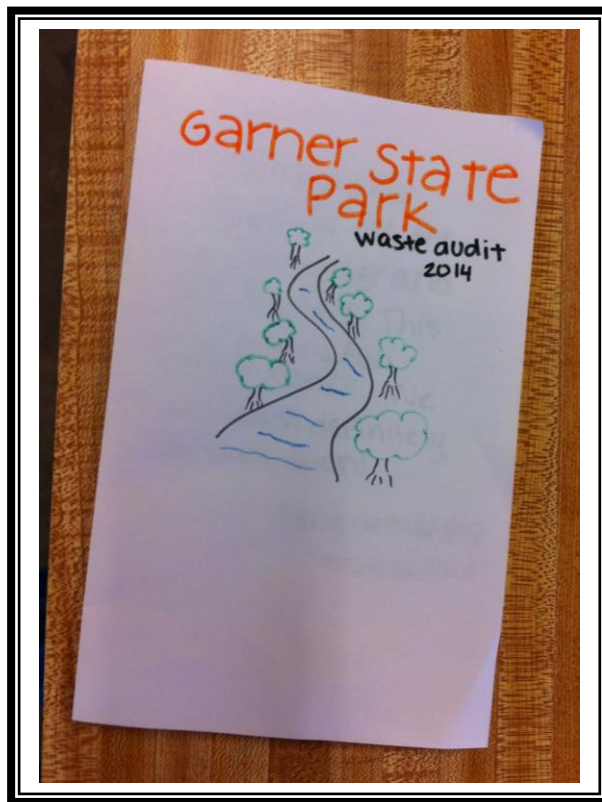
Future Planning

1. Immediate needs to be met for FOG's aluminum can recycling program:
 - Plan an education component for park visitors regarding aluminum can recycling at GSP
 - Alter the collection containers so that they are more visible for instance by dropping a plastic barrel over each wire bin and use the hole in the lid of the barrel to help insure that only cans are dropped in
 - Purchase a can crusher for FOG estimated at \$14K
2. Set up cardboard and pasteboard collection sites at park stores and HQ
3. Craft a long-range waste management plan that involves representatives of each of the park stakeholder groups; GSP, FOG, KUB, TPWD, CTRA, Uvalde County and waste hauling companies that outlines specific expectations and goals for park employees, concessionaires, volunteers, and visitors
4. Identify financial resources to help reduce initial costs
 - Equipment purchases for use in the park for collection, processing and management of aluminum cans, plastic bottles and cardboard; for example a vertical baler estimated at \$18K
 - Labor costs of collection, processing and transportation
 - Transportation costs of recyclables
5. Work with neighboring cities and counties to plan for maximum benefit of the park recycling efforts that will benefit GSP and the surrounding communities and that complements recycling efforts outside of the park

“We’re always looking for ways to keep costs down so we can put more of our scarce resources toward making the park experience more safe, beautiful and fun. We’ve already seen the impact recycling can have on FOG’s income and FOG’s and the park’s “green” goals because FOG collects and recycles 1.5 tons of aluminum each year from the park.”

Dawn Bell, FOG treasurer

Waste management strategies in Texas State Parks need to be analyzed for ways to improve efficiency and to save dollars. This study suggests that enhancing recycling strategies in Garner State Park will result in lowered waste management costs while meeting the expectations of visitors, staff and volunteers for a clean, sustainable park. With short and long-range planning by Friends of Garner, Garner management and staff, and Keep Utopia Beautiful, along with support from TPWD, CTRA and STAR, a model of efficiency and sustainability should be developed for Garner State Park. This approach may serve as a model for waste management planning for state parks.



Art by Carla Hernandez, GeoFORCE Eagle Pass HS

Appendix I

Garner State Park Waste Audit
Tally Sheet

Dumpster No. _____	Campground name/Usage _____	Location within campground _____
Est. fullness _____%	_____	_____
Date: _____	Time started _____ ended _____	Data Recorder _____
_____	_____	_____
Auditor name	Auditor name	Auditor name

If audit of this dumpster was stopped, reason why: _____
 Estimated percentage of the dumpster load that was counted when audit was ended: _____%

Material	Weights	Number of buckets	Notes:
Glass			
Cardboard/ pasteboard			
#1 plastic bottles/cups			
#2 plastic bottles/jugs			
Aluminum cans			
Steel cans			
#2 & #4 plastic bags and case wraps			
Other Metal – not cans			
All Paper, including newspaper			
Garbage		Estimated # buckets of garbage	

Where it goes after measuring:

Dumpster:
 Garbage
 All paper
 Glass
 Dirty Recyclables
 #2 & #4 Plastic bags and wraps

KUB/Utopia Recycles
 (in seed sacks)
 Steel cans and other metals
 #1 Plastic bottles
 #2 Plastic bottles
 Clean cardboard

FOG
 (in red plastic cans)
 Aluminum cans

Appendix II

Garner State Park Waste Audit Project
Interview Form
Park Visitor and Staff Interviews

These are your observations

Male _____
 Female _____

Estimate & mark Age Group
 Under 18 _____ 18-30 _____ 31-60 _____ Over 60 _____

Campground name: _____
 Type of use: _____ examples - Primitive/Tent/Cabin/RV/Store/Golf/etc.

Introduce yourself and quickly describe what you are doing – GeoFORCE students are gathering data about attitudes and interests in having options for recycling in State Parks.

Questions to be answered by Park Visitor or Staff

Questions about home:

1. Do you live in a: Sm. town (<10K) _____ Medium City (10K – 100K) _____ Big City (>100K) _____

Please tell me your ZIP Code. _____

2. Is recycling available in your community? Yes _____ No _____

3. Do you recycle at home? Yes _____ No _____

Comments: _____

Questions about the Park:

4. Do you expect State Parks to have recycling? Yes _____ No _____

5. Do you know that there is aluminum recycling at Garner? Yes _____ No _____

6. How interested do you think the general public is in recycling? _____

7. Do you think most visitors to State Parks would recycle if it was convenient? Yes _____ No _____

8. What would make it convenient? _____

Thank the interviewee for their time and ask if they have any comments about this interview or recycling that they would like recorded.

Interviewer Name _____

What was the most interesting thing about this interview? Write your comments about this process, receptiveness of visitors and staff to talk about recycling, etc.

Appendix III

Garner State Park Waste Audit
Observation Log

Assigned Camping Area _____

Date and Time of Observation _____

Names of Observers _____

Look for and note the following characteristics of the assigned Camping Area:

Is the area generally: very clean somewhat clean littered very littered

If "littered" or "very littered", what specific area(s) are the worst?

What might be the contributing factors? (i.e.: Not close enough trash cans for the area or for the number of people in the area?)

Look for and note the following behaviors:

Who is taking trash to the dumpsters? Adult/Child Male/Female Est. age

Who is taking aluminum cans to FOG bins? Adult/Child Male/Female Est. age

Is there more than one person bringing waste? Who is accompanying them: another adult or a child?

Is waste being dumped the same time as aluminum cans are dumped?

Is waste being dumped when a person is on their way somewhere or do they come from and return to their campsite or picnic area?

Anything else notable about trash/recycling behaviors?

Note the particular location of a behavior within the assigned Camping Area, if pertinent.

Other Observations or Comments

Appendix IV

Waste Auditors and other Participants

Dr. Eleanour Snow
Associate Director of Outreach/GeoFORCE Texas
Jackson School of Geosciences

GeoFORCE Students

Debbie Duran	Eagle Pass, 2013 Graduate UTSA
Hector Garza	Eagle Pass, UT Austin
Elisa Blanco	Uvalde, UTSA
Selina Gerardo	Brackettville, TAMU
Rolando Garza	Uvalde, UTSA
Sarah Berlanga	Eagle Pass, TAMU
Abreana DeLaGarza	Cotulla, TAMU
JT Trevino	Uvalde, UTSA
Belicia Luevano	La Pryor HS
Jay'sun Moore	Eagle Pass HS
Carla Hernandez	Eagle Pass HS
Senayda Saucedo	Eagle Pass HS
Eddie Esquivel	Eagle Pass HS
Eric Herrera	Eagle Pass HS
Cheyenne Hibbitts	Brackettville HS

Steve Killian, Park Superintendent
Claudia Rogers, Keep Utopia Beautiful
Linda Power and Dawn Bell, Friends of Garner
Rachel Hering, Cooperative Teamwork & Recycling Assistance
Sara Nichols, State of Texas Alliance for Recycling
Friends of Garner Volunteer Cooks
Lynn Scotty, Utopia ISD

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Amanda Romero, Solid Waste & Recycling Professional, B.S. Texas State University (2002)
Shaun Auckland, Conservation Coordinator, Travis Co. Transportation & Natural Resources
Jesse Salinas, Quality Recycling Program Manager, Lackland AFB
Christine Chute-Canul, Program Director, Keep Texas Beautiful
Lisa Villanova, Garner State Park Office Manager
Ramona Martinez, Friends Grill, Leakey
Bonnie Crider, Bonnie's Bakery, Leakey
Kelly Johnson, FOG & GSP Park Host
Brett Rimkus, GSP Concessionaire
Tracy Lewis, Garner State Park
Sean McFarland, Utopia ISD
Hondo National Bank