



**INNOVATIVE WASTE REDUCTION & RECYCLING GRANT 05-09**  
**FINAL REPORT**  
**BEACH RECYCLING PILOT PROGRAM & EVALUATION**

**October 2006**



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**PINELLAS COUNTY**  
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**Appendix** Beach Recycling Pilot Program Report



## **SECTION 1.0 INTRODUCTION**

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### **1.1 Background**

In January 2005, Pinellas County Utilities' Department of Solid Waste Operations (DSWO) received an Innovative Waste Reduction and Recycling Grant from the Florida Department of Environmental Protection (FDEP) to conduct a pilot beach recycling program. The purpose of the pilot program was to determine whether a beach recycling program could successfully be implemented in Pinellas County and, if so, the best way to structure such a program.

DSWO enlisted the County Parks Department, County Utilities' Conservation Resources, Kessler Consulting, Inc., and the cities of Redington Shores, Treasure Island, and St. Pete Beach to participate in the project. Collectively, representatives from these entities formed the Project Team.

The pilot program was conducted for four months – March 1 through June 30, 2006 – at the following three south County beach access areas and the beaches immediately adjacent to them.

- Redington Shores Beach Access – 3.5 acre site with 170 parking spaces
- Treasure Island Beach Access – 0.99 acre site with 67 parking spaces
- St. Pete Beach Access – 5.5 acre site with 235 parking spaces

The three locations reflect the diversity of beaches in Pinellas County. They are of varying sizes, and alcoholic beverages are allowed on only one of the beaches – Treasure Island. The beach access area (i.e., parking lot side) of each site is operated by the County Parks Department and the beaches are maintained by the city in which each is located.

This report follows the outline provided in the County's grant agreement with FDEP. A full discussion of the pilot program design and results is provided in the *Beach Recycling Pilot Program Report* included as an Appendix to this report.

## 1.2 Project Goals and Objectives

As mentioned above, the goal of the project was to determine whether a successful beach recycling program could be implemented and, if so, to determine the best structure for such a program. To achieve this goal, the following project objectives were defined:

- **Target materials** – to determine which recyclable materials are generated most abundantly in a beach environment and which recyclables are most likely to be recovered.
- **Recycling containers** – to determine which containers were the most durable in a beach environment, most successful at warding off scavengers, and the most successful at diverting recyclables from the waste stream.
- **Container placement** – to determine in which part of the beach environment to place the containers, making them most convenient to beachgoers and most successful in recovering recyclables (i.e., in the parking lot or on the beach; near the boardwalks or down by the shoreline).
- **Material collection** – to identify a method of recovery that is most cost-effective and convenient for City and County staff.
- **Signage** – to develop effective signage to advertise the program to beachgoers.
- **User feedback** – to measure the attitudes of beachgoers toward the recycling program, to determine the likelihood of their participating, and to obtain feedback on container types and placement, signage, etc.
- **Pilot results** – to evaluate the overall effectiveness of the pilot program in diverting recyclables from disposal and to measure contamination problems.

## 1.3 Innovation

The annual Coastal Clean-up is a major event for many coastal communities; however, this project is significantly different from such litter cleanup programs. Our project **proactively** targeted the refuse of beachgoers – systematically collecting their recyclables rather than reactively scooping up their littered debris. A litter or cleanup program is no substitute for a comprehensive beach recycling program.

Furthermore, beach recycling programs are not common in Florida. An e-mail survey of Recycling Coordinators in Florida’s coastal counties determined that only Palm Beach

and St. Lucie Counties have recycling programs that target beachgoers. Escambia County has drop-off centers located near its beaches, but these do not specifically target beachgoers.

Individuals are generally accustomed to recycling at home and sometimes at work, but the challenge addressed by this project is how to encourage them to recycle while recreating at the beach. The major challenges associated with recreational recycling are (1) making the public aware that the option to recycle exists, (2) establishing a collection system that is convenient for them to use but not abuse (i.e., by placing trash in recycling containers), and (3) cost-effectively collecting and processing the recovered materials. The Project Team designed the pilot program plan specifically with the intent to address these obstacles.

#### **1.4 Intended Audience**

All of Florida's 35 coastal counties have the opportunity to learn from this program. These counties share Florida's 1,200-mile coastline, which includes more than 800 miles of some of the nation's most beautiful and frequently visited beaches. In addition, the lessons learned from this project should be of value to all communities throughout the state since they can be applied in developing recycling programs in public parks or recreation areas.

#### **1.5 Acknowledgments**

DSWO would like to thank FDEP for providing funding for this program. We also thank the County Parks and Recreation Department, County Utilities' Conservation Resources, and the Cities of Treasure Island, Redington Shores, and St. Pete Beach for their participation in this pilot project. Without the services of their respective staffs, this pilot could not have been accomplished.

The County would also like to extend appreciation to Waste Management Inc. (WMI). As a project partner, WMI donated the 90-gallon carts used to store recyclables at each pilot location and processed collected recyclables delivered by the County to their materials recovery facility (MRF).

## SECTION 2.0 PROJECT IMPLEMENTATION

### 2.1 Equipment and Services

After researching various types of collection containers, the three containers listed below were chosen for inclusion in the pilot program. These containers were selected based on size, price, appearance, perceived durability, and the ability to be locked.

- Canables – manufactured by Windsor Barrel Works
- EcoPop – manufactured by EcoPop Designs
- EnviroDesign Recycled Plastic Lumber (RPL) – manufactured by The Fibrex Group

Table 2.1 summarizes the quantities and locations of each container, as well as the types of recyclables collected.

**Table 2.1: Container Types Piloted**

Container Type	Locations	Size	Cost per Unit	Quantity	Target Materials
<u><b>Canables</b></u> 	Redington Shores (Parking Lot)	30 gallon	\$199.80	8	Commingled Containers
	Treasure Island (Parking Lot)	30 gallon	\$199.80	4	Commingled Containers
<u><b>EcoPop</b></u> 	Treasure Island (Beach)	55 gallon	\$385.00	4	Commingled Containers
<u><b>EnviroDesign RPL</b></u> 	St. Pete Beach (Parking Lot)	32 gallon	\$395.25	4	Newspaper and Magazines
				4	Commingled Containers
	St. Pete Beach (Beach)	32 gallon	\$395.25	4	Newspaper and Magazines
				55 gallon	\$464.10

Site preparation was also needed at the three pilot locations. Dumpster enclosures were expanded at two of the sites (Treasure Island and St. Pete Beach) to accommodate the 90-gallon recycling carts, and a new enclosure was constructed at Redington Shores for the dumpster and carts. This entailed pouring foundations and constructing enclosures from recycled plastic lumber.

We were unable to find a contractor to service the recycling carts at the pilot location and deliver the collected recyclables to a local MRF, so DSWO hired a temporary staff person. The staff person hired for this position was responsible for the following:

- Placing the recycling containers and carts onsite,
- Ensuring the recycling containers were being emptied by County Parks or City staff,
- Communicating any changes or recommendations to County Parks and City staff,
- Collecting recyclables from the 90-gallon carts and delivering them to Waste Management's MRF,
- Updating County, City, and KCI staff about any problems or concerns, and
- Recording all collection data, including tonnages and dates of collection.

## **2.2 Project Elements and Timeline**

Table 2.2 provides a summary of each project task, the activities within that task, and the time during which the task was completed. The Appendix to this report contains the *Beach Recycling Pilot Program Report*, which describes all aspects of the pilot program in detail.

**Table 2.2: Project Tasks and Timeline**

<b>TASK</b>	<b>ACTIVITIES</b>	<b>TIMELINE</b>
Assemble Project Team	Identify Project Team members, conduct Team meetings, and solicit Team input.	February – November 2005
Develop Pilot Program Plan	Research beach recycling programs, collection containers, etc. and design pilot program plan.	May – November 2005
Benchmark Waste Stream	Conduct waste composition analyses at the pilot beach locations prior to startup of and during the pilot.	February 10-17, 2006 June 16-22, 2006
Procure Supplies and Services	Acquire or make arrangements for collection containers, signage, promotion materials, and collection services.	December 2005 – February 2006
Implement Pilot Program	Place containers and signs at pilot locations; document material recovery and program costs.	March – June 2006
Conduct User Survey	Conduct onsite survey of beachgoers at pilot locations.	June 2006
Evaluate Pilot Results	Analyze material recovery, contamination, collection system effectiveness, level of use and awareness, and costs and benefits.	July – August 2006
Develop Recommendations for Further Implementation	Develop recommendations for continuing or expanding the pilot program.	July – September 2006

### **2.3 Problem Resolution**

During the pilot, very few problems were encountered. The most serious of these problems was the scavenging of recyclables from the recycling containers. On several occasions, scavengers were witnessed reaching into the containers to remove the aluminum cans. The EnviroDesign RPL containers were the least successful at warding off scavengers. Their flexible fiberglass lids were easily opened and the peg and slot mechanism, used to hold one side of the lid in place, was easily bypassed by forcing the lid out of shape, which allowed the peg to be taken out of the slot. In some instances, the fiberglass lids were broken to get inside. Calls to the manufacturer confirmed that this bin is not an ideal container for locking in an unsupervised location. These containers were used throughout the pilot program, but are not recommended for future use or in expansion of the program.

The Canable containers also experienced problems with their locking mechanisms due to the effect of salt air on the locks. After three months in the beach environment, nearly all of the Canable locks began to rust, making it difficult to open and close them. Calls to Windsor Barrel Works, manufacturer of the Canable containers, confirmed that the containers could be ordered with a U-bolt/hinge assembly that would utilize a padlock. The locking mechanisms on the existing Canables can also be updated to a padlock.

County Parks staff experienced some difficulty lifting the Canable containers when they were full of recyclables. Rigid, plastic liners can be purchased for these containers, which should alleviate this problem. These liners were not available prior to the end of the pilot program, but can be purchased for future use.

Lastly, newspaper and magazine (paper) recovery was tested at one of the pilot locations – St. Pete Beach. The system as piloted was not successful. During the second waste composition study, significantly more paper was found in the dumpster than in the recycling carts (28.5 pounds versus 4.5 pounds), and this did not even include waste from the beach. City and County staff noticed that the paper recycling bins were being used as additional garbage cans, which could be in part because the dome-style lids on these bins resembled garbage cans. Due to these factors, paper recycling, in its current state, is not recommended for future expansion of the program.

## SECTION 3.0 PROJECT RESULTS

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### 3.1 Meeting Goals and Objectives

The goal of this project – to determine whether a successful beach recycling program could be implemented in Pinellas County and, if so, to determine the structure for such a program – was achieved. Based on the results of the pilot, beach recycling appears to be feasible, and the differences in the way the program was set up at the three pilot locations revealed which collection system appears to be most effective. A complete description of the pilot program and its results can be found in the *Beach Recycling Pilot Program Report* in the Appendix. Brief summaries of how the project’s objectives were achieved are presented below.

- **Target materials** – The pilot program was initially intended to target commingled containers, including aluminum cans and PET and HDPE plastics containers. Glass is prohibited on all of the beaches and, therefore, was not one of the initial targets; however, the pre-pilot waste composition study (WCS) revealed relatively large quantities of discarded glass. Therefore, glass was included in the pilot program, but it was not advertised because the Project Team did not want to encourage bringing glass to the beach. Based on the pre-pilot WCS, recovery of newspaper and magazines was also piloted at one of the beaches. The pilot revealed that recovery of commingled containers, including aluminum cans, PET plastic containers, HDPE plastic containers, and glass, could be successful. Glass was the largest recovered material by weight, and PET plastic bottles by volume. Recovery of newspaper and magazines, as set up in the pilot, was not successful.
- **Recycling containers** – Of the containers piloted, the Canables and EcoPops were best suited for the beach environment. Their galvanized steel construction made them resistant to the environment and impervious to scavengers. Conversely, the pilot determined that the locked EnviroDesign RPL containers were not suitable for placement in an unsupervised location.
- **Container placement** – Based on the pilot program, the most convenient and user-friendly location to place recycling containers is on the beach, toward the shoreline where beachgoers tend to sit. Approximately 63% of beachgoers surveyed stated they prefer to recycle on the beach versus in the parking lot. Moreover, the Treasure Island waste composition study revealed that 60% of the recyclables recovered were collected on the beach.

- **Material Collection** – The pilot revealed that a successful collection system could be integrated into both the County Parks and City programs without interfering with normal job responsibilities. However, a more convenient and cost-effective way to service the 90-gallon recycling carts and deliver recyclables to the local MRF is desired than using DSWO staff, as was done in the pilot. Private haulers that were approached indicated that sufficient recyclables were not collected to warrant a dedicated route. We intend to continue pursuing other options, such as expanding the beach recycling program to make collection more cost-effective and/or working with Keep Pinellas Beautiful to service the sites.
- **Signage** – The signage developed for the pilot could be improved to help make the program more visible to beachgoers. Although 92% of beachgoer survey respondents entered the beach through the access area parking lot, only 62% noticed the recycling program signage. Signs for the pilot were developed within size and color restrictions provided by the County Parks Department; however, other options for advertising the program are recommended, such as brighter or bolder recycling bins or labels on the bins.
- **User feedback** – The beachgoer survey revealed that 99% percent of all beachgoers surveyed would recycle at the beach if it was available and convenient. Furthermore, nearly 97% of the beachgoers surveyed would like to see this pilot beach recycling program made permanent. The survey also provided valuable feedback on program signage and container types, placement, and labels. The survey results are more fully discussed in the *Beach Recycling Pilot Program Report* in the Appendix.
- **Pilot results** – Based on the second waste composition study, **40% of the waste generated at the Treasure Island pilot location was diverted for recycling** (33% of the waste generated in the parking lot and 47% of the waste generated on the beach). The other two pilot locations could not be fully evaluated because some waste from these sites was not captured for sorting during the waste composition study. The **recovery rate for the targeted recyclables (i.e., percentage of targeted recyclables recovered versus those disposed) was 71%** (66% in the parking lot and 75% on the beach). These rates are very high, indicating that most beachgoers participated in the program. Aluminum cans had the highest recovery rate, followed closely by glass bottles. Contamination levels in the recovered recyclables ranged from 8% to 19% at the three pilot locations. The highest level of

contamination was found at St. Pete Beach, where the RPL containers looked too similar to the existing garbage cans.

### **3.2 Technology or Process Demonstration**

As previously stated, we identified only two other counties in Florida that have established beach recycling programs. Specific information about these programs, such as waste diversion or materials recovery rates was not available. Therefore, Pinellas County's pilot program may be the first beach recycling pilot in the State to monitor and document this data, as well as other valuable lessons learned. Complete documentation of this information and recommendations to assist other jurisdictions in setting up a successful beach recycling program are provided in the *Beach Recycling Pilot Program Report* in the Appendix.

Specifically, this project resulted in practical information about the types of recycling containers that function best in a beach environment, the best placement of these containers, and the need to make these containers as visible as possible. In addition, the beachgoer survey provided valuable information on the public's overwhelming interest and willingness to participate in beach recycling, as well as recommendations to make the program more user-friendly and successful. Lastly, the quantitative data from the pilot provides information on the composition of beach waste, the types of recyclables to target for recovery, waste diversion and recovery rates that can be expected, and potential program costs.

### **3.3 Material Recovery**

During the four-month pilot program, a total of 4,841 pounds, or 2.4 tons, of recyclables were recovered at the three pilot locations. Based on results of the waste composition study, this is estimated to represent as much as 40% of the waste discarded on the pilot beaches and as much as 70% of the targeted recyclables. In terms of material recovery, we consider this project to have been very successful.

Table 3.1 provides a breakdown of the materials recovered at each location during the pilot, including recovery on a per-bin and per-month basis. The table also estimates an annual recovery rate for each location, which assumes that the four-month pilot period was representative of average beach use over the course of the year.

**Table 3.1: Recyclables Recovered During Pilot (pounds)**

	Total Recyclables Recovered	Average Recovery Per Bin	Average Recovery Per Month	Average Recovery Per Bin Per Month	Estimated Annual Recovery
Redington Shores	1,066	133	266	33	3,197
Treasure Island	1,244	155	311	39	3,731
St. Pete Beach	2,532	158	633	40	7,596
Total	4,841	na	1,210	na	14,523
Average per Site	1,614	149	403	37	4,841

na = not applicable

More than twice as many recyclables were recovered at St. Pete Beach than at each of the other pilot locations, which is not surprising given that this is the largest beach access area included in the pilot and is frequented by tourists and locals. Although Treasure Island beach access area is less than half the size of Redington Shores, more recyclables were collected at Treasure Island. Reasons for this include (1) alcoholic beverages are allowed on Treasure Island’s beach, (2) it is a very popular beach frequented by locals, and (3) recycling containers were placed on both sides of the boardwalks and down near the shoreline, whereas containers were placed only on the parking lot side of the boardwalks at Redington Shores.

When evaluated on a per-bin basis, approximately the same amount of recyclables were collected per bin on St. Pete Beach and Treasure Island, with Redington Shores being only slightly less.

### 3.4 Transferability

This project is transferable to Florida’s 35 coastal counties that are home to more than 800 miles of beaches. Even those counties that have begun beach recycling can benefit from the quantitative data and lessons learned from this project. We further believe that inland communities can benefit from this project since the same approach used in the beach recycling program would be applicable to establishing a program in parks or recreation areas.

We intend to email the final pilot program report contained in the Appendix to Recycling Coordinators in the coastal counties. The report will also be available on our website.

DSWO staff is available to discuss the project with any interested community. In addition, we are preparing an article for publication in the RFT and/or SWANA Florida Sunshine Chapter newsletters and will seek a speaking opportunity at a future statewide conference.

### 3.5 Cost-effectiveness and Efficiency

Table 3.2 provides a breakdown of the total cost of this innovative grant project by task and type of expense, as well as by grant funds and matching in-kind or cash contributions.

**Table 3.2: Total Innovative Grant Project Costs**

Tasks	Expense Categories				Total Budget	Local Match		Total Grant Request
	Personnel	Supplies	Contractual <sup>1</sup>	Construction <sup>2</sup>		In-Kind Match <sup>2</sup>	Cash Match	
Assemble project team; develop pilot plan	\$8,925		\$21,000		\$29,925	\$8,925	\$0	\$21,000
Benchmark waste stream	\$4,000		\$8,125		\$12,125	\$4,000	\$0	\$8,125
Procure containers, signs, etc.	\$3,000	\$2,453	\$16,260		\$21,714	\$3,000	\$2,453	\$16,260
Implement pilot program	\$29,450		\$14,737	\$15,409	\$59,596	\$29,450	\$8,731	\$21,415
Conduct user survey	\$2,000		\$8,000		\$10,000	\$2,000	\$0	\$8,000
Evaluate pilot results	\$4,200		\$14,255		\$18,455	\$4,200	\$0	\$14,255
Recommendations for wide-scale implementation	\$3,925		\$5,333		\$9,258	\$3,925	\$0	\$5,333
Project management & administration	\$4,400		\$9,482		\$13,882	\$4,400	\$0	\$9,482
Progress & final reports	\$2,400		\$9,000		\$11,400	\$2,400	\$0	\$9,000
<b>TOTALS</b>	<b>\$62,300</b>	<b>\$2,453</b>	<b>\$106,192</b>	<b>\$15,409</b>	<b>\$186,355</b>	<b>\$62,300</b>	<b>\$11,185</b>	<b>\$112,870</b>

<sup>1</sup> Contractual includes consulting and supplies and services purchased by the consultant (\$14,260.46 for containers, \$10,577 for site improvements).

<sup>2</sup> Construction and painting of enclosures at three pilot locations (recycled plastic lumber fencing).

Much of the IG project costs were for planning, monitoring, and documenting the pilot program, including conducting two waste composition studies and the beachgoer survey. Table 3.3 provides the expenses for setting up the three pilot recycling locations and labor and fuel to service the sites.

**Table 3.3: Expenditures for Establishing and Servicing Sites**

	Pilot Expenses		Est. Annual Expenses per Site (4)
	Unit Cost	Total	
<b>Enclosures</b>		\$25,000	\$417
Foundations & Enclosures	\$10,000		
Fencing & Gates	\$15,000		
<b>Recycling Containers (1)</b>		\$12,072	\$1,341
Fibrex 55-gallon – 4	\$2,096		
Fibrex 30-gallon – 12	\$5,463		
Canable 30-gallon – 12	\$2,658		
Eco-Pop 55-gallon – 4	\$1,855		
<b>Signs – 14</b>	\$93	\$1,300	\$87
<b>Total Site Set-up Costs</b>		<b>\$38,372</b>	<b>\$1,845</b>
<b>Estimated Labor (2)</b>		\$6,242	\$6,242
<b>Estimated Fuel (3)</b>		\$367	\$367
<b>Total Labor &amp; Fuel</b>		<b>\$6,609</b>	<b>\$6,609</b>
<b>Total Costs</b>		<b>\$44,981</b>	<b>\$8,454</b>

- (1) Includes tax and shipping fees.
- (2) Assumes an hourly rate of \$18.61, benefits equal to 30% of salary, 7.5 hours to complete a daily route, and two routes per week.
- (3) Assumes 44 miles per roundtrip, 12 miles per gallon, and \$2.89 per gallon of fuel.
- (4) Assumes enclosures are amortized over 20 years, containers over 3 years, and signs over 5 years.

The largest expense was to construct or expand the enclosures to house the 90-gallon carts and dumpsters. The enclosures served two purposes: (1) to comply with the enclosure ordinances of Treasure Island and St. Pete Beach and (2) to prevent illegal scavenging of recyclables. The second largest expense was the recycling containers.

Establishing the recycling program at the three locations and servicing these locations during the four-month pilot cost nearly \$45,000, or approximately \$15,000 per site. Assuming the site improvements and supplies are amortized as noted in Table 3.3, the annual cost per site is estimated at slightly less than \$8,500.

It should be noted that the average cost of setting up future sites of similar size would likely be less than the pilot locations. Valuable lessons were learned from the pilot

program that will translate into future cost reductions. For example, the EnviroDesign RPL containers were the most expensive, but did not perform well in the pilot; therefore, other container types are recommended. In addition, unless significant operational changes are made, collection of newspaper and magazines does not seem warranted. In addition, the potential exists for increasing the waste diversion rate by making the program modifications that are recommended as a result of this pilot program and outlined in the *Beach Recycling Pilot Program Report* in the Appendix. These include making the recycling containers and signs more visible and placing containers closer to where people are sitting on the beach.

Perhaps the greatest benefit of this program, but one which cannot easily be quantified, is the public relations and recycling education value that it provided. Pinellas County's beaches are some of the most popular in the state; frequented by tourists and locals alike. The survey of beachgoers determined that over 99% would recycle if it was available and convenient, and 97% wanted this program to be permanent. Not only was this pilot program effective in diverting as much as 40% of the waste generated on the pilot beaches from disposal, it also provided an effective way to reach out to citizens.

# **APPENDIX**

## **BEACH RECYCLING PILOT PROGRAM REPORT**



# BEACH RECYCLING PILOT PROGRAM REPORT

October 2006



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**PINELLAS COUNTY**

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## **SECTION 1.0 INTRODUCTION**

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In January 2005, Pinellas County Utilities' Department of Solid Waste Operations (DSWO) received an Innovative Recycling Grant from the Florida Department of Environmental Protection (FDEP) to conduct a pilot beach recycling program. The purpose of the pilot program was to determine how to best implement a successful beach recycling program in Pinellas County. To accomplish this, the program was designed to identify appropriate recyclables for recovery, test various container types and placement, determine the effectiveness of signage and its placement, obtain beachgoers' responses to the program, and measure recovery rates and contamination levels.

DSWO enlisted the County Parks Department, County Utilities' Conservation Resources, Kessler Consulting, Inc. (KCI) and the cities of Redington Shores, Treasure Island, and St. Pete Beach to participate in the project. Collectively, representatives from these entities formed the Project Team. Waste Management, Inc. was also a project partner. The company donated 90-gallon carts to store recyclables at each pilot location and processed the recyclables delivered by County staff to the company's materials recovery facility (MRF).

The pilot program was conducted for four months at three south County beach access areas operated by the County Parks Department and the beaches immediately adjacent to these access areas. The pilot program ran from March 1 – June 30, 2006. In addition to the project activities outlined above, operational issues that arose during the pilot were noted. Some issues were remedied during the pilot, while others were noted so that they could be addressed if the program is expanded.

## **SECTION 2.0**

### **PILOT PROGRAM DESIGN**

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#### **2.1 Pilot Locations**

The following three County beach access points, and the beaches immediately adjacent to them, were chosen for this pilot recycling program:

- Redington Shores Beach Access – 3.5 acre site with 170 parking spaces
- Treasure Island Beach Access – 0.99 acre site with 67 parking spaces
- St. Pete Beach Access – 5.5 acre site with 235 parking spaces

The three locations reflect the diversity of beaches in Pinellas County. They are of varying sizes, and alcoholic beverages are allowed on only one of the beaches – Treasure Island.

The three sites are all located in southern Pinellas County, which simplified collection logistics. They have similar layouts and features – a parking lot adjacent to the beach, a sidewalk along the side of the parking lot closest to the beach, and several access paths or boardwalks leading over dune grass to the beach. All three also have restroom facilities and outdoor showers located by the access paths. Appendix A provides layouts of the three pilot beach access areas as well as the locations of trash cans and recycling containers.

#### **2.2 Target Materials**

The pilot program initially was intended to target commingled containers, including aluminum cans, PET plastic containers, and HDPE plastics containers. Glass is prohibited on all of the beaches and, therefore, was not one of the initial targets. However, a pre-pilot waste composition study revealed relatively large quantities of discarded glass (4-16% by weight of the discarded waste at the three pilot locations). Therefore, glass was included in the pilot program; however, it was not advertised because the Project Team did not want to encourage bringing glass to the beach.

The pre-pilot waste composition study also indicated that newspapers and magazines comprised about 8-9% of the waste disposed at the pilot locations. Therefore, these materials were targeted for collection at one of the three pilot locations – St. Pete Beach.

### 2.3 Container Types

Various types of collection containers were researched. The following three containers were chosen for inclusion in the pilot program based on size, price, appearance, ability to be locked, and perceived durability:

- Canables – manufactured by Windsor Barrel Works
- EcoPop – manufactured by EcoPop Designs
- EnviroDesign Recycled Plastic Lumber (RPL) – manufactured by The Fibrex Group

Table 2.1 summarizes the quantities and locations of each container, as well as the types of recyclables collected.

**Table 2.1: Container Types Piloted**

Container Type	Locations	Size	Cost per Unit	Quantity	Target Materials
<b><u>Canables</u></b> 	Redington Shores (Parking Lot)	30 gallon	\$199.80	8	Commingled Containers
	Treasure Island (Parking Lot)	30 gallon	\$199.80	4	Commingled Containers
<b><u>EcoPop</u></b> 	Treasure Island (Beach)	55 gallon	\$385.00	4	Commingled Containers
<b><u>EnviroDesign RPL</u></b> 	St. Pete Beach (Parking Lot)	32 gallon	\$395.25	4	Newspaper and Magazines
				4	Commingled Containers
	St. Pete Beach (Beach)	32 gallon	\$395.25	4	Newspaper and Magazines
		55 gallon	\$464.10	4	Commingled Containers

## 2.4 Container Placement

Based on the size of existing garbage cans at each pilot location, it was decided that 30-gallon recycling bins would be most appropriate for the parking lot areas and 55-gallon bins for the beach side. An exception was made when newspaper and magazines were added at St. Pete Beach.

To evaluate the effects of container placement on the success of the recycling program, recycling bins were placed in different locations and combinations at each pilot location. Redington Shores was the only location with no recycling bins placed on the beach itself. Canable containers were placed at the parking lot end of the boardwalks and along the aisles of the parking lot. At Treasure Island, EcoPop containers were placed at the beach end of the boardwalks and Canables at the parking lot end. In addition, EcoPops were placed on the beach near the shoreline. At St. Pete Beach, RPL containers were placed only at each end (parking lot side and beach side) of the boardwalks. All recycling bins were placed near existing garbage cans.

Appendix A illustrates the exact locations of the recycling containers at each of the pilot locations. Figures 2.1 through 2.3 depict the typical placement of recycling bins at the three locations.



**Figure 2.1: Canable Container at Redington Shores**



**Figure 2.2: EcoPop Container at Treasure Island**



**Figure 2.3: Fibrex RPL Container at St. Pete Beach**

## 2.5 Material Collection

At all three beach access areas, Pinellas County Parks Department is responsible for collecting waste generated in the parking lot and along the boardwalks. Therefore, Parks staff integrated collection of recyclables into their daily site maintenance responsibilities by transferring recyclables from the recycling bins to 90-gallon carts provided specifically for consolidating recyclables. To accommodate these carts, dumpster enclosures at each beach access area were expanded or constructed to house both a dumpster and several 90-gallon carts, which were loaned by Waste Management for this project. Figures 2.4 and 2.5 depict the enclosure at St. Pete Beach and the 90-gallon carts inside the enclosure, respectively.

Staffs from St. Pete Beach and Treasure Island were responsible for servicing the recycling containers located on their respective beaches. (No recycling containers were placed on the beach at Redington Shores.) They then consolidated these recyclables with those collected by County Parks staff in the 90-gallon carts located in the beach access area parking lots.

DSWO staff emptied the 90-gallon carts twice per week, on Tuesday and Friday, and transported the recovered materials to Waste Management's MRF for processing and marketing.



**Figure 2.4: Enclosure at St. Pete Beach**



**Figure 2.5: Recycling Carts within the Enclosure**

## 2.6 Signage and Promotion

Pinellas County Utilities' Conservation Resources staff developed signs and promotional materials for the pilot program. An 18" x 24" sign was prominently placed at each end of the boardwalks leading to and from the beaches at each pilot location. Conservation Resources staff worked with the Project Team to develop a simple, yet eye-catching, message that also met the size and color restrictions of the County Parks Department. Figure 2.6 depicts the sign at Redington Shores.



**Figure 2.6: Program Sign at Redington Shores**

Conservation Resources prepared a press release with photographs and advertisement that were sent to local newspapers. The advertisement was published in the Seminole and Beach Beacon and articles ran in this paper as well as the Largo Leader. The press release and photographs were also sent to the three participating municipalities for their use. In addition, information about the beach program was posted on the Pinellas County Utilities website. Appendix B contains copies of the signs placed at each pilot location, a copy of the program advertisement, and articles published in local newspapers.

All recycling containers purchased for the program had appropriate signage and graphics on them to indicate acceptable materials; therefore, additional signs were not prepared for these containers.

## SECTION 3.0 PILOT PROGRAM RESULTS

The success of the pilot beach recycling program was evaluated based on the following results:

- Material Recovery – the total amount of recyclables recovered during the four-month pilot and estimates for annual recovery.
- Waste Diversion Rates, Recovery Rates, and Contamination Levels – based on a waste composition study conducted during the pilot program.
- Beachgoer Survey – to obtain user feedback on the program, container types, and signage.
- Program Costs – estimating the pilot program costs and costs for program continuation or expansion.

### 3.1 Material Recovery

During the four-month pilot program a total of 4,841 pounds, or 2.4 tons, of recyclables were recovered. Based on results of the waste composition study, which are discussed in Section 3.2, this is estimated to represent as much as 40% of the waste discarded on the pilot beaches. Table 3.1 provides a breakdown of the materials recovered at each location during the pilot, including recovery on a per-bin basis and per-month basis. The table also estimates an annual recovery rate for each location, which assumes that the four-month pilot period was representative of average beach use over the course of the year.

**Table 3.1: Recyclables Recovered During Pilot (pounds)**

	Total Recyclables Recovered	Average Recovery Per Bin	Average Recovery Per Month	Average Recovery Per Bin Per Month	Estimated Annual Recovery
Redington Shores	1,066	133	266	33	3,197
Treasure Island	1,244	155	311	39	3,731
St. Pete Beach	2,532	158	633	40	7,596
Total	4,841	na	1,210	na	14,523
Average per Site	1,614	149	403	37	4,841

na = not applicable

More than twice as many recyclables were recovered at St. Pete Beach than at each of the other pilot locations, which is not surprising given that this is the largest beach access area included in the pilot and a site frequented by tourists and locals. Although Treasure Island beach access area is less than half the size of Redington Shores, more recyclables were collected at Treasure Island. Reasons for this include (1) alcoholic beverages are allowed on Treasure Island's beach, (2) it is a very popular beach frequented by locals, and (3) recycling containers were placed on both sides of the boardwalks and down near the shoreline, whereas containers were placed only on the parking lot side of the boardwalks at Redington Shores.

When evaluated on a per-bin basis, approximately the same amount of recyclables were collected per bin on St. Pete Beach and Treasure Island, with Redington Shores being only slightly less.

### **3.2 Waste Diversion and Recovery Rates**

Two waste composition studies (WCS), utilizing standard industry-accepted methodologies, were conducted to assist in evaluating the pilot program. The first study was conducted during the week of February 6-10, 2006, prior to the start of the pilot, to determine the types and quantities of recyclables disposed at each location. However, the weather during the week of this study was uncommonly poor, which resulted in low beach attendance and, therefore, below average waste generation.

Results of the first WCS are presented in Appendix C. As mentioned previously, based on these results, it was decided to include glass bottles in the targeted recyclables, although this was not advertised since glass is not officially allowed on any of the beaches. In addition, recovery of magazines and newspaper was added to the program at St. Pete Beach beginning April 13, 2006.

Fifteen weeks into the pilot, during the week of June 16-22, 2006, a second WCS was conducted. The methodology for this study called for capturing recovered materials and waste collected in the parking lot separate from that collected on the beach, with the exception of Redington Shores, where no recyclables were being collected on the beach. Because of miscommunication, no waste was captured from the beaches at Redington Shores or St. Pete Beach for the study, and only one of the two dumpster pulls from Redington Shores' parking lot was delivered for sorting. In addition, the

recyclables collected in the parking lot and on the beach at St. Pete Beach were not kept separate. Therefore, a complete analysis of waste diversion and recovery rates could only be performed for Treasure Island. Table 3.2 summarizes the results for Treasure Island and data from the complete study is provided in Appendix D.

**Table 3.2: Treasure Island Waste Diversion and Recovery Rates**

**PARKING LOT**  
**Waste Diversion - 33%**

	Pre-pilot Waste Composition	Pilot Waste Composition		Pilot Recyclables Composition		Recovery Rate
	% by Weight	Pounds	% by Weight	Pounds	% by Weight	% by Weight
Aluminum Cans	5.2%	3.8	2.2%	17.8	16.9%	82.6%
PET Plastic Bottles	1.6%	10.7	6.1%	21.5	20.4%	66.9%
HDPE Plastic Bottles	0.4%	1.3	0.7%	0.3	0.2%	16.7%
Glass Bottles	9.9%	31.8	18.3%	51.9	49.1%	62.0%
<b>Total Recyclables</b>	<b>17.1%</b>	<b>47.5</b>	<b>27.4%</b>	<b>91.5</b>	<b>86.6%</b>	<b>65.8%</b>
Waste	82.9%	125.9	72.6%	14.2	13.4%	
<b>Totals</b>	<b>100.0%</b>	<b>173.3</b>	<b>100.0%</b>	<b>105.6</b>	<b>100.0%</b>	

**BEACH**  
**Waste Diversion - 47%**

	Pre-pilot Waste Composition	Pilot Waste Composition		Pilot Recyclables Composition		Recovery Rate
	% by Weight	Pounds	% by Weight	Pounds	% by Weight	% by Weight
Aluminum Cans	6.2%	5.2	3.2%	18.3	11.8%	77.8%
PET Plastic Bottles	4.0%	13.3	8.1%	11.0	7.1%	45.3%
HDPE Plastic Bottles	0.2%	1.0	0.6%	0.0	0.0%	0.0%
Glass Bottles	26.1%	29.6	18.1%	120.3	77.6%	80.3%
<b>Total Recyclables</b>	<b>36.5%</b>	<b>49.0</b>	<b>29.9%</b>	<b>149.5</b>	<b>96.5%</b>	<b>75.3%</b>
Waste	63.5%	114.7	70.1%	5.4	3.5%	
<b>Totals</b>	<b>100.0%</b>	<b>163.7</b>	<b>100.0%</b>	<b>154.9</b>	<b>100.0%</b>	

**PARKING LOT & BEACH COMBINED**  
**Waste Diversion - 40%**

	Pre-pilot Waste Composition	Pilot Waste Composition		Pilot Recyclables Composition		Recovery Rate
	% by Weight	Pounds	% by Weight	Pounds	% by Weight	% by Weight
Aluminum Cans	5.6%	9.0	2.7%	36.1	13.8%	80.1%
PET Plastic Bottles	2.6%	24.0	7.1%	32.5	12.5%	57.6%
HDPE Plastic Bottles	0.3%	2.2	0.7%	0.3	0.1%	10.2%
Glass Bottles	16.2%	61.4	18.2%	172.2	66.1%	73.7%
<b>Total Recyclables</b>	<b>24.7%</b>	<b>96.5</b>	<b>28.6%</b>	<b>241.0</b>	<b>92.5%</b>	<b>71.4%</b>
Waste	75.3%	240.5	71.4%	19.6	7.5%	
<b>Totals</b>	<b>100.0%</b>	<b>337.0</b>	<b>100.0%</b>	<b>260.5</b>	<b>100.0%</b>	

Waste diversion rates (i.e., waste diverted from disposal for recycling) achieved at Treasure Island were very impressive – 33% in the parking lot, 47% on the beach, and a combined total of 40%. Actual recovery rates for the targeted recyclables (i.e., percentage of targeted recyclables recovered versus those disposed) were 66% in the parking lot, 75% on the beach, and 71% combined. These rates are very high, indicating that most beachgoers participated in the program. Aluminum cans had the highest recovery rate, followed closely by glass bottles.

A closer analysis of the composition of recovered containers at the three pilot locations during the second WCS was conducted. Table 3.3 presents the composition of the commingled containers by weight, and Table 3.4 provides the composition by volume using industry-accepted weight to volume conversion factors.

**Table 3.3: Composition by Weight of Commingled Containers**

	Redington Shores		Treasure Island		St. Pete Beach		Combined	
	Pounds	% by Weight	Pounds	% by Weight	Pounds	% by Weight	Pounds	% by Weight
Aluminum Cans	5.1	19.7%	36.1	15.0%	20.0	20.0%	61.2	16.7%
PET Plastic Bottles	10.7	41.4%	32.5	13.5%	29.7	29.7%	72.9	19.9%
HDPE Plastic Bottles	0.0	0.0%	0.3	0.1%	1.5	1.5%	1.8	0.5%
Glass Bottles	10.1	38.9%	172.2	71.4%	48.7	48.7%	230.9	63.0%
Total Recyclables	25.9	100.0%	241.0	100.0%	99.9	100.0%	366.7	100.0%

**Table 3.4: Composition by Volume of Commingled Containers**

	Lbs./CY	Redington Shores		Treasure Island		St. Pete Beach		Combined	
		CY	% by Volume	CY	% by Volume	CY	% by Volume	CY	% by Volume
Aluminum Cans	74	0.07	15.6%	0.49	26.1%	0.27	19.3%	0.83	22.3%
PET Plastic Bottles	30	0.36	80.6%	1.08	58.0%	0.99	70.6%	2.43	65.5%
HDPE Plastic Bottles	25	0.00	0.0%	0.01	0.5%	0.06	4.3%	0.07	1.9%
Glass Bottles	600	0.02	3.8%	0.29	15.4%	0.08	5.8%	0.38	10.4%
Total Recyclables		0.44	100.0%	1.87	100.0%	1.40	100.0%	3.71	100.0%

On a weight basis, glass bottles constituted the highest percentage of containers recovered (63%) in large part because glass is far heavier than the other targeted containers. Significantly more glass was recovered at Treasure Island than at the other two pilot locations, most likely because alcoholic beverages are allowed on Treasure Island’s beach. On a volume basis, PET plastic bottles represented the highest

percentage of the containers recovered (66%), followed by aluminum (22%) and glass (10%).

Based on the WCS results at Treasure Island, the pilot program was very successful; however, opportunity exists for improvement. As noted in Table 3.5, approximately 25% to 29% of the waste disposed at the three pilot locations still consisted of recyclables that were targeted for collection (in St. Pete Beach, this includes newspaper and magazines). As discussed later in this report, the survey of beachgoers provided valuable information on how to potentially increase participation.

**Table 3.5: Recyclables Remaining in the Waste Stream**

	Redington Shores (1)		Treasure Island		St. Pete Beach (2)	
	Pounds	% by Weight	Pounds	% by Weight	Pounds	% by Weight
Aluminum Cans	3.2	3.9%	9.0	2.7%	10.5	2.5%
PET Plastic Bottles	8.2	10.1%	24.0	7.1%	23.6	5.6%
HDPE Plastic Bottles	0.4	0.5%	2.2	0.7%	3.1	0.7%
Glass Bottles	9.0	11.0%	61.4	18.2%	49.0	11.6%
Newspaper	na	na	na	na	28.5	6.7%
Magazines	na	na	na	na	0.0	0.0%
<b>Total Recyclables</b>	<b>20.8</b>	<b>25.4%</b>	<b>96.5</b>	<b>28.6%</b>	<b>114.6</b>	<b>27.1%</b>
Waste	60.8	74.6%	240.5	71.4%	307.8	72.9%
<b>Totals</b>	<b>81.6</b>	<b>100.0%</b>	<b>337.0</b>	<b>100.0%</b>	<b>422.4</b>	<b>100.0%</b>

(1) Includes only one load of waste during the week of the WCS.

(2) Includes only waste from parking lot.

na = not applicable

### 3.3 Contamination Levels

Contamination levels in the recovered recyclables ranged from approximately 8% to 19%, as noted in Table 3.6. Two items are worth noting. At Treasure Island, contamination levels could be measured separately for recyclables collected in the parking lot versus those collected on the beach. As noted in Table 3.2, significantly more contamination was found in the parking lot recyclables (13%) than in the beach recyclables (4%). It may be that as people are returning to their vehicles, loaded down with beach paraphernalia, they are less likely to take the time to differentiate between garbage and recyclables.

The other item worth noting is that at St. Pete Beach, the only beach at which newspaper and magazines were collected, recovered paper and containers were not kept separate in the 90-gallon carts. Therefore, it is likely that the processor treated the paper as contamination when processing the containers, which would increase the contamination level at this site to nearly 23%. On one occasion, the DSWO staff person delivering recyclables to the MRF was instructed to place recyclables from St. Pete Beach directly in the waste container because they were too contaminated for processing.

**Table 3.6: Contamination in Recovered Recyclables**

	Redington Shores (1)		Treasure Island (2)		St. Pete Beach (2,3)		Combined	
	Pounds	% by Weight	Pounds	% by Weight	Pounds	% by Weight	Pounds	% by Weight
Aluminum Cans	5.1	17.0%	36.1	13.8%	20.0	15.5%	61.2	14.6%
PET Plastic Bottles	10.7	35.7%	32.5	12.5%	29.7	23.0%	72.9	17.4%
HDPE Plastic Bottles	0.0	0.0%	0.3	0.1%	1.5	1.2%	1.8	0.4%
Glass Bottles	10.1	33.6%	172.2	66.1%	48.7	37.7%	230.9	55.0%
Newspaper	na	na	na	na	4.1	3.1%	4.1	1.0%
Magazines	na	na	na	na	0.4	0.3%	0.4	0.1%
Total Recyclables	25.9	86.3%	241.0	92.5%	104.3	80.9%	371.1	88.5%
Waste (Contamination)	4.1	13.7%	19.6	7.5%	24.6	19.1%	48.3	11.5%
Totals	30.0	100.0%	260.5	100.0%	128.9	100.0%	419.4	100.0%

(1) Includes only recyclables from parking lot because recyclables were not collected on this beach at this pilot location.

(2) Combines recyclables from the parking lot and the beach.

(3) Contamination is likely underestimated. Recovered paper and containers were not being stored in separate recycling carts; therefore, the processor likely treated the paper as contamination.

na = not applicable

### 3.4 Beachgoer Survey

A survey of beachgoers was conducted on Saturday, June 10, 2006, to assess public reaction and preferences regarding the recycling program and collection systems. The survey was conducted for four hours, 10:00 a.m. to 2:00 p.m., and was aimed at obtaining responses from all people using the pilot beach locations during that time period. Although 334 people were requested to complete the survey, 23 declined and 311 agreed: 72 at Redington Shores, 92 at Treasure Island, and 147 at St. Pete Beach. Of those surveyed, approximately 44% were Pinellas County residents, 32% were on a day trip from out-of-county, and 23% were vacationing from out-of-county. A copy of

the survey form and data results are provided in Appendix E; several highlights of the survey are summarized in Table 3.7.

**Table 3.7: Summary of Key Survey Responses**

	% Responding "Yes"			
	Weighted Average	Redington Shores	Treasure Island	St. Pete Beach
Would you recycle at the beach if it were available and convenient?	99.4%	97.2%	100.0%	100.0%
Did you notice the recycling program at this beach access area?	62.1%	50.0%	81.5%	55.8%
Have you used the recycling bins today?	31.5%	11.1%	70.7%	17.0%
Should this pilot beach recycling program be made permanent?	96.8%	95.8%	92.4%	100.0%

Nearly all of those surveyed (**99.4%**) stated they would recycle at the beach if it was available and convenient and nearly **97%** of respondents thought the pilot program should become a permanent program. Of the two respondents that indicated they would not recycle, one stated they did not bring recyclables to the beach and the other said it was more convenient to just throw them in the trash.

Significantly more people noticed the recycling program and had used the recycling bins at Treasure Island than at the other two locations, indicating that the types of containers used and/or placement of containers on the beach near the shoreline made the program more noticeable and convenient. Conversely, Redington Shores, which is the only pilot location that had no recycling bins on the beach side of the boardwalks, had the lowest percentage of respondents who noticed or used the recycling containers. It should be noted that when asked why they had not used the recycling bins, 49% of respondents from all locations said they did not have any recyclables to put in them and 24% said they planned to recycle when they were leaving the beach. Only 25% had not noticed the signs or bins.

Most beachgoers prefer to use recycling bins placed on the beach rather than in the parking lot. Overall, 63% of respondents would rather recycle on the beach, 8% preferred the parking lot side, and 28% had no preference. Placing containers on the beach alleviates beachgoers from having to carry their recyclables to the parking lot, along with all the other gear they have brought to the beach.

Table 3.8 summarizes the responses received from beachgoers when asked how the pilot program could be improved. Better signage and more/better placement of recycling bins were the two most common answers. “Other” improvements that were suggested included the following:

- Placing recycling bins in the middle of the beach or closer to the shoreline.
- Making the posted signs, as well as the signs on the bins, more noticeable.
- Using recycling bins that are more noticeable, such as brightly colored bins.
- Imposing fines for non-participants.
- Increasing public awareness and education.

**Table 3.8: Survey Responses Regarding How to Improve the Program**

	% Selecting this Response			
	Weighted Average	Redington Shores	Treasure Island	St. Pete Beach
Better signs with information on what or where to recycle	32.4%	34.1%	16.5%	41.5%
More or better placement of recycling bins	29.7%	36.5%	22.0%	31.3%
No improvements suggested	23.0%	23.5%	36.7%	14.2%
Other improvements	12.2%	5.9%	21.1%	9.7%
Collect more types of recyclables	1.6%	0.0%	1.8%	2.3%
Larger recycling bins or bins emptied more often	1.1%	0.0%	1.8%	1.1%

### 3.5 Container Evaluation and Operational Issues

Throughout the pilot program, DSWO, Parks Department, and city staff members were encouraged to provide feedback on how the containers were functioning and any other operational issues. Provided below is a summary of the lessons learned.

- **Container Durability and Security:** Overall, the Canable and EcoPop containers were best suited for the beach environment and were most successful at preventing scavengers from taking recyclables. Their galvanized steel construction made them impervious to vandals. Problems were noticed with the manufacturer-installed locks on the Canable containers. After three months in the beach environment,

nearly all of the Canable locks began to rust, making it difficult to open and close them. If the locking mechanisms on the Canables were updated to a padlock, these containers, as well as the EcoPop containers, should last three to five years.

The Fibrex RPL containers manufactured from recycled plastic lumber, while attractive, could not withstand the onslaught of scavengers. The flexible fiberglass lids were easily opened by scavengers looking for aluminum cans. The peg and slot technique, used to hold one side of the lid in place, was easily bypassed by forcing the lid out of shape, which allowed the peg to be taken out of the slot. In some instances, the fiberglass lids were broken to get inside. These containers also utilized the same locking mechanism as found on the Canable containers, which rusted. Calls to the manufacturer confirmed that this bin is not an ideal container for locking in an unsupervised location.



**Figure 3.1: Vandalized Lock on Fibrex RPL Container at St. Pete Beach**

- **Container Appearance:** The Canable and EcoPop containers were easily distinguishable as recycling containers; however, the PRL containers looked too much like the garbage cans in use at St. Pete Beach. This was the opinion of City staff and is supported by the higher level of contamination found in recyclables collected at St. Pete Beach.
- **Servicing Containers:** Both the EcoPop and RPL containers have rigid, plastic liners making it easier to empty recyclables from the container without lifting the entire container. A similar plastic liner was available for the Canables, but was not purchased for the pilot program because of the lighter weight of these containers. However, Parks staff indicated that the Canables were relatively heavy to lift when full and requested that these liners be purchased. The manufacturer was unable to provide the liners prior to the end date of the pilot; therefore, it was recommended to Parks staff to use heavy plastic trash can liners in the interim.

- **Container Costs:** Provided below is a summary of the costs for the containers included in the pilot. The two containers that proved to be most functional during the pilot program, Canable and EcoPop, are also the least expensive. The optional rigid, plastic liner for the Canables is an additional \$46. Even at a price of \$246, the Canable is still significantly less expensive than the RPL 32-gallon bin.

<u>30/32-gallon Container</u>	<u>55-gallon Containers</u>
Canables - \$199.80	EcoPop - \$385.00
Fibrex RPL - \$395.25	Fibrex RPL - \$464.10

### 3.6 Program Costs

Table 3.9 summarizes the costs incurred by DSWO for the pilot program. It also provides the estimated annual cost per site assuming site improvements, containers, and signs are amortized as noted in the table.

**Table 3.9: Estimated Program Costs**

	Expenses for 4-Month Pilot		Est. Annual Expenses per Site (4)
	Unit Cost	Total	
<b>Enclosures</b>		\$25,000	\$417
Foundations & Enclosures	\$10,000		
Fencing & Gates	\$15,000		
<b>Recycling Containers (1)</b>		\$12,072	\$1,341
4 Fibrex 55-gallon	\$2,096		
12 Fibrex 30-gallon	\$5,463		
12 Canable 30-gallon	\$2,658		
4 Eco-Pop 55-gallon	\$1,855		
<b>Signs (14)</b>	\$93	\$1,300	\$87
<b>Total Site Set-up Costs</b>		<b>\$38,372</b>	<b>\$1,845</b>
<b>Estimated Labor (2)</b>		\$6,242	\$6,242
<b>Estimated Fuel (3)</b>		\$367	\$367
<b>Total Labor &amp; Fuel</b>		<b>\$6,609</b>	<b>\$6,609</b>
<b>Total Costs</b>		<b>\$44,981</b>	<b>\$8,454</b>

- (1) Includes tax and shipping fees.
- (2) Assumes an hourly rate of \$18.61, benefits equal to 30% of salary, 7.5 hours to complete a daily route, and two routes per week.
- (3) Assumes 44 miles per roundtrip, 12 miles per gallon, and \$2.89 per gallon of fuel.
- (4) Assumes enclosures are amortized over 20 years, containers over 3 years, and signs over 5 years.

The largest expense was to construct or expand the enclosures to house the 90-gallon carts and dumpsters. The enclosures served two purposes: (1) to comply with the enclosure ordinances of Treasure Island and St. Pete Beach and (2) to prevent illegal scavenging of recyclables. The second largest expense was the recycling containers. In addition to those containers listed in Table 3.9, DSWO also purchased five extra containers in case of theft or vandalism.

Labor and fuel to service the pilot locations and transport the recovered materials for processing are estimated to have cost approximately \$6,600 during the four-month pilot, or about \$19,800 over the course of a year.

Establishing the recycling program at the three locations and servicing these locations during the four-month pilot cost nearly \$45,000, or approximately \$15,000 per site. Assuming the site improvements and supplies are amortized as noted in Table 3.9, the annual cost per site is estimated at slightly less than \$8,500.

It should be noted that the average cost of setting up future sites of similar size would likely be less than the pilot locations. Valuable lessons were learned from the pilot program that will translate into future cost reductions. For example, the Fibrex RPL containers were the most expensive, but did not perform well in the pilot; therefore, other container types are recommended. In addition, unless significant operational changes are made, collection of newspaper and magazines does not seem warranted.

## SECTION 4.0

### RECOMMENDATIONS RESULTING FROM THE PILOT

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#### 4.1 Recommendations Regarding the Existing Program

Based on the pilot program results, the studies conducted during the program, and feedback from the Project Team, the following recommendations regarding the existing program are offered.

- **Continue the beach recycling program, incorporating the program revisions outlined in this section.** Overwhelming public support for the beach recycling program is best demonstrated by the 99% of the beachgoers surveyed that said they would recycle if the program was available and convenient. Moreover, 97% would like to see the pilot program made permanent.
- **Develop an ongoing method of tracking the quantity of recyclables recovered.** The pilot beach recycling program was successful in diverting recyclables from disposal. Treasure Island recorded a total waste diversion rate of 40% and recovered an impressive 71% of all target recyclables. Continuing to measure progress is important for promoting and expanding the program.
- **Include glass in the beach recycling program even if it is not officially advertised, and consider listing glass on the recycling bin signs.** Although prohibited on most beaches, glass is a major component by weight of the beach waste stream. Glass comprised approximately 62% by weight of the recyclables recovered during the week of the waste composition study.
- **Discontinue recovering newspaper and magazines unless a more efficient system is developed.** The newspaper and magazine (paper) recovery system as conducted at St. Pete Beach was not successful. During the waste composition study, significantly more paper was found in the dumpster than in the recycling carts (28.5 pounds versus 4.5 pounds), and this did not even include waste from the beach. City and County staff noticed that the paper recycling bins were being used as additional garbage cans, which could be in part because the dome-style lids on these bins resembled garbage cans. In addition, these materials were not kept separate when consolidated into the 90-gallon carts; therefore, the paper merely became a contaminant of the commingled containers.

- **Relocate recycling bins at Redington Shores and St. Pete Beach.** Approximately 63% of beachgoers surveyed stated they prefer to recycle on the beach versus in the parking lot, and specific suggestions were to move recycling bins to the middle of the beach or closer to the shoreline. Moreover, the Treasure Island waste composition study revealed that 60% of the recyclables recovered were collected on the beach. **Specifically, recycling bins at Redington Shores should be placed with the clusters of garbage cans located on the beach, assuming the City is willing to service these bins. The recycling bins located near the boardwalks on the parking lot side should remain; however, the bins located along the parking aisles could be removed since they did not appear to be used frequently. At St. Pete Beach, additional recycling bins should be placed on the beach, possibly closer to the shoreline.**
  
- **Replace the Fibrex PRL containers.** These containers did not function well during the pilot. They were relatively easy to vandalize, and scavenging of aluminum cans was noted by or reported to County and City staff. They also looked too much like the existing garbage cans in use at St. Pete Beach, which resulted in contamination of recyclables.
  
- **Replace the locking mechanisms on the Canable containers.** The locks on these containers began to rust during the pilot program, whereas the padlocks on the EcoPop containers showed no signs of damage. The Canable locks should be replaced by a u-bolt and hinge with a padlock.
  
- **Purchase rigid, plastic liners for the Canable containers.** County Parks staff found the Canable containers too heavy to lift when full of recyclables. The rigid, plastic liners available from the container manufacturer provide a more durable and environmentally sound alternative than using disposable plastic can liners.
  
- **Develop a consistent theme to “brand” the program and continue program promotion.** Although nearly all beachgoers surveyed would participate in a beach recycling program, only 62% noticed that a program existed. DSWO and Conservation Resources staff should work together to develop a program theme or “look” that will brand the program and that can be incorporated into signs, advertisements, and any new or replacement containers that are purchased. In

addition, the County should continue to promote the program through advertisements and articles in local newspapers.

- **Modify posted signs to make them more noticeable.** Survey results indicated that 92% of the respondents entered the beach through the beach access area parking lot, and therefore passed the recycling signs posted on each end of the boardwalks, yet only 66% of these individuals noticed there was a recycling program in place. The program theme recommended above should be incorporated into new signs to make the program more noticeable and identifiable.
  
- **Continue to explore options for collecting and processing recyclables recovered at the beaches.** DSWO staff serviced the recycling carts during the pilot program; however, a more cost-effective option is desirable. Waste Management and Waste Services were requested to provide preliminary price estimates for providing this service on an ongoing basis. Waste Management declined, stating that the service would be too cost prohibitive for the company. Waste Services estimated a price of \$50 per cart per month for once per week collection of source separated recyclables. Assuming that a total of 18 carts are needed, six per location, the cost to the County would be \$900 per month, or just under \$11,000 per year. While this is more cost-effective than the current labor and fuel costs, it would not be feasible to collect each material type separately. DSWO should proactively work to develop a mutually beneficial partnership with a private hauler, recycling company, or nonprofit organization, such as Keep Pinellas Beautiful, that would be willing to transport and/or process recyclables recovered at the beach.

## 4.2 Recommendations for Program Expansion

In addition to the above recommendations for continuing the existing program, the following recommendations are offered for expanding the program to additional beaches, parks, or recreational areas.

- **Expand the program to locations in close proximity to the existing beach locations.** Adding such locations to the program would not only increase waste diversion and recovery of recyclables, but should also improve the efficiency and cost-effectiveness of servicing all locations. Collection routes could be consolidated

or a collection route large enough to entice a private hauler to provide service could potentially be created.

- **Encourage additional beach recycling by assisting with program costs or through public-private partnerships.** DSWO could encourage establishment of beach recycling at other beaches or recreational areas by helping to cover the costs of constructing/expanding enclosures for dumpsters and recycling carts, as well as the expense of recycling bins and signs. In addition, DSWO could reach out to hotels, motels, bars, and restaurants on the beach to provide technical assistance to help them set up similar programs. Other business leaders and civic groups could also be invited to sponsor a beach recycling program or provide assistance in some form.
  
- **Select EcoPops or similar 55-gallon recycling containers.** Of the containers used in the pilot program, the EcoPops seemed to function best in the breezy, salty conditions of the beach environment and were also the least costly container of this size. No problems were reported with the Master Lock® padlocks used on these containers. One of the main suggestions noted during the beachgoer survey was that the recycling bins should be more noticeable. As mentioned previously, DSWO and Conservation Resources staff should develop a program theme or “look” that would be carried throughout the program on signs and containers. Although the EcoPops have a shiny metal finish that is not available in any other colors, a durable, bright, program-specific label could be placed on the sides of each container. DSWO should also continue to look for other cost-effective containers of similar durability and price.
  
- **Select Canables or similar 30-gallon recycling containers with certain modifications.** Canable containers also functioned well in the pilot program, although the built-in locking mechanism rusted within a few months. Windsor Barrel Works, the manufacturer, confirmed that Canables could be ordered with a hinge/u-bolt assembly, similar to the EcoPops, upon which a padlock could be attached. This would alleviate the rusting problem. As mentioned above, one of the common suggestions received during the beachgoer survey



**Figure 4.1: Canables with Graphic Wrap Designs**

was to make the recycling bins more eye-catching, for example by using brightly colored bins. Canables are available from the manufacturer completely wrapped with a durable, outdoor-rated, four-color graphic design protected by a laminate. Figure 4.1 depicts several of the graphics available from the manufacturer, but the County could also provide its own graphic design that would be consistent with the program theme that would help brand the program. This would add approximately \$150 to the price for each Canable container.

### 4.3 Recommendations if the County Program is Not Continued

Although it is recommended that the County continue and expand the beach recycling program, the following recommendations are offered in the event that the County chooses not to do so.

- **Turn the existing beach recycling program over to each city.** In the event DSWO does not continue to operate the beach recycling program, it should work with the cities of Treasure Island and St. Pete Beach to determine whether they would be willing to continue collecting recyclables on their beaches, and discuss with Redington Shores the possibility of adding this program to its beach. Since each city currently has a recycling program in place (curbside or drop-off), the recyclables could be collected as normal and combined with recyclables from their respective programs. Recycling containers currently in the parking lots could be transferred to the cities for their use.
  
- **Work with public or private sector sponsors to establish additional beach recycling programs.** DSWO could encourage cities, private businesses, nonprofit organizations, or civic groups to establish a beach recycling program by offering recycling bins, signs, and technical assistance. Although the County would not directly be responsible for collecting recyclables, this option would allow for a consistent program theme, container type, and signage throughout the County, which was suggested during the beachgoer survey.

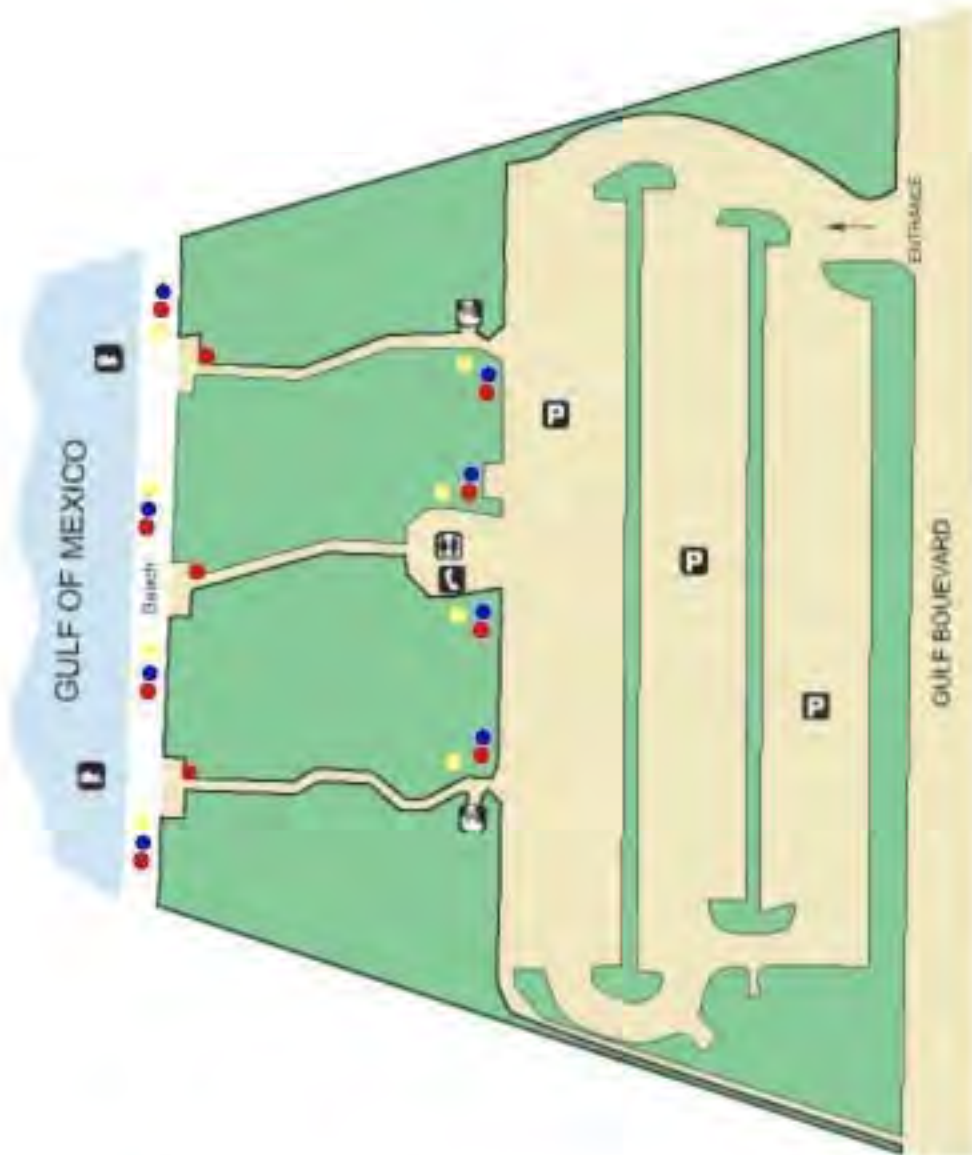
## **APPENDIX A**

### **PILOT LOCATIONS AND CONTAINER PLACEMENT ILLUSTRATIONS**



# ST. PETE BEACH ACCESS

4700 Gulf Boulevard  
 St. Pete Beach, Florida 33706  
 727-582-2267 (Fort DeSoto)



- = Current Garbage Can
- = Bottle and Can Recycling Container
- = Newspaper Recycling Container

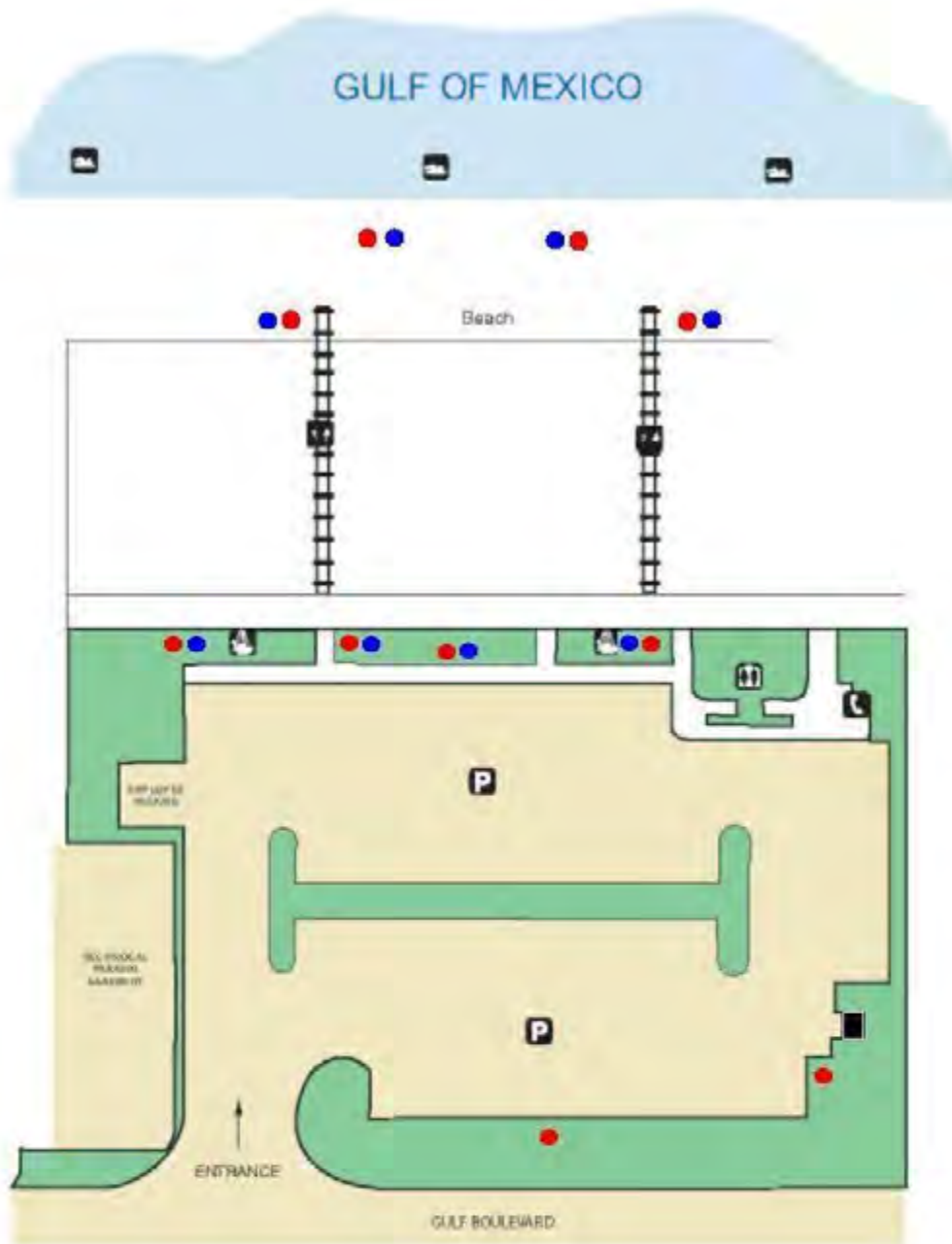


LEGEND	
	Campground
	Canoe Trail
	Concession
	Barrier Free Trail
	Ball Field
	Boat Ramp
	Boardwalk, Nature Trail
	Education Center
	Equestrian Trails
	Fishing
	Historic Interest
	Multi-Purpose Trail
	Observation Tower
	Parking
	Paw Playground
	Picnic Area
	Pier
	Playground Equipment
	Ranger Station
	Restroom
	Shelter & Grills
	Showers
	Swimming
	Telephone
	Umbrella/Cabana Rental



# TREASURE ISLAND BEACH ACCESS

10400 Gulf Boulevard  
 Treasure Island, Florida 33706-4815  
 727-549-6165 (War Veterans' Memorial Park)



● = Current Garbage Can  
 ● = Recycling Container

NORTH

MAP NOT TO SCALE

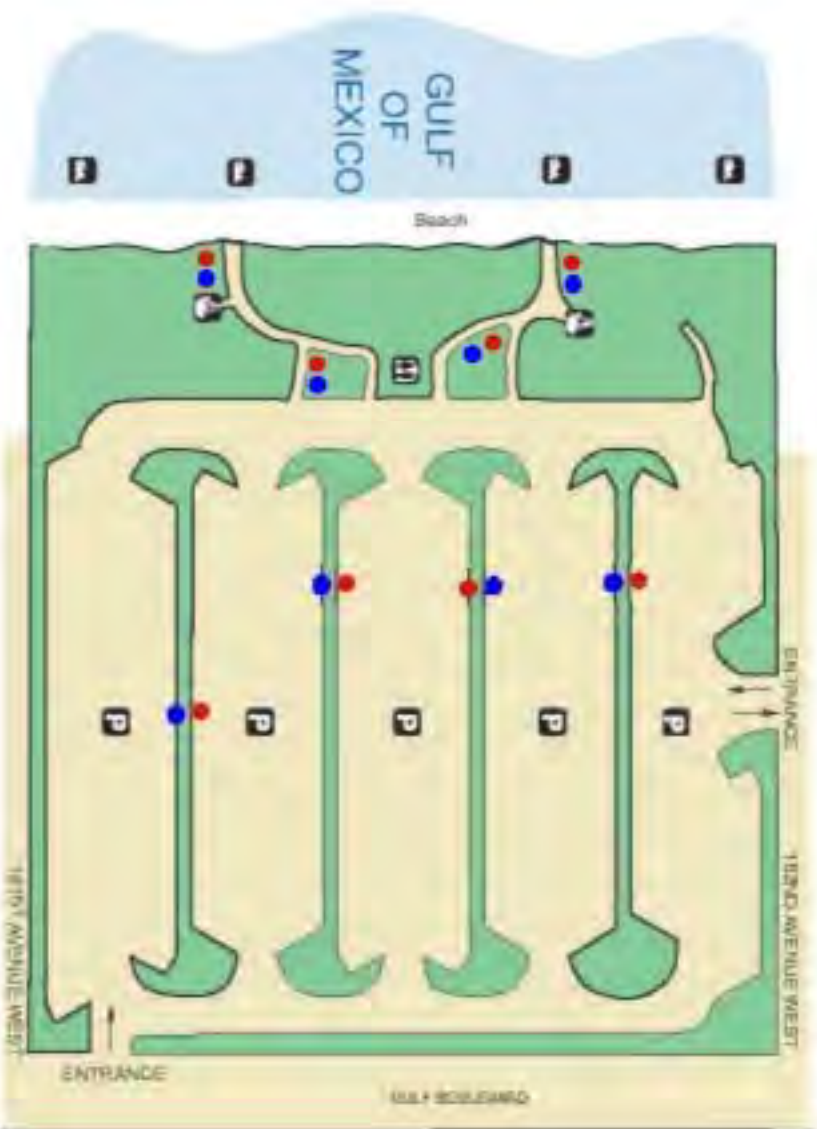
## LEGEND

	Campground
	Cance Trail
	Concession
	Barrier Free Trail
	Ball Field
	Boat Ramp
	Boardwalk, Nature Trail
	Education Center
	Equestrian Trails
	Fishing
	Historic Interest
	Multi-Purpose Trail
	Observation Tower
<input checked="" type="checkbox"/>	Parking
	Paw Playground
	Picnic Area
	Pier
	Playground Equipment
	Ranger Station
<input checked="" type="checkbox"/>	Restroom
<input checked="" type="checkbox"/>	Shelter & Grills
<input checked="" type="checkbox"/>	Showers
<input checked="" type="checkbox"/>	Swimming
<input checked="" type="checkbox"/>	Telephone
	Umbrella/Cabana Rental



# REDINGTON SHORES BEACH ACCESS

18200 Gulf Boulevard  
 Redington Shores, Florida 33708-1045  
 727-549-6165 (War Veterans' Memorial Park)



## LEGEND

	Campground
	Canoe Trail
	Concession
	Barrier Free Trail
	Ball Field
	Boat Ramp
	Boardwalk, Nature Trail
	Education Center
	Equestrian Trails
	Fishing
	Historic Interest
	Multi-Purpose Trail
	Observation Tower
	Parking
	Paw Playground
	Picnic Area
	Pier
	Playground Equipment
	Ranger Station
	Restroom
	Shelter & Grill
	Showers
	Swimming
	Telephone
	Umbrella/Chaise Rental

## **APPENDIX B**

### **PILOT SIGNAGE, ADVERTISEMENTS, AND ARTICLES**



# Beach Recycling Pilot Project

PLEASE RECYCLE

 plastic bottles

 aluminum cans

Your participation is important  
to Redington Shores!





# Beach Recycling Pilot Project

PLEASE RECYCLE

 plastic bottles

 aluminum cans

Your participation is important  
to Treasure Island!





# Beach Recycling Pilot Project

PLEASE RECYCLE

 plastic bottles

 aluminum cans

Your participation is important  
to St. Pete Beach!



Do you believe in reincarnation?

I've got more lives than a cat!



## Announcing the **Beach Recycling Pilot Project**

Feasibility study of recycling at public access beaches:

### **Redington Shores Beach**

- *Aluminum cans*
- *Plastic bottles*

### **St. Pete Beach**

- *Aluminum cans*
- *Plastic bottles*
- *Newspapers*

### **Treasure Island Beach**

- *Aluminum cans*
- *Plastic bottles*



The Beach Recycling Pilot project team includes members from Pinellas County Parks & Recreation, Pinellas County Utilities, the Cities of Redington Shores, Treasure Island and Indian Rocks Beach, and Waste Management, Inc. The pilot is funded by the Florida Department of Environmental Protection.

**Around  
Pinellas**



Sunday, May 14

**Reclaimed water use limited**

PINELLAS COUNTY - Pinellas County Utilities' north county reclaimed water system is shut down on Monday and Tuesday of each week from 7 a.m. Monday until 7 a.m. Wednesday. The system shut down will remain in effect until seasonal rains resume.

On the days when the reclaimed water system is active, customers are urged to refrain from irrigating between the hours of 10 a.m. and 4 p.m.

St. Petersburg's city reclaimed water customers are limited to watering Tuesday, Thursday and Saturday for residents with even addresses; Wednesday, Friday and Sunday for odd addresses, between the hours of 5 to 9 a.m. or 7 to 11 p.m.

**Beach recycling**

PINELLAS COUNTY - Beachgoers in the public beach access areas of Redington Shores, St. Pete Beach and Treasure Island have access to recycling bins that sit beside selected trash cans. The Beach Recycling Pilot project team installed the bins as a first step toward the goal of recycling at all public beach access points.

The Beach Recycling Pilot Project started in early March and will continue for at least three months. The project is funded by the Florida Department of Environmental Protection.

**Alternative 'oil'**



This guy gasses up at a fast food joint. See page 14.

**Weekly features**

**Section I**

Entertainment Pages 15-17

**Commission to ban 'fight**

By DAVE SHELTON

LARGO - A new Citizens' Guide to Participation in Largo City Commission Meetings would prohibit "fighting words" that could include the "tone of voice" of those who address the commission.

The new booklet is intended to clarify the rules and to maintain the decorum of the commission meetings that

The city wants to make sure speakers maintain a sense of respect when they address the commission.

are broadcast on cable television.

"We're not trying to shut people down," said Mayor Pat Gerard during the commis-

sion's May 9 workshop.

"I want to ensure everyone, the first or 150th person, is treated the same," added Commissioner Gay Gentry.

The commission voted to ban a procedure it approved during its May 2 meeting which speakers could use to take their three-minute time to another speaker. Speakers yielded their time

**Get it while it's hot**



Photos by JIM LAYFIELD

Jerry Nguyen, left, and Chris McDonald, both Largo Fire Rescue firefighters, turn ribs at the Battle of the Badges Chili and Rib Cook-Off at Largo Central Park on May 6.



Kelly, Matt, Bronwyn, 1, and Blake Ewert, 3, of St. Pete Beach, dance to Cotton-Eyed Joe.

**Prepare for hurri**

By SUZETTE PORTER

PINELLAS COUNTY Health officials say the county needs to prepare for a possible influenza pandemic that health officials believe is coming sometime in the future.

"We're doing our best to calm people," said Gary Guidash with the Pinellas County Department of Health's health preparedness division, told the Board of Health in a meeting April 14. "But, people need to be prepared."

Guidash is working with Gary Vickers, director of the county's emergency management department, on a continuity plan and preparedness measures. Communicating with the public of the need to prepare and self-protection is a key component in the plan.

"Once it (pandemic influenza) takes hold, there is very little or no help from the outside," Guidash said.

Most people are aware of H5N1 Avian Influenza virus that affects wild chickens and human

**Keeping the 'envelope' intact k**

Experts warn about wind entering a structure - it'll blow off the roof

By LESTER R. DAILEY

PINELLAS COUNTY - During a hurricane, plunging barometric pressures may make the pressure outside a

structure violently rush from the area of higher pressure to the area of lower pressure.

"Think of the exterior of a building as an envelope," said Rick Davis, president of



# Thanks students ful school year kids Appreciation Day

Stephen Nickse is the chairman and has been involved with the event since he was a youngster. Dressed as Mr. Peanut, he greeted students to the park. Now, Nickse coordinates the prize drawing and loves hamming it up with the students.

Entertainment ready to rock the park include this year's Seminole Sings winner Amanda Hull and demonstrations from Jim Graden's Cardio Karate Center and Sarah Jones' Pinellas Dance Workshop. Clowns Wendy and Sunny will keep students laughing. And bouncing tents and a mist tent are always a big hit.

The staff at the Seminole Recreation Center who always know how to get kids excited and participating will offer games. The watermelon contest is just fine - and messy - for children while adults also get a kick out of it. The Seminole Fire Rescue and Pinellas County Sheriff's Office will bring vehicles and associated gadgets.

The chamber is still asking for monetary donations to buy presents for the prize drawing.

"Dr. Steve has a shopping list and promises the prizes will be impressive," said Cain.

"I like to get the latest and greatest for the children," said Nickse.

He said bikes, X-boxes, mini-handheld games and MP3 games would be on the drawing list.

"It is so much fun doing the drawings," said Nickse about the event's grand finale. "I just love to see the children's smiling faces."

To donate, call Cain at the chamber 392-3245.

## vocal ensembles

Senior women's ensemble, consisting of grades 10 to 12. Seminole Singers is the senior mixed ensemble. Women in grades 11 and 12 and men, grades 9 to 12 also may audition. Contact Nancy Fannon at 547-7536, ext. 152.



Photo by KATHY FERGUSON

Fresh from the pool, McKenzie Brown, 5, proudly displays her graduation certificate from the Kiwanis nonswimmer program.

## Graduation goes just swimmingly

By KATHY FERGUSON

SEMINOLE - Some cried when they first had to stick their faces in the pool. Others stood perfectly still, nervously dreading the water. But after three weeks, all the youngsters made the transition from fearful to water savvy.

"They are not experts," said Don Bitting, Kiwanis chairman of the Every Child a Swimmer program, "but they can save their lives if they have to."

He urged the youngsters to practice their skills over the summer.

About 100 of these little tadpoles swam, ate and got pats on the back for successfully completing the program. This is the 22nd year the organization has offered this three-week nonswimmer water safety program. The lessons and graduation celebration were at the Seminole Recreation Complex in partnership with the city.

Carmen Marlowe, a water instructor for the last three years, said learning to swim is critical.

"Everyone should be able to swim living in Florida," she said.

Marlowe is passionate about the need for strong swimming skills.

"Perhaps people shouldn't be able to swim, until they get a license in a process similar to getting a driver's license," she said.

Another water instructor, Mary Champney, presented certificates to the happy children, and from

PINELLAS, from page 1

on Monday and Tuesday of each week from 7 a.m. Monday until 7 a.m. Wednesday. The system shut down will remain in effect until seasonal rains resume.

On the days when the reclaimed water system is active, customers are urged to refrain from irrigating between the hours of 10 a.m. and 4 p.m.

St. Petersburg's city reclaimed water customers are limited to watering Tuesday, Thursday and Saturday for residents with even addresses; Wednesday, Friday and Sunday for odd addresses, between the hours of 5 to 9 a.m. or 7 to 11 p.m.

## Beach recycles

PINELLAS COUNTY - Beachgoers in the public beach access areas of Redington Shores, St. Pete Beach and Treasure Island have access to recycling bins that sit beside selected trash cans. The Beach Recycling Pilot project team installed the bins as a first step toward the goal of recycling at all public beach access points.

The Beach Recycling Pilot Project started in early March and will continue for at least three months. The pilot is funded by the Florida Department of Environmental Protection.

## Starkey to be widened

PINELLAS COUNTY - The northern 3-mile stretch of Starkey Road will be widened,

## **APPENDIX C**

### **PRE-PILOT WASTE COMPOSITION STUDY RESULTS**

**APPENDIX C  
PRE-PILOT WASTE COMPOSITION STUDY RESULTS**

**Table C-1. Composition of All Waste from Parking Lots and Beaches**

Material Categories	*All Waste		*Parking Lot Waste		Beach Waste	
	Pounds	% by Weight	Pounds	% by Weight	Pounds	% by Weight
Aluminum Cans	18.5	2.1%	11.9	1.6%	6.6	4.4%
PET Plastic Bottles	19.0	2.2%	13.3	1.8%	5.7	3.8%
HDPE Plastic Bottles	4.2	0.5%	4.0	0.6%	0.2	0.1%
Total Pilot Containers	41.6	4.8%	29.2	4.0%	12.5	8.3%
Other Plastic Containers	2.4	0.3%	1.9	0.3%	0.5	0.3%
Glass Bottles	72.7	8.3%	43.5	6.0%	29.2	19.4%
Polycoated Paper Cartons	0.7	0.1%	0.4	0.0%	0.3	0.2%
Total Other Containers	75.7	8.7%	45.8	6.3%	29.9	19.9%
Newspaper	64.9	7.4%	55.3	7.7%	9.6	6.4%
Magazines	6.5	0.7%	5.1	0.7%	1.4	0.9%
Mixed Paper	32.8	3.8%	29.6	4.1%	3.2	2.1%
Corrugated Cardboard	9.8	1.1%	9.8	1.4%	0.0	0.0%
Total Mixed Paper	113.9	13.1%	99.8	13.8%	14.1	9.4%
All Other Waste	640.5	73.5%	546.6	75.8%	93.9	62.5%
Total All Waste	871.6	100.0%	721.3	100.0%	150.4	100.0%

\* Data does not include television and safety glass (166 lbs.) from the Redington Shores dumpster.

**Table C-2. Composition of Waste from Parking Lots**

Material Categories	St. Pete Beach		Treasure Island		*Redington Shores	
	Pounds	% by Weight	Pounds	% by Weight	Pounds	% by Weight
Aluminum Cans	2.6	0.7%	5.6	5.2%	3.7	1.6%
PET Plastic Bottles	8.3	2.1%	1.7	1.6%	3.4	1.5%
HDPE Plastic Bottles	2.0	0.5%	0.4	0.4%	1.6	0.7%
Total Pilot Containers	12.9	3.3%	7.7	7.2%	8.7	3.7%
Other Plastic Containers	1.6	0.4%	0.1	0.1%	0.3	0.1%
Glass Bottles	10.2	2.7%	10.5	9.9%	22.9	9.9%
Polycoated Paper Cartons	0.2	0.1%	0.2	0.1%	0.0	0.0%
Total Other Containers	12.0	3.1%	10.7	10.1%	23.1	10.0%
Newspaper	28.2	7.3%	14.3	13.5%	12.9	5.6%
Magazines	0.3	0.1%	0.0	0.0%	4.8	2.1%
Mixed Paper	7.3	1.9%	5.4	5.1%	17.0	7.4%
Corrugated Cardboard	1.8	0.5%	2.5	2.3%	5.6	2.4%
Total Mixed Paper	37.5	9.7%	22.1	20.8%	40.3	17.4%
All Other Waste	322.2	83.8%	65.5	61.8%	159.0	68.8%
Total All Waste	384.4	100.0%	105.9	100.0%	231.0	100.0%

\*Data does not include the television and safety glass from the Redington Shores dumpster.

**Table C-3. Composition of Waste from Beaches**

Material Categories	St. Pete Beach		Treasure Island		*Redington Shores	
	Pounds	% by Weight	Pounds	% by Weight	Pounds	% by Weight
Aluminum Cans	1.3	2.4%	4.3	6.2%	1.1	3.7%
PET Plastic Bottles	2.4	4.6%	2.8	4.0%	0.5	1.7%
HDPE Plastic Bottles	0.0	0.1%	0.2	0.2%	0.0	0.0%
Total Pilot Containers	3.7	7.1%	7.2	10.4%	1.6	5.4%
Other Plastic Containers	0.2	0.3%	0.3	0.4%	0.0	0.2%
Glass Bottles	7.7	14.7%	17.9	26.1%	3.6	12.2%
Polycoated Paper Cartons	0.2	0.3%	0.0	0.0%	0.2	0.5%
Total Other Containers	8.0	15.3%	18.2	26.4%	3.8	12.8%
Newspaper	4.3	8.3%	2.1	3.0%	3.2	10.8%
Magazines	1.4	2.7%	0.0	0.0%	0.0	0.0%
Mixed Paper	0.6	1.2%	2.4	3.5%	0.1	0.3%
Corrugated Cardboard	0.0	0.0%	0.0	0.0%	0.0	0.0%
Total Mixed Paper	6.4	12.2%	4.5	6.5%	3.3	11.1%
All Other Waste	34.1	65.5%	38.9	56.7%	20.9	70.6%
Total All Waste	52.1	100.0%	68.7	100.0%	29.6	100.0%

**Table C-4. Composition of Waste from St. Pete Beach Access Area**

Material Categories	Parking Lot		Beach		All St. Pete Beach	
	Pounds	% by Weight	Pounds	% by Weight	Pounds	% by Weight
Aluminum Cans	2.6	0.7%	1.3	2.4%	3.9	0.9%
PET Plastic Bottles	8.3	2.1%	2.4	4.6%	10.7	2.4%
HDPE Plastic Bottles	2.0	0.5%	0.0	0.1%	2.1	0.5%
Total Pilot Containers	12.9	3.3%	3.7	7.1%	16.6	3.8%
Other Plastic Containers	1.6	0.4%	0.2	0.3%	1.7	0.4%
Glass Bottles	10.2	2.7%	7.7	14.7%	17.9	4.1%
Polycoated Paper Cartons	0.2	0.1%	0.2	0.3%	0.4	0.1%
Total Other Containers	12.0	3.1%	8.0	15.3%	19.9	4.6%
Newspaper	28.2	7.3%	4.3	8.3%	32.5	7.4%
Magazines	0.3	0.1%	1.4	2.7%	1.7	0.4%
Mixed Paper	7.3	1.9%	0.6	1.2%	7.9	1.8%
Corrugated Cardboard	1.8	0.5%	0.0	0.0%	1.8	0.4%
Total Mixed Paper	37.5	9.7%	6.4	12.2%	43.8	10.0%
All Other Waste	322.2	83.8%	34.1	65.5%	356.3	81.6%
Total All Waste	384.4	100.0%	52.1	100.0%	436.5	100.0%

**Table C-5. Composition of Waste from Treasure Island Access Area**

Material Categories	Parking Lot		Beach		All Treasure Island	
	Pounds	% by Weight	Pounds	% by Weight	Pounds	% by Weight
Aluminum Cans	5.6	5.2%	4.3	6.2%	9.8	5.6%
PET Plastic Bottles	1.7	1.6%	2.8	4.0%	4.5	2.6%
HDPE Plastic Bottles	0.4	0.4%	0.2	0.2%	0.6	0.3%
Total Pilot Containers	7.7	7.2%	7.2	10.4%	14.8	8.5%
Other Plastic Containers	0.1	0.1%	0.3	0.4%	0.4	0.2%
Glass Bottles	10.5	9.9%	17.9	26.1%	28.4	16.2%
Polycoated Paper Cartons	0.2	0.1%	0.0	0.0%	0.2	0.1%
Total Other Containers	10.7	10.1%	18.2	26.4%	28.9	16.5%
Newspaper	14.3	13.5%	2.1	3.0%	16.3	9.3%
Magazines	0.0	0.0%	0.0	0.0%	0.0	0.0%
Mixed Paper	5.4	5.1%	2.4	3.5%	7.8	4.4%
Corrugated Cardboard	2.5	2.3%	0.0	0.0%	2.5	1.4%
Total Mixed Paper	22.1	20.8%	4.5	6.5%	26.5	15.2%
All Other Waste	65.5	61.8%	38.9	56.7%	104.4	59.8%
Total All Waste	105.9	100.0%	68.7	100.0%	174.5	100.0%

**Table C-6. Composition of Waste from Redington Shores Access Area**

Material Categories	*Parking Lot		Beach		*All Redington Shores	
	Pounds	% by Weight	Pounds	% by Weight	Pounds	% by Weight
Aluminum Cans	3.7	1.6%	1.1	3.7%	4.8	1.8%
PET Plastic Bottles	3.4	1.5%	0.5	1.7%	3.9	1.5%
HDPE Plastic Bottles	1.6	0.7%	0.0	0.0%	1.6	0.6%
Total Pilot Containers	8.7	3.7%	1.6	5.4%	10.3	3.9%
Other Plastic Containers	0.3	0.1%	0.0	0.2%	0.3	0.1%
Glass Bottles	22.9	9.9%	3.6	12.2%	26.5	10.1%
Polycoated Paper Cartons	0.0	0.0%	0.2	0.5%	0.2	0.1%
Total Other Containers	23.1	10.0%	3.8	12.8%	26.9	10.3%
Newspaper	12.9	5.6%	3.2	10.8%	16.1	6.2%
Magazines	4.8	2.1%	0.0	0.0%	4.8	1.8%
Mixed Paper	17.0	7.4%	0.1	0.3%	17.1	6.6%
Corrugated Cardboard	5.6	2.4%	0.0	0.0%	5.6	2.1%
Total Mixed Paper	40.3	17.4%	3.3	11.1%	43.6	16.7%
All Other Waste	159.0	68.8%	20.9	70.6%	179.9	69.0%
Total All Waste	231.0	100.0%	29.6	100.0%	260.6	100.0%

\*Data does not include the television and safety glass from the Redington Shores parking lot dumpster.

## **APPENDIX D**

### **WASTE COMPOSITION STUDY RESULTS DURING PILOT PROGRAM**

**APPENDIX D**  
**WASTE COMPOSITION STUDY RESULTS DURING PILOT PROGRAM**

**Table D-1. Treasure Island Parking Lot and Beach Combined**

	Waste Composition		Recyclables Composition	
	Pounds	% by Weight	Pounds	% by Weight
<b>Targeted Recyclables</b>				
Aluminum Cans	9.0	2.7%	36.1	13.8%
PET Plastic Bottles	24.0	7.1%	32.5	12.5%
HDPE Plastic Bottles	2.2	0.7%	0.3	0.1%
Total Recyclables (w/o glass)	35.1	10.4%	68.8	26.4%
Glass Bottles	61.4	18.2%	172.2	66.1%
Total Recyclables (w/ glass)	96.5	28.6%	241.0	92.5%
<b>Waste</b>				
Other Plastic Containers	1.2	0.3%	0.4	0.2%
Polycoated Paper Cartons	0.9	0.3%	0.1	0.0%
Newspaper	20.0	5.9%	0.0	0.0%
Magazines	0.2	0.1%	0.0	0.0%
Mixed Paper	19.9	5.9%	5.7	2.2%
Corrugated Cardboard	6.9	2.0%	0.0	0.0%
All Other Waste	191.6	56.8%	13.4	5.1%
Total Waste	240.5	71.4%	19.6	7.5%
Totals	337.0	100.0%	260.5	100.0%

**Table D-2. Treasure Island Parking Lot**

	Waste Composition		Recyclables Composition	
	Pounds	% by Weight	Pounds	% by Weight
<b>Targeted Recyclables</b>				
Aluminum Cans	3.8	2.2%	17.8	16.9%
PET Plastic Bottles	10.7	6.1%	21.5	20.4%
HDPE Plastic Bottles	1.3	0.7%	0.3	0.2%
Total Recyclables (w/o glass)	15.7	9.0%	39.6	37.5%
Glass Bottles	31.8	18.3%	51.9	49.1%
Total Recyclables (w/ glass)	47.5	27.4%	91.5	86.6%
<b>Waste</b>				
Other Plastic Containers	0.2	0.1%	0.4	0.3%
Polycoated Paper Cartons	0.6	0.3%	0.1	0.0%
Newspaper	14.9	8.6%	0.0	0.0%
Magazines	0.2	0.1%	0.0	0.0%
Mixed Paper	13.5	7.8%	4.2	3.9%
Corrugated Cardboard	6.0	3.5%	0.0	0.0%
All Other Waste	90.5	52.2%	9.6	9.1%
Total Waste	125.9	72.6%	14.2	13.4%
Totals	173.3	100.0%	105.6	100.0%

**Table D-3. Treasure Island Beach**

	Waste Composition		Recyclables Composition	
	Pounds	% by Weight	Pounds	% by Weight
<b>Targeted Recyclables</b>				
Aluminum Cans	5.2	3.2%	18.3	11.8%
PET Plastic Bottles	13.3	8.1%	11.0	7.1%
HDPE Plastic Bottles	1.0	0.6%	0.0	0.0%
<b>Total Recyclables (w/o glass)</b>	<b>19.5</b>	<b>11.9%</b>	<b>29.3</b>	<b>18.9%</b>
Glass Bottles	29.6	18.1%	120.3	77.6%
<b>Total Recyclables (w/ glass)</b>	<b>49.0</b>	<b>29.9%</b>	<b>149.5</b>	<b>96.5%</b>
<b>Waste</b>				
Other Plastic Containers	1.0	0.6%	0.1	0.0%
Polycoated Paper Cartons	0.3	0.2%	0.0	0.0%
Newspaper	5.1	3.1%	0.0	0.0%
Magazines	0.0	0.0%	0.0	0.0%
Mixed Paper	6.4	3.9%	1.6	1.0%
Corrugated Cardboard	0.9	0.5%	0.0	0.0%
All Other Waste	101.1	61.7%	3.8	2.5%
<b>Total Waste</b>	<b>114.7</b>	<b>70.1%</b>	<b>5.4</b>	<b>3.5%</b>
<b>Totals</b>	<b>163.7</b>	<b>100.0%</b>	<b>154.9</b>	<b>100.0%</b>

**Table D-4. Redington Shores Parking Lot**

	Waste Composition (1)		Recyclables Composition (2)	
	Pounds	% by Weight	Pounds	% by Weight
<b>Targeted Recyclables</b>				
Aluminum Cans	3.15	3.9%	5.1	17.0%
PET Plastic Bottles	8.20	10.1%	10.7	35.7%
HDPE Plastic Bottles	0.40	0.5%	0.0	0.0%
<b>Total Recyclables (w/o glass)</b>	<b>11.8</b>	<b>14.4%</b>	<b>15.8</b>	<b>52.8%</b>
Glass Bottles	9.0	11.0%	10.1	33.6%
<b>Total Recyclables (w/ glass)</b>	<b>20.8</b>	<b>25.4%</b>	<b>25.9</b>	<b>86.3%</b>
<b>Waste</b>				
Other Plastic Containers	0.1	0.1%	0.1	0.2%
Polycoated Paper Cartons	0.1	0.1%	0.0	0.2%
Newspaper	2.8	3.4%	0.0	0.0%
Magazines	0.0	0.0%	0.0	0.0%
Mixed Paper	2.2	2.7%	0.0	0.0%
Corrugated Cardboard	0.0	0.0%	0.0	0.0%
All Other Waste	55.7	68.2%	4.0	13.4%
<b>Total Waste</b>	<b>60.8</b>	<b>74.6%</b>	<b>4.1</b>	<b>13.7%</b>
<b>Totals</b>	<b>81.6</b>	<b>100.0%</b>	<b>30.0</b>	<b>100.0%</b>

(1) Only one load of garbage from the parking lot was delivered during the week of the waste sort, therefore waste generated over the weekend was not captured. No waste from the beach was captured for sorting.

(2) During the pilot, recyclables were collected only on the parking lot side of the Redington Shores Access Area.

**Table D-5. St. Pete Beach**

	Waste Composition (1)		Recyclables Composition (2)	
	Pounds	% by Weight	Pounds	% by Weight
<b>Targeted Recyclables</b>				
Aluminum Cans	10.5	2.5%	20.0	15.5%
PET Plastic Bottles	23.6	5.6%	29.7	23.0%
HDPE Plastic Bottles	3.1	0.7%	1.5	1.2%
Newspaper	28.5	6.7%	4.1	3.1%
Magazines	0.0	0.0%	0.4	0.3%
<b>Total Recyclables (w/o glass)</b>	<b>65.7</b>	<b>15.5%</b>	<b>55.7</b>	<b>43.2%</b>
Glass Bottles	49.0	11.6%	48.7	37.7%
<b>Total Recyclables (w/ glass)</b>	<b>114.6</b>	<b>27.1%</b>	<b>104.3</b>	<b>80.9%</b>
<b>Waste</b>				
Other Plastic Containers	0.8	0.2%	0.5	0.4%
Polycoated Paper Cartons	0.8	0.2%	0.2	0.1%
Mixed Paper	15.0	3.6%	0.7	0.5%
Corrugated Cardboard	10.6	2.5%	0.0	0.0%
All Other Waste	280.7	66.4%	23.3	18.1%
<b>Total Waste</b>	<b>307.8</b>	<b>72.9%</b>	<b>24.6</b>	<b>19.1%</b>
<b>Totals</b>	<b>422.4</b>	<b>100.0%</b>	<b>128.9</b>	<b>100.0%</b>

(1) Includes only waste from parking lot. Because waste collected on the beach was not brought to the dumpster in the parking lot during the week of the second sort, the amount of waste generated is underestimated and a recovery rate could not be calculated.

(2) Includes recyclables from the parking lot and the beach. Because recyclables collected on the beach were not bagged before placing them in the carts with the parking lot recyclables, a comparison between the parking lot and beach could not be made.

## **APPENDIX E**

### **BEACHGOER SURVEY FORM AND RESULTS**



# PINELLAS COUNTY PILOT BEACH RECYCLING SURVEY

1. Would you recycle at the beach if it were available and convenient?  Yes  No
2. If **yes**, skip to #3. If **no**, why not (then skip to #10)?
  - Not convenient - easier to throw everything away
  - Recycling doesn't pay
  - Don't bring anything to beach that could be recycled
  - Not interested in recycling
  - Other: \_\_\_\_\_
3. Did you notice the recycling program at this beach access area?  Yes  No
4. Did you park or enter through the beach access parking lot?  Yes  No
5. Have you used the recycling bins today?  Yes  No
6. If **yes**, skip to #7. If **no**, what is the main reason you did **not** use a recycling bin?
  - Did not have recyclables to put in it
  - Did not notice signs or recycling bins
  - Trash bin was closer or more convenient
  - Plan to use recycling bin when leaving
  - Recycling bins were full
  - Other: \_\_\_\_\_
7. Did you use or would you be more likely to use a recycling bin on the **beach** side or on the **parking lot** side of the boardwalk?
  - Beach side
  - Parking lot side
  - Either one (no preference)
  - Neither
8. How could the beach recycling program be **improved**?
  - More or better placement of recycling bins, such as: \_\_\_\_\_
  - Better signs with information on what or where to recycle
  - Collect more types of recyclables, such as: \_\_\_\_\_
  - Larger recycling bins or bins emptied more often
  - No improvements suggested
  - Other: \_\_\_\_\_
9. Should this pilot beach recycling program be made permanent?  Yes  No  Don't care
10. Are you a resident of Pinellas County?  Yes  No, day trip  No, vacationing
11. Do you recycle at home?  Yes  No
12. Circle One:            Male                            Female
13. Circle age range:    10 – 19            20-29            30 – 39            40 – 49            50 – 59            60+

Location: \_\_\_\_\_ Interviewer: \_\_\_\_\_ # in Group (if not responding individually): \_\_\_\_\_



# PINELLAS COUNTY PILOT BEACH RECYCLING SURVEY

1. Would you recycle at the beach if it were available and convenient?  Yes  No
2. If **yes**, skip to #3. If **no**, why not (then skip to #10)?
  - Not convenient - easier to throw everything away
  - Recycling doesn't pay
  - Don't bring anything to beach that could be recycled
  - Not interested in recycling
  - Other: \_\_\_\_\_
3. Did you notice the recycling program at this beach access area?  Yes  No
4. Did you park or enter through the beach access parking lot?  Yes  No
5. Have you used the recycling bins today?  Yes  No
6. If **yes**, skip to #7. If **no**, what is the main reason you did **not** use a recycling bin?
  - Did not have recyclables to put in it
  - Did not notice signs or recycling bins
  - Trash bin was closer or more convenient
  - Plan to use recycling bin when leaving
  - Recycling bins were full
  - Other: \_\_\_\_\_
7. Did you use or would you be more likely to use a recycling bin on the **beach** side or on the **parking lot** side of the boardwalk?
  - Beach side
  - Parking lot side
  - Either one (no preference)
  - Neither
8. How could the beach recycling program be **improved**?
  - More or better placement of recycling bins, such as: \_\_\_\_\_
  - Better signs with information on what or where to recycle
  - Collect more types of recyclables, such as: \_\_\_\_\_
  - Larger recycling bins or bins emptied more often
  - No improvements suggested
  - Other: \_\_\_\_\_
9. Should this pilot beach recycling program be made permanent?  Yes  No  Don't care
10. Are you a resident of Pinellas County?  Yes  No, day trip  No, vacationing
11. Do you recycle at home?  Yes  No
12. Circle One:            Male                            Female
13. Circle age range:    10 – 19            20-29            30 – 39            40 – 49            50 – 59            60+

Location: \_\_\_\_\_ Interviewer: \_\_\_\_\_ # in Group (if not responding individually): \_\_\_\_\_



## APPENDIX E BEACHGOER SURVEY FORM AND RESULTS

### Number of Respondents

	All	St. Pete Beach	Redington Shores	Treasure Island
Number of Respondents	311	147	72	92
Number of Denials	23	19	0	4
Total Approached	334	166	72	96

1. Would you recycle at the beach if it were available and convenient?

	All	St. Pete Beach	Redington Shores	Treasure Island
Yes	99.4%	100%	97.2%	100%
No	0.6%	0%	2.8%	0%
N =	311	147	72	92

2. If **yes**, skip to #3. If **no**, why not (then skip to #10)?

	All	St. Pete Beach	Redington Shores	Treasure Island
Not convenient - easier to throw everything away	50.0%	0%	50.0%	0%
Recycling doesn't pay	0%	0%	0%	0%
Don't bring anything to beach that could be recycled	50.0%	0%	50.0%	0%
Not interested in recycling	0%	0%	0%	0%
Other	0%	0%	0%	0%
N =	2	0	2	0

3. Did you notice the recycling program at this beach access area?

	All	St. Pete Beach	Redington Shores	Treasure Island
Yes	62.1%	55.8%	50.0%	81.5%
No	37.9%	44.2%	50.0%	18.5%
N =	311	147	72	92

4. Did you park or enter through the beach access parking lot?

	All	St. Pete Beach	Redington Shores	Treasure Island
Yes	91.6%	87.8%	90.3%	98.9%
No	8.4%	12.2%	9.7%	1.1%
N =	311	147	72	92

5. Have you used the recycling bins today?

	All	St. Pete Beach	Redington Shores	Treasure Island
Yes	31.5%	17.0%	11.1%	70.7%
No	68.5%	83.0%	88.9%	29.3%
N =	311	147	72	92

6. If **yes**, skip to #7. If **no**, what is the main reason you did **not** use a recycling bin?

	All	St. Pete Beach	Redington Shores	Treasure Island
Did not have recyclables to put in it	49.0%	59.3%	31.8%	40.0%
Did not notice signs or recycling bins	25.0%	24.4%	27.3%	20.0%
Trash bin was closer or more convenient	2.0%	0%	3%	13.3%
Plan to use recycling bin when leaving	24.0%	16.3%	37.9%	26.7%
Recycling bins were full	0%	0%	0%	0%
N =	204	123	66	15

7. Did you use or would you be more likely to use a recycling bin on the **beach** side or on the **parking lot** side of the boardwalk?

	All	St. Pete Beach	Redington Shores	Treasure Island
Beach side	63.1%	72.4%	68.1%	43.5%
Parking lot side	8.4%	3.8%	16.7%	9.8%
Either one	27.5%	23.7%	12.5%	45.7%
Neither	0.9%	0%	2.8%	1.1%
N =	320	156	72	92

8. How could the beach recycling program be **improved**?

	All	St. Pete Beach	Redington Shores	Treasure Island
More or better placement of recycling bins	29.7%	31.3%	36.5%	22.0%
Better signs with information on what or where to recycle	32.4%	41.5%	34.1%	16.5%
Collect more types of recyclables	1.6%	2.3%	0%	1.8%
Larger recycling bins or bins emptied more often	1.1%	1.1%	0%	1.8%
Other improvements	12.2%	9.7%	5.9%	21.1%
No improvements suggested	23.0%	14.2%	23.5%	36.7%
N =	370	176	85	109

8a. Suggestions for how the beach recycling program could be **improved** (see Appendix for more details):

- (1) Of the 16 respondents that suggested a better location for the recycling bins:
  - 56.3% suggested moving the bins to the middle of the beach
  - 37.5% suggested moving the bins closer to the water
  - 6.3% suggested making the bins more visible
- (2) Of the four (4) respondents that suggested adding additional material categories:
  - 50.0% suggested adding corrugated cardboard
  - 50.0% suggested adding glass or fining those that have glass
- (3) Of the 50 respondents that suggested other improvements to the program:
  - 28.0% suggested changes to signage
  - 26.0% suggested different colors for the recycling bins
  - 18.0% suggested additional education and outreach efforts
  - 18.0% suggested fining non-recyclers
  - 10.0% suggested changes to bin location

9. Should this pilot beach recycling program be made permanent?

	All	St. Pete Beach	Redington Shores	Treasure Island
Yes	96.8%	100%	95.8%	92.4%
No	3.2%	0%	4.2%	7.6%
N =	311	147	72	92

10. Are you a resident of Pinellas County?

	All	St. Pete Beach	Redington Shores	Treasure Island
Yes	44.4%	34.4%	66.7%	44.4%
No, Day Trip	32.3%	40.0%	22.2%	26.7%
No, Vacationing	23.3%	25.6%	11.1%	28.9%

11. Do you recycle at home?

	All	St. Pete Beach	Redington Shores	Treasure Island
Yes	67.8%	69.4%	75.0%	59.8%
No	32.2%	30.6%	25.0%	40.2%

12. Circle One:

	All	St. Pete Beach	Redington Shores	Treasure Island
Male	40.4%	43.1%	32.4%	40.3%
Female	59.6%	56.9%	67.6%	59.7%

13. Circle age range:

	All	St. Pete Beach	Redington Shores	Treasure Island
10 – 19	8.7%	6.0%	15.3%	8.5%
20-29	30.7%	34.9%	26.4%	25.4%
30 – 39	35.0%	35.5%	36.1%	32.4%
40 – 49	13.6%	10.2%	9.7%	25.4%
50 – 59	7.8%	8.4%	8.3%	5.6%
60+	4.2%	4.8%	4.2%	2.8%

## Appendix Additional Suggestions for Improving the Pilot Program

Question 8: How could the beach recycling program be improved?

(A) More or better placement of recycling bins, such as (16 respondents):

- On beach – 4
- Closer to shore – 3
- Closer to beach – 2
- Closer to water – 2
- Closer to middle – 2
- Closer on both sides – 1
- Closer bins – 1
- Visibility – 1

(B) Collect more types of recyclables, such as (4 respondents):

- Glass or glass fines – 2
- Corrugated cardboard – 1
- Cardboard – 1

(C) Other improvements, such as (50 respondents):

### Signage Suggestions (16)

- More noticeable signs – 3
- More noticeable language on signs – 2
- Signs on bins more visible – 2
- Bright colors on signs/bins – 2
- Red signs/bins – 2
- Better labeling of bins – 2
- Better labels on accepted materials – 1
- Better language on signs – 1
- Bigger signs – 1

### Bin Color Suggestions (14)

- More visible – 4
- Bright colors on signs/bins – 2
- Different colored bins – 2
- Red signs/bins – 2
- Yellow bins – 2
- Signs on bins – 2

### Enforcement/Fine Suggestions (9)

- Fines – 6
- Fines for non recyclers – 2
- Enforcement (litter) – 1

### Education and Outreach Suggestions (8)

- Public awareness and education – 3
- More awareness and marketing – 1
- Make people aware – 1
- Usage of a slogan/catch phrase – 1
- Consistent program at all beaches – 1
- Use school system – 1

### Location Suggestions (5)

- Closer bins – 3
- Bins on/@ bridge – 1
- More containers – 1