

**SEMINOLE COUNTY, FLORIDA  
INNOVATIVE GRANT PROJECT REPORT  
Project #IG1-15**



**DECISION SUPPORT TOOL  
FOR LOCAL SOURCE REDUCTION AND  
RECYCLING INITIATIVES**

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**FOR IMMEDIATE RELEASE**

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**Florida WastePlan:  
A Solid Waste Management Planning Tool for Florida Communities**

Seminole County, Kessler Consulting, Inc., and Tellus Institute are pleased to announce the availability of WastePlan, a solid waste management planning tool for use by Florida communities. This program planning software is being made available, free of charge, to Florida cities and counties as a result of a Florida Department of Environmental Protection Innovative Recycling and Waste Reduction Grant awarded to Seminole County. Program partners also included Alachua, Highlands, and Pinellas Counties, whose system information was modeled in WastePlan to assist in customizing the program for Florida communities.

WastePlan is a user-friendly computer program designed to facilitate integrated solid waste planning and analysis. With WastePlan, an integrated solid waste management system can be “built” right on your computer screen. The system can be as comprehensive and detailed as the user desires depending upon the amount of operational and financial information input into the program.

Modeling begins by quantifying and describing the waste generated in a community, based on user-defined generator types and waste categories. The generated waste is then directed into defined sectors of source reduction, collection, recycling, and composting, each of which have associated operational parameters, costs, and revenues. Finally, the collected wastes are routed to existing or planned facilities, which may be transfer stations, recycling or composting facilities, incinerators or landfills.

The results are calculated automatically and describe the simulation of a real or planned solid waste system. Waste flows, diversion rates, collection truck and labor requirements, processing and disposal capacity needs, total costs, and costs per ton are presented in a variety of output formats. Environmental benefits, known as “resource conservation benefits,” associated with local waste diversion programs are automatically quantified. WastePlan also allows for sensitivity analyses of various program changes or options by modifying assumptions about technologies, efficiencies, costs, or performance of any part of the system.

Florida County or City Solid Waste Managers can learn more about WastePlan, register for a license to use it, and download the program at [www.wasteplan.org/florida.html](http://www.wasteplan.org/florida.html). Additional information is available by contacting Kessler Consulting at (813) 971-8333.

**SEMINOLE COUNTY, FLORIDA  
INNOVATIVE GRANT PROJECT REPORT**

**WASTEPLAN FOR FLORIDA: DECISION SUPPORT TOOL FOR LOCAL  
SOURCE REDUCTION AND RECYCLING INITIATIVES**

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## SECTION 1.0 INTRODUCTION

### 1.1 Background

Seminole County (Seminole) conducted this project to develop an analytical software tool to assist local solid waste management personnel with evaluating and reaching decisions regarding source reduction and recycling program initiatives. The Florida Department of Environmental Protection (DEP) funded the project through its 2000-2001 Innovative Recycling/Waste Reduction Grant Program (Grant Number IG1-15).

To complete the project, Seminole assembled a team of experts recognized for their innovative approaches to devising new waste reduction and recycling methods. The Seminole Project Team included Tellus Institute and Kessler Consulting, Inc. (KCI). Tellus Institute, which developed the software program known as WastePlan, is nationally known for its expertise in measurement of source reduction and recycling rates, the application of full cost accounting, and modeling the impacts of alternative solid waste management practices. KCI has extensive experience in assisting Florida communities with planning, evaluating, and implementing comprehensive solid waste management programs. In addition, the Project Team included Alachua, Highlands, and Pinellas Counties, which participated as demonstration or case studies for the Florida WastePlan software. These counties were carefully chosen for their varied and unique characteristics in order to showcase a broad range of WastePlan's capabilities.

### 1.2 Goals and Objectives

The goal of this project was to promote waste diversion in Florida by enhancing local integrated waste system information management and analytical capabilities. A tool capable of quantifying the environmental and economic benefits of waste prevention and recycling initiatives would assist local program managers in obtaining support for program implementation. Such a software planning tool would help take abstract concepts and turn them into practical environmental benefits.

To achieve this goal, WastePlan, an analytical tool developed by Tellus Institute, was upgraded and made more user-friendly. WastePlan is intended to help communities:

- Quantify resource conservation benefits (RCBs), or environmental benefits, associated with local waste diversion programs.
- Identify the true costs and benefits of local source reduction, recycling, and composting programs.
- Evaluate how local source reduction, recycling and composting alternatives interact to affect collection, processing and disposal system costs and operations.

- Track and analyze materials from the point of generation through the local collection, processing, and disposal system.
- Evaluate or develop solid waste service bid specifications and performance contracts.
- Conduct full cost and user fee analyses to identify an appropriate fee level and establish rate stability.

### 1.3 Innovation

Innovation was achieved in this project by the use of a state-of-the-art analytical software tool, upgraded for Florida communities. While full-cost accounting software has been available to Florida communities, it falls short of the practical planning needs of local solid waste managers. WastePlan differs in that it uses full-cost accounting information as a point of departure, utilizing it for longer term planning and evaluation of dynamic changes and alternatives in a solid waste management system. Although an earlier version of the WastePlan software program existed, it was not being used by Florida communities and did not have a user interface that made it convenient for local community use.

### 1.4 Outreach to Intended Audience

WastePlan is a software program licensed by Tellus Institute. As part of this project, Tellus Institute has made 100 licenses, currently valued at \$2,000 per license for public sector use, available to Florida cities and counties at no charge. To distribute these licenses and provide information about project results, the *WastePlan for Florida* website ([www.wasteplan.org/florida](http://www.wasteplan.org/florida)) was established. Section 2.3.6 of this report provides additional details about the structure of the website.

The following outreach activities have been implemented or are planned to notify local solid waste managers of the availability of a license for the WastePlan software:

- An announcement was e-mailed to all county solid waste directors, as well as city solid waste directors for which e-mail addresses were available. Since a comprehensive list of city solid waste directors was not available, the e-mail to counties requested that they forward the message to their counterparts in the municipalities within their county.
- A press release, a copy of which is provided in Appendix A, was sent to the *Florida Specifier*, SWANA Florida Sunshine Chapter, Florida League of Cities, Florida Association of Counties, and Florida City and County Management Association. Articles about the availability of WastePlan were published in the Spring 2003 issue of *Talking Trash*, SWANA Florida Sunshine Chapter's newsletter, and the May 2003 issue of *Renewable News*, Recycle Florida Today's newsletter. Copies of available articles and announcements are included in Appendix B.

- A WastePlan for Florida notice was also developed and distributed at appropriate solid waste management conferences and meetings. A copy of this notice is also included in Appendix B.
- A link to the *WastePlan for Florida* website has been established on the Recycling Main Page of DEP's website.
- Two presentations on Florida WastePlan are scheduled during the next two months. Seminole County staff will provide a presentation at the annual Pollution Prevention Conference in Orlando on July 31, 2003. Tellus Institute and KCI staff will also make a presentation on August 21, 2003, at the SWANA Florida Sunshine Chapter's conference in Jacksonville.

### 1.5 Acknowledgments

Seminole County would like to extend thanks to those who assisted with this project. In particular, Seminole thanks Alachua County, Highlands County, and Pinellas County staff members, who participated in the modeling of their solid waste management systems and provided valuable feedback on the WastePlan program. Seminole County would also like to thank Kessler Consulting, Inc., and Tellus Institute for their extensive project assistance and solid waste and software programming expertise.

**SECTION 2.0  
PROJECT IMPLEMENTATION**

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**2.1 Equipment and Services**

To assist with this Innovative Grant project, appropriate solid waste and software development expertise was required. Seminole enlisted the assistance of Kessler Consulting, Inc., (KCI) and Tellus Institute.

KCI assisted with the following project tasks, which are further explained in Section 2.3:

- Benchmarking solid waste management programs in the four participating counties.
- Identifying program modifications for evaluation.
- Reviewing and evaluating the baseline and scenario models of the four participating counties.
- Coordinating the activities of the participating counties.
- Coordinating and participating in project meetings and workshops.
- Assisting with development of the website text and format.
- Reviewing requests for WastePlan licenses and issuing registration codes.
- Developing and distributing project outreach materials.
- Assisting with project management and report preparation.

**Tellus Institute assisted with the following project tasks,  
which are also further discussed in Section 2.3:**

- Upgrading the WastePlan software for use by Florida communities.
- Developing the baseline and scenario models for the four participating counties.
- Developing the *User Guide* and case studies.
- Creating the *WastePlan for Florida* website.
- Making 100 WastePlan licenses available for use by Florida cities or counties.
- Providing technical software assistance.
- Participating in project meetings and workshops.

**2.2 Cooperative Effort**

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This project required a unique level of participation by multiple counties. Seminole hosted the project and had lead responsibility for coordinating project activities. Alachua, Highlands, and Pinellas Counties participated by providing detailed information about their solid waste management systems, reviewing and evaluating their baseline and scenario models, providing valuable feedback on the WastePlan model, commenting on their case studies, and participating in a kick-off meeting and a training workshop.

The participating counties were selected based on the diversity of their demographics and solid waste management systems. This helped to demonstrate a broad range of settings in which the WastePlan software can be applied.

*Seminole County* is a predominantly urban county that is experiencing rapid growth; its population has increased 20 percent since 1990. The County contracts for residential solid waste, yard waste, and recycling collection for the unincorporated area, which accounts for about half of the population, but has a free enterprise system for commercial and multi-family collection. The County owns and operates a transfer station and landfill and receives nearly all solid waste generated within the County. It contracts for offsite processing of residential recyclables received at the transfer station and for onsite processing of yard waste at the landfill site.

*Alachua County* is a more rural county with a large university. Nearly half of the County's population is located in the City of Gainesville. The County contracts jointly with Gainesville for collection of residential solid waste, recyclables, and yard waste. The County also operates a network of Rural Collection Centers for collecting solid waste and recyclables in the rural parts of the County. The County owns the Leveda Brown Environmental Park, a complex that houses a County-operated transfer station, mulching operation for the processing of land-clearing debris, and recovered materials processing facility (RMPF). The RMPF is leased to a private company, and the County's franchise hauler contracts with the RMPF operator for processing the recyclables it collects. Yard waste collected curbside is directly land-applied at a local farm. All solid waste received at the transfer station is transported to the New River Landfill in Union County, which the County contracts to provide disposal.

*Highlands County* is the most rural and sparsely populated of the participating counties. Agriculture, forestry and fishing are the prevailing industries in the County, which has only three municipalities. The County contracts for solid waste collection, and recyclables are received at drop-off centers. The County owns and operates a landfill and very basic recycling processing facility. Yard waste is processed and used onsite or given to residents.

*Pinellas County* is the most densely populated county in Florida, with a population of more than 900,000. Approximately one-third of the residents live in the unincorporated county, one-third in the City of St. Petersburg, and one-third in the other 23 municipalities. Unlike the other participating counties, Pinellas County has a free enterprise system for both residential and commercial solid waste collection. The County operates recycling drop-off centers, which are serviced by a contractor. The County owns a contractor-operated waste-to-energy (WTE) facility and a contractor-operated landfill, for waste that cannot be processed in the WTE facility.

The landfill operator is also responsible for processing yard waste. Ash from the WTE is processed for metals recovery then used as daily cover.

## **2.3 Project Elements and Timeline**

This project consisted of nine elements. These elements and the project timeline are discussed in the subsections below.

### **2.3.1 Benchmark Existing Solid Waste Management Systems**

A Project Team Kick-Off Meeting was held in June 2001. At this meeting, Tellus Institute demonstrated the WastePlan software and Resource Conservation Benefits (RCB) worksheets for the Project Team. Each of the counties presented a brief overview of their solid waste management systems and identified preliminary issues that their county might want to explore using WastePlan's scenario analysis capabilities. County representatives were also solicited for their feedback regarding what they hoped to obtain from WastePlan.

WastePlan is a Windows-based program designed for multi-year integrated solid waste management planning and analysis. It consists of three interactive modules: waste generation and composition, diversion and collection, and processing and disposal facilities. The level of detail required in the data gathered for input into the model depends upon the structure of the solid waste management program and what the user wishes to obtain from WastePlan. The more detailed the information entered into WastePlan, the more reliable the output will be in terms of predicting results of contemplated program changes.

For each of the four participating county models, a similar procedure was used to compile county data about the county's solid waste management system and identify program changes under consideration. Through an iterative process over several months, KCI led the data gathering effort with each county to research and compile specific information on their existing solid waste system and costs. Because of the diversity among the counties' solid waste management systems, the data required differed with each county. However, in general, the following information was compiled for each participating county:

- Demographic information, consisting of total population and a breakdown by generator type (i.e., single-family residential, multi-family residential, commercial).
- Waste composition studies.
- Contracts and rate structures, including revenues if applicable, for collection, processing, or disposal.

- MSW tonnage reports, including the quantity of materials generated, collected, managed at county facilities, and disposed of.
- Department budgets, including debt service for previous and current fiscal years.
- Department financial statement for the most recent fiscal year.
- User fee or assessment information, broken out for collection vs. disposal fees, if applicable.
- Daily and remaining capacity for facilities the County controls or currently uses.

Cost data was the most challenging to develop since some counties do not track costs by program area (e.g., recycling, processing, disposal), and fixed costs may not be distinguished from variable costs (i.e., costs that fluctuate based on tonnage or another system variable).

Once this information was gathered, it was extensively analyzed and spreadsheets were developed in order to present each county's information in a consistent format for input into WastePlan. In addition to these detailed spreadsheets, a program narrative was developed for each county, along with a chart graphically presenting the flow of waste from generation to disposal. KCI then provided this information to Tellus Institute.

### **2.3.2 Identify Program Options for Evaluation**

Concurrent with the data gathering process, the project team discussed possible alternative management scenarios that each county was considering and would be interested in evaluating using WastePlan. Provided below is a summary of the modeling scenarios selected by the participating counties:

- Seminole County – changes in its fee structure for self-hauled yard waste from a flat-rate fee to a per-ton fee.
- Alachua County – management of additional out-of-county waste.
- Pinellas County – increased diversion of yard waste and revisions to the County's yard waste processing contract.
- Highlands County – no scenario was modeled due to data limitations.

Once a modeling scenario was selected, additional information was generally needed to develop the scenario analysis and assumptions to be used in the analysis. This information was compiled and provided to Tellus Institute for completion of each county's baseline and scenario analyses.

### **2.3.3 Customize and Upgrade WastePlan Software**

Tellus Institute completed a major upgrade of WastePlan and expanded its capabilities in several ways, including an improved user interface, enhanced flexibility, and expanded data import and export capabilities, as explained below. This flexibility and power facilitates scenario-based analyses that are invaluable to planning and decision-making. Dynamic links to spreadsheets and other models enable further “off-line” analyses, and eases the development of presentations and other documents.

- Improved, More User-Friendly Interface

Florida WastePlan uses the Delphi programming language, giving it the “look and feel” of many commercial software products. This makes the connections among different modules of the program more transparent and makes it easier for users to navigate within WastePlan. Moreover, WastePlan now includes a “View Bar” that allows the user to easily navigate among four different views: Data, Results, Overview, and Notes. The revised model also uses a “tree” structure, which provides the user a hierarchical outline used to organize and edit the main data structures in WastePlan.

- Greater Modeling Flexibility

The upgraded WastePlan provides users with greater flexibility in structuring their model and data inputs. For example, the ability to use equations to express population growth and growth in tonnage generated per activity unit permits non-linear growth to be modeled. In the new version, the user can create customized variables and equations in order to more precisely describe a solid waste management system and how it changes over time. The updated version borrows an approach made popular in spreadsheets: the ability for users to enter data and construct models using mathematical expressions.

- Improving and Expanding Data Import and Export Capabilities

The new version of WastePlan allows data to be imported directly from and exported directly to Excel spreadsheets. While direct entry of data into WastePlan will still be possible, these import and export functions will facilitate “off-line” calculations, expedite data handling, and minimize the potential for error.

- Integrating WastePlan and the Source Reduction Program Potential and RCB Worksheets

In order to calculate the source reduction program potential and resource conservation benefits (RCB) associated with various solid waste management system practices and configurations, the previous version of WastePlan required the user to manually enter WastePlan outputs in Tellus’ Source Reduction Program Potential and RCB Worksheets. The new WastePlan provides an automated link to these spreadsheets. By activating the link, the results of the WastePlan analysis are automatically entered in the proper cells of the

Worksheets, providing for more seamless analysis and timesavings through avoided data preparation, maintenance, and entry.

- *Faster Processing*

The new WastePlan employs fast-solution algorithms, which permit quick analyses and efficient modeling. This is particularly valuable for conducting complicated scenario analyses with large data sets.

### **2.3.4 Conduct Program Evaluations**

Using the data described in Section 2.3.1, Tellus created a baseline analysis for each county, depicting the current system's waste flows and costs in a base year (usually 2001) with projections through 2011. As the baseline was being configured, the need for clarification or additional data often arose. This data development and configuration process was labor intensive, involving many communications among the counties, KCI, and Tellus. The objective in this process was to use WastePlan to model each county's existing system as accurately as possible so that changes to the present system could be easily evaluated. The baseline models were reviewed and commented on by the counties, with Tellus making appropriate changes.

After the baseline model was approved by each respective county and a modeling scenario identified, Tellus then configured the scenario analysis. In some cases, modifications were needed in the baseline, or reference, model to allow for modeling the selected scenario. Such modifications included inputting more accurate or detailed tonnage information or adjusting fixed annual expenses to unit-based expenses. In these cases, a "corrected reference" scenario was first developed and then utilized for comparison with the program modification scenario.

### **2.3.5 Develop WastePlan *User Guide* and Case Studies**

Tellus Institute developed a *User Guide* to assist county solid waste officials and others in using the new version of WastePlan. The *Guide*, a copy of which is provided in Appendix C, includes five major and five supporting sections that introduce users to the software and how to model their systems: 1) Introduction; 2) WastePlan Structure; 3) Setting up Your Analysis; 4) Data; 5) Results; 6) Supporting Screens; 7) Expressions; 8) Technical Support; 9) Glossary; and 10) Index. The *User Guide* mirrors the Help function of WastePlan, and includes screen captures throughout the document. The *Guide* has been made available to counties and others both in hard copy and electronically through the *WastePlan for Florida* website, which is further discussed in Section 2.3.6.

**The project team also developed brief case study reports for each of the county WastePlan applications. Each case study follows a similar structure:**

- Introduction with background information on the County, its solid waste system, and the issues of concern.
- Diagram depicting the WastePlan Model Structure for the county, including the generation sectors, collection programs, and management facilities.

- Overview of the Baseline Analysis, including key assumptions and sections on generation, collection programs, facilities, and resource conservation benefits of existing diversion programs.
- Description of the Scenario Analysis, including the key changes from the Baseline assumptions.
- Summary of the Comparative Results and Conclusions concerning the impact of the changes modeled in the Scenario Analysis on the County's waste flows and costs.

County officials reviewed drafts of the case studies, which were revised based on their feedback. Copies of the case studies are provided in Appendix D and are also available on the website.

### **2.3.6 Develop *WastePlan for Florida* Website**

The project team created the *WastePlan for Florida* website ([www.wasteplan.org/florida](http://www.wasteplan.org/florida)) for Florida public agencies interested in using WastePlan. The website includes a summary of the grant project and a general description of WastePlan and its capabilities. The website has hyperlinks to an easy-to-download demonstration version of the model, as well as a license agreement to obtain the fully functional version. There is also a hyperlink to the WastePlan *User Guide*, the four case studies described above, and contacts for the project team. Finally, there are links to Florida DEP, the Solid Waste Association of North America (SWANA) and its Florida Chapter, and Recycle Florida Today, Inc. Since the website and the new version of WastePlan were announced in late February, more than 30 Florida users have downloaded the demonstration model from the website.

### **2.3.7 Conduct Training Workshops**

A training workshop for the participating counties was held in August 2002. Prior to the workshop, participants were provided with the most up-to-date version of the WastePlan software and their baseline data, and were encouraged to explore the software, experiment, and make notes in preparation for the workshop. At the workshop, Tellus staff demonstrated the capabilities of the software, answered questions, and took note of enhancements suggested by the participants. A helpful highlight of the workshop was the guidance of participants through a step-by-step creation of a demonstration model. Computers were available to the participants during the afternoon session of the workshop to put into practice what had been learned during the morning session. Each county's dataset was reviewed and questions were asked and answered.

**Two additional presentations to broader audiences have been confirmed and are on the agendas for the following conferences:**

- Florida's Annual Pollution Prevention Conference, Orlando, July 2003.
- SWANA Florida Sunshine Chapter's Conference, Jacksonville, August 2003.

### **2.3.8 Distribute WastePlan Licenses**

As part of the grant agreement, Tellus Institute has made 100 WastePlan licenses available to Florida cities and counties at no charge. Beginning in February 2003, the program and license were made available through the *WastePlan for Florida* website. As mentioned above, a demonstration version of WastePlan can be downloaded from the website. It is a functional program, with the exception that data cannot be saved. After city or county representatives complete and return via e-mail the license agreement on the website, they receive a registration code that allows them to access a fully functional program and automatic program updates.

An outreach campaign to advertise the availability of WastePlan licenses to Florida cities and counties was implemented, as explained in Section 1.4. In summary, the campaign included a widely distributed press release, an e-mail announcement to all county and many city solid waste directors, a link to the *WastePlan for Florida* website from DEP's Recycling Main Page, the presentations mentioned in Section 2.3.7, articles in the SWANA Florida Sunshine Chapter and Recycle Florida Today newsletters, and distribution of a WastePlan flyer at appropriate solid waste conferences and meetings.

### 2.3.9 Provide Technical Support

Tellus Institute and KCI have been available to respond to any questions regarding WastePlan and to provide technical assistance with the program, as requested.

### 2.3.10 Project Timeline

Table 2.1, *Project Timeline*, presents the completion schedule of all project elements.

<b>Table 2.1 Project Timeline</b>		
<i>Project Element</i>	<b>Initiation Date</b>	<b>Completion Date</b>
Benchmark Existing Solid Waste Systems	June 2001	December 2001
Identify Program Options for Evaluation	June 2001	November 2002
Customize and Upgrade the WastePlan Software	July 2001	November 2002
Conduct Program Evaluations	July 2001	March 2003
Develop WastePlan <i>User Guide</i> and Case Studies	November 2001	June 2003
Develop Website	November 2002	February 2003
Conduct Training Workshops	April 2002	August 2003
Distribute WastePlan licenses	February 2003	Ongoing
Provide Technical Support	February 2003	Ongoing

### 2.4 Problem Resolution

Some project delays occurred due to the nature of communicating and coordinating with four project participants, the numerous demands placed on county staff, and the iterative process required to obtain all necessary data. An extension of the project schedule was requested and granted to accommodate these delays.

## SECTION 3.0 PROJECT RESULTS

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### 3.1 Project Accomplishments

This Innovative Grant project resulted in development of Florida WastePlan, a software program to assist local solid waste management decision makers with long-term evaluation of their existing program and future program changes, including source reduction and recycling initiatives. This was accomplished by significantly upgrading WastePlan, an existing program developed by Tellus Institute, and making it more user-friendly. The upgraded program was then demonstrated through the participation of four Florida counties (Seminole, Alachua, Highlands, and Pinellas). These four counties have diverse solid waste management systems and demographics, allowing for demonstration of a broad range of WastePlan's capabilities.

Each county's existing solid waste management system was carefully modeled to provide an accurate baseline, or reference, analysis over the next ten years. Three of the four counties then had a scenario analysis constructed to evaluate a proposed program change. Case studies for all four county models were developed and are provided in Appendix D.

Through this project, licenses for WastePlan are available, at no charge, to solid waste managers in up to 100 Florida cities and counties. Licenses can be obtained through the *WastePlan for Florida* website ([www.wasteplan.org/florida](http://www.wasteplan.org/florida)). The case studies, a *User Guide*, and other project information are also available on the website.

### 3.2 Advanced Technologies

This project demonstrated the use of a state-of-the-art software program for modeling comprehensive solid waste management systems. Such a powerful analytical tool was not previously being used by Florida communities. With WastePlan, users can develop a "desk-top" version of a complete solid waste management system, allowing them to see all available data in one place. It incorporates full-cost accounting principles, and uses this information for long-term planning and evaluation.

While use of this advanced technology greatly enhances analytical capabilities, WastePlan, as with all comprehensive modeling systems, takes time to learn and understand. During the course of the project, a full-day training workshop was held for project participants. In addition, numerous conference calls were conducted with each county to walk them through their specific models. Even though representatives from the participating counties recognized WastePlan as a

very powerful analytical tool, feedback from them indicated that none felt they had become proficient at using the program. This indicates that either additional time and training was needed to become proficient at using WastePlan, greater involvement of county staff was needed in creating the models of their existing systems, or greater technical knowledge of software model development was required.

### **3.3 Potential for Increased Material Recovery**

The premise behind this project is a sound one – that by providing solid waste managers with a tool to demonstrate and quantify the environmental and economic benefits of proposed source reduction and recycling initiatives, they are better able to gain support and approval for implementation of these programs. WastePlan clearly has the ability to fully evaluate the long-term impacts, both economic and environmental, of such waste reduction initiatives. Although the case studies conducted as part of this project utilized a ten-year planning period, WastePlan has the capability of longer-term projections.

One of the key software upgrades was to incorporate Resource Conservation Benefit (RCB) worksheets into the model. This allows for automatic quantification of environmental benefits such as landfill space savings, reduction in greenhouse gas emissions, reduction in virgin timber consumption, energy savings (expressed in BTUs and gallons of gasoline), and reduction in air emissions. The RCB worksheets also quantify the financial benefits specifically derived from source reduction and recycling programs.

WastePlan’s analytical capabilities are directly related to the accuracy and level of detail of the data input into the model, as well as how it is input (e.g., inputting costs as variable versus fixed). Based on the project results, the challenge with WastePlan will be for county and municipal solid waste staff to have the time to gain sufficient understanding of the program in order to utilize it to its full potential.

### **3.4 Technology Transfer**

The WastePlan software is not only transferable to all Florida communities, this project provides up to 100 software licenses at no charge to interested cities and counties through the *WastePlan for Florida* website. An outreach campaign was conducted to notify local solid waste managers of this opportunity. This outreach campaign appears to have been successful, with over 30 individuals, to date, downloading the demonstration version of WastePlan from the website.

Two main challenges exist regarding the transfer of this technology to other Florida communities. As mentioned previously, it requires a commitment to learn and understand the software program, its capabilities, and how to input and maneuver data within a model. Secondly, most counties already have some form of accounting system. While such a system may not have the analytical capabilities of WastePlan, some counties may be reluctant to learn and utilize a new program despite its enhanced capabilities.

### 3.5 Cost-Effectiveness

Table 3.1, *Costs by Project Element*, summarizes the costs of the project, including grant funds expenditures and in-kind contributions for each project element.

<i>Project Element</i>	<b>In-Kind</b>	<b>Grant Funds</b>	<b>Total</b>
Benchmark Existing Solid Waste Systems	\$8,220	\$25,000	\$33,220
Identify Program Options for Evaluation	\$10,400	\$25,000	\$35,400
Customize and Upgrade WastePlan Software	\$5,000	\$30,000	\$35,000
Conduct Program Evaluations	\$10,400	\$35,000	\$45,400
Develop <i>User Guide</i> and Case Studies	\$5,040	\$23,000	\$28,040
Develop Website	\$2,000	\$5,000	\$7,000
Conduct Training Workshops	\$7,440	\$21,000	\$28,440
Distribute WastePlan Licenses	\$100,000	\$0	\$100,000
Provide Technical Support	\$5,000	\$12,000	\$17,000
Report Preparation	\$7,200	\$18,500	\$25,700
Project Administration	\$3,300	\$25,000	\$28,300
<b>Total</b>	\$164,000	\$219,500	\$383,500

This project provided significant benefits to the participating counties in that it helped them take a fresh and comprehensive look at their total solid waste management systems. The data-gathering exercise in itself helped them compile valuable programmatic information.

A true cost/benefit analysis is not possible at this time since the main benefits of this project are the long-term environmental and economic benefits of implementing the program changes that are evaluated using WastePlan. However, looking at just the monetary value of the 100 WastePlan licenses being offered to Florida communities at no charge, the benefits are

significant. The current market value of the 100 licenses (\$200,000, or \$2,000 per license for public sector entities), plus the project benefits to the four participating counties, far exceeds the grant funds expended by DEP.

**FOR IMMEDIATE RELEASE**

**Contact:**     **Robin Mitchell, Kessler Consulting, Inc.**  
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**Florida WastePlan:  
A Solid Waste Management Planning Tool for Florida Communities**

Seminole County, Kessler Consulting, Inc., and Tellus Institute are pleased to announce the availability of WastePlan, a solid waste management planning tool for use by Florida communities. This program planning software is being made available, free of charge, to Florida cities and counties as a result of a Florida Department of Environmental Protection Innovative Recycling and Waste Reduction Grant awarded to Seminole County. Program partners also included Alachua, Highlands, and Pinellas Counties, whose system information was modeled in WastePlan to assist in customizing the program for Florida communities.

WastePlan is a user-friendly computer program designed to facilitate integrated solid waste planning and analysis. With WastePlan, an integrated solid waste management system can be “built” right on your computer screen. The system can be as comprehensive and detailed as the user desires depending upon the amount of operational and financial information input into the program.

Modeling begins by quantifying and describing the waste generated in a community, based on user-defined generator types and waste categories. The generated waste is then directed into defined sectors of source reduction, collection, recycling, and composting, each of which have associated operational parameters, costs, and revenues. Finally, the collected wastes are routed to existing or planned facilities, which may be transfer stations, recycling or composting facilities, incinerators or landfills.

The results are calculated automatically and describe the simulation of a real or planned solid waste system. Waste flows, diversion rates, collection truck and labor requirements, processing and disposal capacity needs, total costs, and costs per ton are presented in a variety of output formats. Environmental benefits, known as “resource conservation benefits,” associated with local waste diversion programs are automatically quantified. WastePlan also allows for

sensitivity analyses of various program changes or options by modifying assumptions about technologies, efficiencies, costs, or performance of any part of the system.

Florida County or City Solid Waste Managers can learn more about WastePlan, register for a license to use it, and download the program at [www.wasteplan.org/florida.html](http://www.wasteplan.org/florida.html). Additional information is available by contacting Kessler Consulting at (813) 971-8333.

###



***A Solid Waste Management Planning Tool for Florida Communities***

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Additional information is available by contacting:

**Kessler Consulting**

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**Florida WastePlan Demonstration Project  
Seminole County Case Study**

## Introduction

Using the *WastePlan* software, Tellus Institute created a model to examine Seminole County's solid waste management system. A Baseline Model was first developed to benchmark the County's solid waste programs. This model was based on Fiscal Year 1999/2000 (FY 99/00) and included a 10-year projection of system operations. A Scenario Analysis was then conducted to evaluate the results of modifying specific program components. This case study provides a summary of the County's solid waste management system, explains development of the Baseline and Scenario Analyses, and compares the results of the two.

Seminole County is located north of Orlando and is bordered by Volusia, Lake, Brevard, and Orange counties. According to the 2000 census, the County's population was 365,196, an increase of 77,667 since 1990. This 27% increase is the 5th largest increase within the 15 largest counties in Florida. Seminole County's population has been increasing rapidly since 1970, as have most areas adjacent to Orlando. The vast majority of population growth has been due to net migration. Approximately 54% of Seminole County households (almost 56,000 households) were living in unincorporated areas in 2000, with the remainder (over 48,000 households) in municipalities.

### **Seminole County Solid Waste Management System**

#### Collection

Residential collection in the unincorporated County is provided by three private haulers through exclusive franchise agreements. These agreements require that all municipal solid waste (MSW) collected in this program be delivered to County facilities. Residents have a choice of four different levels of service:

- (1) Twice per week garbage, weekly recycling, and weekly yard waste collection (the most commonly selected service level).
- (2) Twice per week garbage and weekly recycling collection.
- (3) Weekly garbage, weekly recycling, and weekly yard waste collection.
- (4) Weekly garbage and weekly recycling collection.

Self-hauling materials to County-operated facilities is also available for those who have received an exemption from curbside collection. Recyclables collected include old newsprint (ONP); magazines and catalogs; all narrow-necked plastic bottles; clear, green, and brown glass containers; and aluminum and steel cans. Old telephone books are collected for a limited time each year in this program. Recyclables are collected in 15-gallon bins and separated at the curb into two streams, fiber and commingled containers.

Unincorporated County residents living in single-family homes pay an annual, non-ad valorem assessment for solid waste services. This assessment covers the cost of collection and disposal, as well as costs for assessment collection and contract administration. The assessment varies according to franchise area and level of service. Residential dwelling units that have been granted exempt status are assessed only disposal and administrative fees. The County pays each hauler a specified amount per household for disposal and the hauler pays the tip fee at County facilities.

Collection of MSW from commercial and multi-family generators is conducted under an open market system in unincorporated Seminole County. Commercial customers contract directly with the hauler of their choice for service. Haulers must obtain a "Certificate of Public Convenience and Necessity" in order to provide collection service to commercial/multi-family generators. The County believes that most of the MSW collected is delivered to the County landfill or Central Transfer Station, though it receives very little of the recyclable materials collected from commercial/multi-family generators.

Of the seven municipalities in Seminole County, one directly provides residential MSW collection and six have exclusive franchise agreements. The cities of Lake Mary, Sanford, and Winter Springs have exclusive franchises for the collection of commercial/multi-family MSW. The cities of Altamonte Springs, Casselberry, Longwood, and Oviedo have non-exclusive commercial franchises.

Seminole County also operates citizen drop-off areas for recyclables at the Central Transfer Station and the landfill. The same recyclable materials collected in the curbside program are accepted at the drop-off facilities. There are also citizen drop-off areas for Household Hazardous Waste (HHW) at the County's transfer station and landfill. The HHW program accepts automobile batteries, disinfectants, insecticides, propane tanks, lawn chemicals, fluorescent light tubes, glues, poisons, solvents, antifreeze, household batteries, pool chemicals, gasoline, paints and other materials.

#### County Facilities

The County owns and operates the Seminole County Landfill and the Central Transfer Station (CTS). In FY 99/00, the tip fee at both facilities for garbage and yard waste was \$33.17/ton. Garbage and yard waste are loaded separately into transfer trailers and taken to the landfill. Approximately 90% of the garbage and yard waste collected in the County goes through the CTS before being transported to the Seminole County Landfill. The landfill has over 40 years of capacity remaining.

**Recyclables are accepted only at the CTS, and no tip fee is charged.** Recyclables are delivered in a two-stream sort: fiber and commingled containers. Municipalities or their haulers may also bring recyclables to the CTS. All or most recyclables from Casselberry, Lake Mary, and Altamonte Springs are delivered to the CTS,

**but only a small percentage of recyclables are received from Winter Springs, Longwood, and Sanford. Typically, no recyclables are received from Oviedo.**

Processing

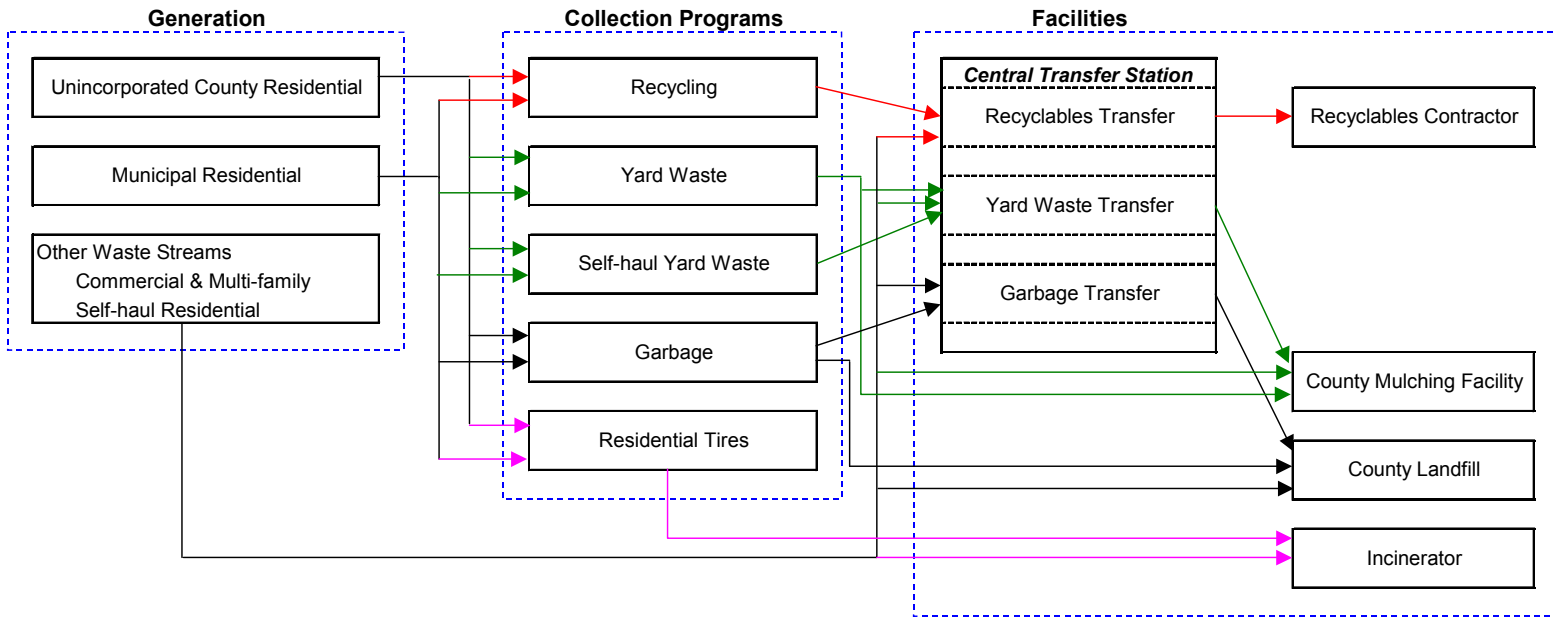
Seminole County has a processing agreement for recyclables with Waste Management, which has the following terms:

- The County receives a processing payment for its fiber stream with a guaranteed floor price of \$42 per ton.
- The County receives a \$2.50 per ton processing payment for its commingled container stream.
- If the monthly average market value for commingled containers exceeds \$151.67/ton, the County will receive an additional payment equal to 50% of the difference between the monthly market value and the base average market value.
- If the County chooses to transport recyclable materials to the processing facility, the contractor will pay \$175 per fully loaded transfer trailer delivered to the Orange County MRF, operated by Waste Management.

Once yard waste has reached the landfill, the County's contractor processes it through a tub grinder. The mulched yard waste is then 1) utilized onsite for landfill cover and side-slope stabilization, 2) transported off-site for energy recovery, or 3) utilized for landscaping by County residents who pick it up from the facility at no charge. The County pays the contractor \$7.25/ton for processing yard waste for onsite use, \$10.00/ton for processing yard waste for removal, and \$12.00/ton for removing yard waste offsite.

Figure 1 depicts the basic solid waste material flows in Seminole County.

Figure 1 – Seminole County WastePlan Model Structure<sup>1</sup>



<sup>1</sup> Developed by Kessler Consulting, Inc.

### **Baseline Analysis**

**The County provided data describing the quantity and flow of materials through its solid waste management system, as well as detailing costs and revenues associated with the system. Using this information and interviews with Seminole County staff, Tellus constructed a Baseline Model that includes FY 99/00 (Model Year 2000) as the Current System and a Reference Scenario that projects the status quo through 2010. Total Current System costs and revenues in the model were \$9,060,304 and \$10,588,560 respectively.**

**These costs are consistent with the FY 99/00 cost data provided by the County.**

**The system was modeled as follows (capitalized terms generally refer to named model elements):**

#### Key Assumptions

An inflation rate of 3 percent was selected at the beginning of model development. For each cost and revenue included later in the model, a decision was made as to whether that cost or revenue should increase at the rate of inflation. Most of the Itemized Costs and Assessment Fees mentioned below were modeled to increase with inflation, except for tip fees and other revenues.

#### **Generation**

The Baseline Model includes two local generating sectors that represent the County Franchise Residential collection area in the unincorporated county and Municipal Residential generation. The number of households in the County Franchise Residential area is projected to rise 1.924% annually and 2.968% in the Municipalities, based on recent growth patterns. Number of households and per household waste generation rates together drive the amount of waste entering the system from each sector. The types of waste generated by each sector are defined using waste composition data for single-family residential households and waste diversion data.

The following five import streams are also included in the model:

- (1) Commercial and MultiFamily Import – includes all commercial and multi-family MSW delivered to County facilities.
- (2) County Franchise Small Load Self-Hauled MSW – includes loads of up to eight containers of MSW self-hauled by unincorporated County residents, for which no tip fee is charged.
- (3) County Franchise Large Load Self-Hauled MSW – includes loads of more than eight containers, carloads, pickup loads, or small trailers of up to one-ton capacity of MSW self-hauled by unincorporated County residents, for which no tip fee is charged.
- (4) Municipal Small Load Self-Hauled MSW – includes loads of up to eight containers of MSW self-hauled by municipal residents, which are charged flat-rate tip fee (i.e., tip fee per load rather than per ton).
- (5) Municipal Large Load Self-Hauled MSW – includes loads of more than eight containers, carloads, pickup loads, or small trailers of up to one-ton capacity of MSW self-hauled by municipal residents, which are charged a flat-rate tip fee (i.e., tip fee per load rather than per ton).

With the exception of Commercial and MultiFamily Import, each of these import streams is assumed to have the single-family waste composition described above. The composition for Commercial and MultiFamily Import is derived from waste composition data from these sources. With the same exception, the quantity of waste for all imports is assumed to increase at the same rate as households, 1.924% annually in the County Franchise Residential area and 2.968% in the Municipalities. Since the County has no control over the disposal destination of commercial and multi-family waste, the amount imported from the Commercial and MultiFamily Import stream is assumed to remain constant.

### **Collection Programs**

The following collection programs are included in the model. Although the County pays the franchise haulers for collection of garbage, recyclables, and yard waste from residents of the unincorporated area, residents pay an assessment to cover this cost; therefore, this is essentially a pass-through expense and is not included in the model.

- Recycling

County Franchise Recycling is the collection program to which recyclables generated in the County Franchise Residential area are routed. The County receives no revenue, but incurs costs from providing replacement recycling bins annually and from associated program administration.

Recyclables generated in the Municipalities are routed to Municipal Recycling. There are no costs or revenues associated with this collection program as Seminole County is not involved with this service.

- Composting

Yard waste from the County Franchise Residential generating sector is routed to three composting collection programs:

- (1) County Franchise Yard Waste Collection – yard waste collected by the County’s franchise haulers.
- (2) County Franchise Small Load Self-Hauled Yard Waste – loads of up to eight containers of yard waste self-hauled by unincorporated County residents, for which no tip fee is charged.
- (3) County Franchise Large Load Self-Hauled Yard Waste – loads of more than eight containers, carloads, pickup loads, or small trailers of up to one-ton capacity of yard waste self-hauled by unincorporated County residents, for which no tip fee is charged.

Similarly, Yard waste from the Municipal Residential generating sector is routed to three composting collection programs:

- (1) Municipal Yard Waste Collection – yard waste collected by the municipalities or their contract haulers.

- (2) Municipal Small Load Self-Hauled Yard Waste – loads of up to eight containers of yard waste self-hauled by municipal residents, which are charged flat-rate tip fee (i.e., tip fee per load rather than per ton).
- (3) Municipal Large Load Self-Hauled Yard Waste – loads of more than eight containers, carloads, pickup loads, or small trailers of up to one-ton capacity of yard waste self-hauled by municipal residents, which are charged a flat-rate tip fee (i.e., tip fee per load rather than per ton).

- Special Wastes

The County’s Residential Tire Program receives tires from both the County Franchise Residential and Municipal Residential generating sectors. Since generators deliver tires to the County facilities, the County incurs no collection costs.

- Garbage Collection

Refuse from the County Franchise Residential generating sector is routed to the County Franchise Garbage Collection program. Similarly, refuse from the Municipal Residential generating sector is routed to the Municipal Garbage Collection program.

**Facilities**

**As mentioned previously, the County operates a transfer station and landfill, both of which are included in the Facilities section of the model. In addition, the County handles recyclables and compostable material (yard waste) at its facilities and contracts for the processing of these materials. These contractual arrangements are also included in the Facilities section of the model.**

- Transfer Station

In the *WastePlan* model, the Central Transfer Station (CTS) operations are divided into three areas or cost centers: CTS Recyclables, CTS Yard Waste, and CTS MSW. Operating and Equipment replacement costs, and debt service are shared among the three cost centers based on the respective tonnages of recyclables, yard waste, and garbage delivered to the CTS.

CTS Recyclables receives recyclables from the County Franchise Recycling collection program and Commercial and MultiFamily Imports, as well as a portion of those from the Municipal Recycling collection program. The County does not receive tip fee revenue for this material.

CTS Yard Waste receives the vast majority of yard waste from the County Franchise Yard Waste collection program, Municipal Yard Waste collection program, County Franchise Large Load Self-Hauled Yard Waste, County Franchise Small Load Self-Hauled Yard Waste, Municipal Yard Waste Collection, Municipal Large Load Self-Hauled Yard Waste, and Municipal Small Load Self-Hauled Yard Waste. (A small percentage is delivered directly to the landfill.) Yard waste from the Commercial and MultiFamily Import stream is also delivered to the CTS. The County receives tip fee revenue from all but the County Franchise Small Load Self-Hauled Yard Waste and County Franchise Large Load Self-Hauled Yard Waste sectors, which are accepted by the County with no tip fee.

CTS MSW receives refuse from the following sectors: County Franchise Garbage collection, Municipal Garbage collection, Commercial and MultiFamily Imports, County Franchise Large Load Self-Hauled MSW, County Franchise Small Load Self-Hauled MSW, Municipal Large Load Self-Hauled MSW, and Municipal Small Load Self-Hauled MSW. The County receives tip fee revenue from all but the County Franchise Small Load Self-Hauled MSW and County Franchise Large Load Self-Hauled MSW sectors, which are accepted by the County with no tip fee.

- Recycling

The model routes recyclables collected at the CTS to WM Processing, which represents Waste Management, the County's recyclables processing contractor. The County incurs a variable cost for the transfer of this material to Waste Management's processing facility, as well as Itemized Costs related to the recycling program and its administration. Seminole County receives revenue from Waste Management for transporting the recycled materials, as well as revenue for the recyclable commodities themselves, as specified in the contract and explained in the Introduction.

- Composting

Yard waste received at the CTS is transferred to the Seminole County Mulching site at the County Landfill, where the balance of yard waste from the following sectors is delivered: County Franchise Yard Waste collection, Municipal Yard Waste collection, Commercial and MultiFamily Imports, County Franchise Large Load Self-Hauled Yard Waste, County Franchise Small Load Self-Hauled Yard Waste, Municipal Large Load Self-Hauled Yard Waste, and Municipal Small Load Self-Hauled Yard Waste.

The County incurs a cost for the transfer of yard waste from the CTS to the Mulching site, a per-ton cost for the services of its yard waste processing contractor, and Itemized Costs related to the recycling program and its administration. The County receives tip fee revenue for all yard waste delivered directly to the Mulching site (yard waste transferred from the CTS is charged a tip fee at that location), except for yard waste from the County Franchise Small Load and Large Load Self-Hauled Yard Waste sectors, which are not charged a tip fee.

- Landfill

The Seminole County Landfill receives refuse directly from the following: County Franchise Garbage collection, Municipal Garbage collection, Commercial and MultiFamily Imports, County Franchise Large Load Self-Hauled MSW, County Franchise Small Load Self-Hauled MSW, Municipal Large Load Self-Hauled MSW, and Municipal Small Load Self-Hauled MSW. In addition, garbage is transferred from the CTS to the landfill.

The County incurs a cost for the transfer of waste from the CTS to this facility, debt service costs, and additional Itemized Operating and Equipment Costs associated with the facility and its operations. The County receives tip fee revenue for garbage delivered directly to the landfill (waste transferred from the CTS is charged a tip fee at that location), except for garbage from the County Franchise Small Load and Large Load Self-Hauled MSW sectors, which are not charged a tip fee.

- Incinerator

The Wheelabrator Ridge Incinerator receives all tires from the Commercial and MultiFamily Import stream and from the Residential Tire Program. The County receives a per-ton tip fee for these tires and pays a lower per ton tip fee to the incinerator.

#### Resource Conservation Benefits

Source reduction and recycling have benefits beyond the direct avoided disposal costs. These benefits include landfill space savings, avoided air emissions including greenhouse gasses (GHGs), energy savings, and forest acreage savings. WastePlan's Resource Conservation Benefits (RCB) Worksheets calculate the source reduction program potential and resource conservation benefits (RCB) associated with various solid waste management system practices and configurations. The results of the WastePlan Baseline Analysis for Seminole County in 2000 show a total of 11,924 tons of recycled material plus over 42,700 tons of yard waste diverted for composting. The recyclables are paper (7,463 tons), plastics (1,201 tons), glass (2,267 tons), and metals (993 tons). There are no data or estimates on source reduction tonnage in Seminole County.

The resource conservation benefits associated with the recycling and composting described above include:

- over 3,022,000 cubic feet of saved landfill space;
- greenhouse gas reductions of 9,126 metric tons of carbon equivalent (MCTE);
- more than 207,000 million BTU of energy savings; and
- about 2,566 acres of forest saved.

**The landfill space savings are the result primarily of the significant yard waste diversion, while paper recycling accounts for the bulk of greenhouse gas reductions and forest benefits. Most of the energy reductions result from a combination of the recycling of paper and metals.**

#### *Scenario Analysis*

Officials from Seminole County decided to use *WastePlan* to examine the potential impacts of modifying the tip fee pricing structure for self-hauled yard waste.

#### Corrected Reference Scenario

To facilitate this analysis, it was first necessary to more accurately quantify the amount of garbage and yard waste contained in self-hauled loads. In the baseline analysis, the quantity of self-hauled MSW and yard waste was estimated by dividing the total amount of flat-rate tip fees collected by the County's per ton tip fee. While this was the best estimate at the time the Baseline Model was developed, it was known to underestimate the actual quantity of materials delivered.

Therefore, the County conducted a study of self-hauled loads and provided Tellus Institute with more accurate information to input into the model. This "corrected" information was utilized to construct the Corrected Reference (2001-2010) projection. This Corrected Reference scenario contains more accurate information regarding the following:

- Quantity of County Franchise Large Load Self-Hauled MSW, County Franchise Small Load Self-Hauled MSW, Municipal Large Load Self-Hauled MSW, and Municipal Small Load Self-Hauled MSW delivered to the CTS and landfill.
- Quantity of yard waste delivered by the Self-Hauled sectors versus the County Franchise and Municipal collection programs.

Once more accurate tonnage information was compiled, it was possible to more accurately translate the flat-rate tip fees for self-hauled MSW to per-ton tip fees. These revised tip fees were used in the Corrected Reference scenario to adjust the revenue received by the County for Municipal Self-Hauled MSW delivered to the CTS and landfill, and Municipal Self-Hauled Yard Waste delivered to the CTS and Mulching site.

This Corrected Reference projection was then used as the “new” baseline model for comparison with the Scenario projections that are discussed below.

#### Scenario Projections

Five scenarios related to self-hauled yard waste were modeled.

- (1) Weighed Muni Lg. SH YW: Scenario in which, beginning in 2003, large self-hauled loads of yard waste from the municipalities are weighed and charged \$33.17 per ton. Yard waste self-hauled by residents from the County franchise area is still tipped for free.
- (2) Weighed All Lg. SH YW: Scenario in which, beginning in 2003, large, self-hauled loads of yard waste from the County franchise area and the municipalities are weighed and charged \$33.17 per ton.
- (3) Lower fee, Weighed Muni Lg. SH YW: Scenario in which, beginning in 2003, 1) Large, self-hauled loads of yard waste from the municipalities are weighed and charged \$27/ton; and 2) All other weighed sources of yard waste are also charged \$27/ton. Yard waste self-hauled by residents from the County franchise area is still tipped for free.
- (4) Lower fee, Weighed All Lg. SH YW: Scenario in which, beginning in 2003, 1) Large, self-hauled loads of yard waste from the County franchise area and the municipalities are weighed and charged \$27/ton; and 2) All other weighed sources of yard waste are also charged \$27/ton.
- (5) 10% Ton Drop, Weighed Muni Lg. SH YW: Scenario in which, beginning in 2003, 1) Large, self-hauled loads of yard waste from the municipalities are weighed and charged \$33.17/ton; 2) All other weighed sources of yard waste are also charged \$33.17/ton; and 3) Tonnage of large, self-hauled loads of yard waste from the municipalities drops by 10%.

There were several noteworthy assumptions made in the preparation of the Seminole County baseline and scenario analyses:

- Self-hauled MSW, which in the model is imported directly to the CTS or landfill, has the same composition as the County franchise and municipal residential MSW and is from households that do not otherwise receive curbside collection.
- Self-hauled yard waste is from households in the respective residential areas (County franchise or municipalities).

- Yard waste represents 32.35% of the total waste stream generated in these areas.
- The yard waste processing cost is the same in the Corrected Reference scenario as it was in the initial Reference model.
- An average processing cost for yard waste of \$16.10 per ton is used in the model.

To facilitate the analysis of potential decreases in yard waste tonnage resulting from the changed tip fee structure, Percent Tonnage Drop was incorporated into the Scenario Analysis as a Key Assumption. This *WastePlan* feature allows for easy construction of additional scenarios using different assumptions regarding changes in the quantities of self-hauled yard waste.

*Comparative Results*

Comparing the Corrected Reference scenario with the five self-hauled yard waste scenarios yields the System-Wide Cost/Revenue Comparison for Model Year 2003, the first year in which the County might make changes to its flat-rate pricing system for self-hauled yard waste, presented in Table 1. The *WastePlan* results presented in Table 1 indicate that for four of the five scenarios, there is a significant net increase in revenues by charging tip fees based on actual weights of the self-hauled yard waste loads rather than flat rates. Only in the scenario where the tip fee yard waste is lowered to \$27/ton and self-hauled yard waste from municipalities, but not from County franchise areas, are charged this per-ton tip fee, are net revenues virtually the same as in the Corrected Reference. While in three scenarios the net revenue increase is in the range of \$325,000 - \$366,000 per year, the greatest increase in net revenue is achieved in the case where all loads, both from municipalities and the County franchise areas, are weighed and charged \$33.17 per ton.

*Table 1 – System-Wide Cost/Revenue Comparison for Model Year 2003*

All Costs/Revenues	Corrected Reference	Weighed Muni Lg. SH YW	Weighed All Lg. SH YW	Lower fee, Weighed Muni Lg. SH YW	Lower fee, Weighed All Lg. SH YW	10% Ton Drop, Weighed Muni Lg. SH YW
Costs	-9,861,539	-9,861,491	-9,861,491	-9,861,491	-9,861,491	-9,833,175
Revenues	10,874,893	11,224,931	11,655,187	10,890,932	11,241,156	11,171,567
Net	1,013,353	1,363,440	1,793,696	1,029,441	1,379,665	1,338,392
Change from Reference		350,087	780,343	16,088	366,312	325,039

**Conclusion**

**Based on the *WastePlan* scenario analysis described above, it is financially advantageous for the County to weigh self-hauled loads of yard waste in all scenarios considered. It is most advantageous to weigh all loads, both from the municipalities and from the County franchise areas, and to maintain the tip fee at \$33.17 per ton. Lowering the tip fee**

**to \$27 per ton reduces the net benefit of weighing all loads by more than 50%, from about \$780,000 to \$366,000.**

**Similarly, maintaining the current tip fee of \$33.17 but weighing only municipal loads provides \$350,000 in net benefits. The one scenario only marginally worth pursuing is the option of lowering the tip fee to \$27 per ton and only weighing the self-haul loads from municipalities. The**

**\$16,000 net revenue increase may not be worth the administrative efforts required to implement the weighing program.**

**Since charging a per-ton tip fee may result in a decrease in the amount of yard waste delivered to County facilities, the final scenario in which a 10% drop in municipal self-hauled loads is projected, is noteworthy. This 10% drop results in only a modest decline, approximately \$25,000, in net economic benefits to about \$325,000. The model is structured so that additional assumptions regarding decreases in yard waste could easily be modeled and evaluated.**

**Florida WastePlan Demonstration Project  
Pinellas County Case Study**

**Introduction**

**The population of Pinellas County was estimated to be 898,784 in 1999. Roughly one-third of the County's population resides in the unincorporated areas, one-third in the City of St. Petersburg, and one-third in the other 23 municipalities.**

The County operates facilities for self-hauled refuse and recycling as well as a yard waste-to-mulch program, a household electronics and chemicals collection center, a metals recovery site, a waste-to-energy (WTE) facility, and a landfill at which both MSW and construction & demolition waste is managed. Other than the drop-off sites, the County is not involved with the collection of waste. Figure 1 depicts the basic solid waste material flows in Pinellas County.

### Collection

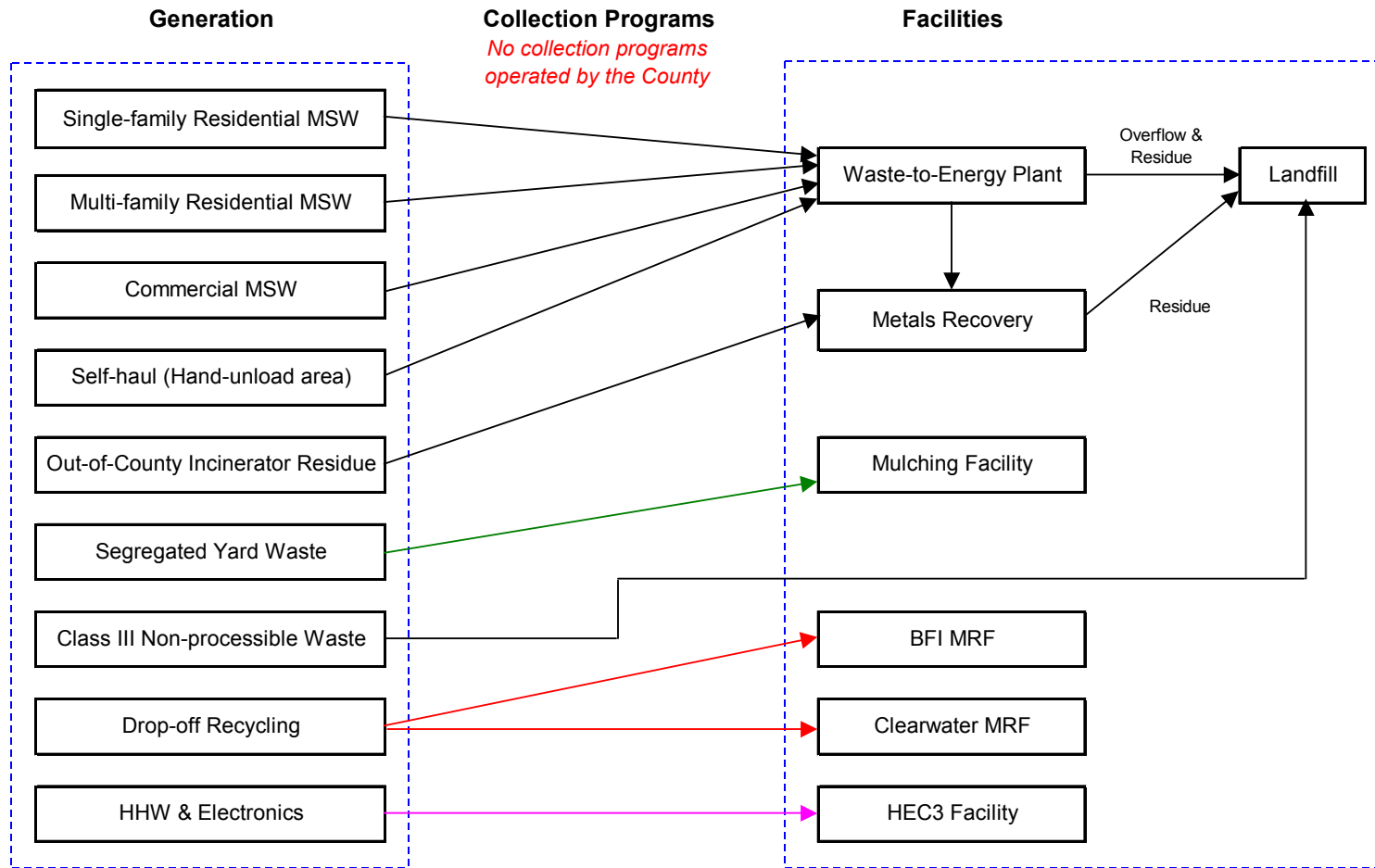
Unincorporated Pinellas County has a free enterprise system for solid waste collection from its single-family residential, multi-family residential, and commercial businesses and institutions. Each selects and pays for the level of service desired and may change collection companies as needed. The 24 municipalities in Pinellas County use varied methods to collect solid waste from residents and businesses that range from municipal collection to contracts with private hauling companies. The County has inter-local agreements with each municipality that requires all refuse collected or controlled by the cities be delivered to County facilities.

The mini hand-unload area is provided for people to safely unload refuse by hand from smaller vehicles, thereby avoiding larger trucks at the landfill or on the WTE plant's tipping floor. Residents and people with small commercial vehicles are the primary users of this area. The landfill contractor is responsible for maintaining this area and transporting the full containers to the WTE plant. Since 2003, segregated yard waste that would have been directed to the mini hand-unload area is instead directed to the mulching area.

**The County also operates nine drop-off centers for recyclables, four in the North County and five in the South County. BFI Waste Systems (BFI) and the City of Clearwater serviced the South and North drop-off centers respectively, under contract with Pinellas County, until late 2002, at which time the County contracted with the City of Clearwater to service all drop-off centers. The County pays vendors for hauling and processing services, and receives a percentage of revenues from the sale of recycled materials.**

**Residents from Pinellas County can also drop off common household electronics and chemicals at the Household Electronics & Chemical Collection Center (HEC<sub>3</sub>). The County contracts for waste removal, recycling and/or disposal services for this center.**

**Figure 1**  
**Pinellas County WastePlan Model Structure**



## Processing

Clean, segregated yard debris is delivered to the mulching area at the Bridgeway Acres site. A subcontractor, under contract with the County's landfill operations contractor, grinds the material using a tub grinder. Twelve Pinellas cities participate in the County's yard waste-to-mulch program, and pay a reduced tipping fee of \$15.00 per ton. As mentioned above, beginning in 2003, segregated loads of yard debris that would have been directed to the mini hand-unload area were instead directed to the mulching area. The *WastePlan* scenario analyses conducted for the Pinellas County case study involve the redirection of additional yard waste from single-family residential and commercial generators to the mulching area beginning in 2004.

Adjacent to the County-owned WTE plant is a Metals Recovery System (MRS), also owned by the County but operated by Resource Recycling, a subcontractor of the WTE contractor, Wheelabrator of Pinellas, Inc. Metals are recovered from combustor ash, shredded, and sorted using a combination of magnets, eddy currents, and hand sorting. The segregated metals are sold to scrap dealers and the revenue is shared between the County, the WTE operator, and the MRS operator. In addition, the subcontractor has agreements with other counties to accept their WTE residuals at the Pinellas County MRS. Each county delivering ash to the facility is required to remove a percentage of the leftover aggregate or pay Pinellas County for its disposal at the Bridgeway Acres Landfill at \$8.64 per ton. Most of the guest counties pay the disposal fee rather than back-haul the ash.

## Disposal

**Refuse generated in the County is directed to Pinellas County's WTE plant, which is operated by and maintained under contract with Wheelabrator of Pinellas, Inc. Any overflow or residue is directed to the County's landfill, as is incinerator ash that has been through the MRS. Each month, the County receives revenue from the electricity generated by the WTE plant.**

**The Bridgeway Acres Landfill was operated under contract by Superior Waste Services until 2001, at which time the County contracted with Onyx to provide this service. The landfill is used primarily for disposal of ash and solid waste that possesses a low BTU value or cannot be incinerated (e.g., construction & demolition debris). It is also used as a backup when boilers are down at the plant or when there is not enough room to accommodate all incoming garbage on the plant's tipping floor. Ash resulting from the WTE process is used as landfill cover material.**

## Baseline Analysis

**The County provided data describing the quantity and flow of materials through its solid waste management system, as well as detailing costs and revenues associated with the system. Using this information and interviews with Pinellas County Solid Waste Operations staff, Tellus constructed a baseline model that includes Fiscal Year 2000/2001 (Model Year 2001) as the Current System and a Reference Scenario that projects the status quo through 2011. Based on this cost data provided by the County, Total Current System costs and revenues in the model for 2001 were \$52,177,000 and \$66,735,000 respectively.**

**The system was modeled in *WastePlan* as follows (capitalized terms generally refer to named model elements):**

### Key Assumptions

An inflation rate of 3 percent was selected at the beginning of model development. For each cost and revenue included later in the model, a decision was made as to whether that cost or revenue should increase at the rate of inflation. Most of the Itemized Costs mentioned below were modeled to increase with inflation; however, the tip fees and other revenues were not. Rather, the model includes the step increases contained in the various contracts.

### **Generation**

**Because the County has very limited involvement in curbside collection of solid waste, there is little quantitative data available. Therefore, material is modeled as Imports as it was received at County facilities in 2001, and no Collection of material is modeled. Import sectors include the following:**

- **Single Family MSW**
- **Multi Family MSW**
- **Commercial MSW**
- **Mini Hand-Unload**
- **Yard Waste (from participating municipalities)**
- **Drop Off Recycling**
- **Household Hazardous Waste and Electronics**
- **Incinerator Residue from Outside the County**

- **Class III NP (waste that is not easily processed at the WTE - largely Construction and Demolition waste)**

**Each import sector has a unique waste composition as specified by a Pinellas County Waste Composition Study conducted in 2000/2001 (for the Single Family MSW, Multi Family MSW, and Commercial MSW imports) or data on waste received. The Drop Off Recycling import stream composition reflects the material collected by both BFI and the City of Clearwater. The quantity of waste for the Single Family MSW, Multi Family MSW, Commercial MSW, Drop Off Recycling, Incinerator Residue from Outside County, and Yard Waste imports is assumed to increase at 0.79% per year; the remaining waste streams are assumed to remain constant.**

#### **Facilities**

- Recycling

Drop Off Recycling tonnage is split between the City of Clearwater Material Recovery Facility (MRF) and the BFI MRF based on data provided by the contractors to the County. Revenue from the sale of recyclables is received by the County, and revenues and costs associated with the respective contracts and administration of the recycling program are itemized in the *WastePlan* model.

The Metals Recovery System (MRS) processes ash from Pinellas County's WTE facility to recover metals and also recovers metals from Incinerator Residue from Outside the County. The remaining Ash is routed to the Landfill. Net operational and administrative costs of this system are itemized in the model.

The HEC<sub>3</sub> program receives waste only from the HHW and Electronics Import stream, and is the only facility to which that Import is routed. Costs associated with this facility are itemized.

- Composting

**The Bridgeway Acres Mulching Area receives yard waste from the Yard Waste Import stream. In Model Year 2003, segregated yard waste from the Mini Hand Unload Import stream was diverted to the Mulching Area. In addition, the two Pinellas County scenarios modeled in *WastePlan* revolve around the additional routing of yard waste from Single Family MSW and Commercial MSW; this routing is active only in the scenarios. The County receives \$15 per ton in tip fee revenue for the Municipally-generated Yard Waste Import stream. Revenue for the yard waste diverted from the Mini Hand Unload Import stream ranges from \$37.50 per ton to flat per vehicle fees of \$7 to \$15. An average of \$25 per ton is used in the model. The County also pays a per-ton charge to a contractor for mulching, and has additional associated Itemized Costs.**

- Incineration

The County's WTE facility receives all of the material from the Single Family MSW, Multi Family MSW, and Commercial MSW Import streams through the Current System and Reference Scenario projection. It also receives all of the material from the Mini Hand Unload Import stream in the Current System year, but beginning in 2003 the yard waste from that Import is instead routed to the Bridgeway Acres Mulching Area, as described above. Pinellas receives revenue of \$37.50 per ton from each Import that directs material to the WTE plant and also receives revenue from the generation and sale of electricity at the plant. The County incurs a cost per ton of material transferred from the Mini Hand Unload area to the WTE facility, as well as Itemized Costs that are associated with the WTE plant and its operation, including payments to Wheelabrator of Pinellas, Inc.

- Landfill

Class III Non-processible (NP) waste (predominantly C&D debris) is routed directly to the Bridgeway Acres Landfill, as is the ash component of Incinerator Residue from Outside the County. In addition, ash residue and a representative quantity of overflow refuse from the WTE plant are routed here. The County receives tip fee revenue for the ash it receives from outside the county. It also has Itemized Costs associated with the landfill and its operations, including payments to its contractor.

#### **Resource Conservation Benefits**

Source reduction and recycling have benefits beyond the direct avoided disposal costs. These benefits include landfill space savings, avoided air emissions including greenhouse gasses (GHGs), energy savings, and forest acreage savings. WastePlan's Resource Conservation Benefits (RCB) Worksheets calculate the source reduction program potential and resource conservation benefits (RCB) associated with various solid waste management system practices and configurations. The results of the WastePlan Baseline Analysis for Pinellas County in 2001 show a total of 38,508 tons of recycled material plus 15,785 tons of yard waste diverted for composting. The recyclables comprise paper (1,060 tons), plastics (63 tons), glass (64 tons), metals (36,784 tons) and household hazardous waste and electronics (536 tons). The vast majority of the large quantity of metals recycled is recovered from the incinerator operations. There are no data or estimates on source reduction tonnage in Pinellas County.

The resource conservation benefits associated with the recycling and composting described above include:

- over 5,333,000 cubic feet of saved landfill space;
- greenhouse gas reductions of 23,818 metric tons of carbon equivalent (MCTE);
- more than 861,000 million BTU of energy savings; and
- about 372 acres of forest saved.

**Except for the forest acreage saved, which results from paper recycling, the remaining benefits result primarily from the significant recycling of metals.**

*Scenario Analysis*

*WastePlan* was used to examine the implications of increased diversion of yard waste from the Single Family residential and Commercial sectors. Two scenarios were developed, as described below.

Scenario A assumes, beginning in model year 2004:

- 10% diversion of yard waste from the Single Family MSW and Commercial MSW Import streams to the Bridgeway Acres Mulching Area;
- Average tip fee of \$25 per ton for Single Family and Commercial yard debris and yard debris diverted from the Mini Hand Unload Import stream; and
- Cost of yard waste mulching/processing would remain at \$13.84 per ton.

Scenario B assumes, beginning in model year 2004:

- Diversion of yard waste from the Single Family MSW and Commercial MSW Import streams to the Bridgeway Acres Mulching Area begins at 5% and increases linearly to 20% in 2011;
- Average tip fee of \$25 per ton for Single Family and Commercial yard debris and yard debris diverted from the Mini Hand Unload Import stream;
- Cost of yard waste mulching/processing increases to \$15 per ton; and
- Revenue from the sale of processed compost averages \$10 per ton beginning in Model Year 2008.

The Yard Waste Diversion is defined as a Key Assumption in the model, allowing for easy construction of additional scenarios around various additional quantities of yard waste diverted from the Single Family MSW and Commercial MSW Import streams in *WastePlan*.

Comparative Results

It should be noted that the scenario analyses are quite dependent on assumptions about how costs and revenues change over time. Initial comparison of the Reference Scenario with the two Yard Waste Scenarios yields the System-Wide Cost/Revenue Comparison for Model Year 2004, the first year in which the additional waste would be diverted, presented in Table 1. The *WastePlan* results presented in Table 1 suggest that it may not be cost effective to increase diversion of Yard Waste away from disposal (primarily at the WTE plant) and to the Bridgeway Acres Mulching Area.

Table 1 – System-Wide Cost/Revenue Comparison for Model Year 2004

All Costs/Revenues	Reference	Yard Waste Scenario A (10% add'l diversion in 2004)	Yard Waste Scenario B (5% add'l diversion in 2004)
Total Tons Refuse	1,017,732	1,009,913	1,013,822
Costs	-54,886,363	-55,287,836	-55,353,026
Revenues	70,495,187	70,335,299	70,496,053
Net Revenue / Cost	15,149,841	15,047,463	15,143,028
Change from Reference		-102,378	-6,813

Closer examination of the changes that occur between scenarios facilitates an understanding of how and why costs and revenues change as more yard waste is diverted.

While the table above reflects all MSW system costs and revenues, the changes from scenario to scenario reflect the effect of tonnage changes on the variable (per ton) costs at the WTE and the Mulching Area in the model. In particular, a ton diverted from the WTE plant in 2004 would save contractor costs of \$21.23 per ton, but would lose tip fee revenue of \$37.50 per ton and electricity generation revenue estimated at \$28.62 per ton, for a net revenue loss of \$44.89 per ton. The relatively few tons diverted from the Mini Hand Unload would save an additional \$4.31 per ton in transport costs. Tons routed to the Mulching Area would incur contractor costs of \$13.84 per ton and would generate an estimated \$25 per ton in tip fee revenue, for a net revenue gain of \$11.16 per ton. Thus, the typical ton diverted from the WTE to the Mulching Area yields \$33.73 less revenue for the County.

It is interesting to also examine costs and revenues from scenario to scenario in a later year, after the Scenario B diversion rate has reached 20% and its assumption that the County will charge for the sale of processed compost has taken effect (\$10 per ton beginning in 2008). As with Table 1, Table 2 presents the results of that comparison for the entire system for 2011.

Table 2 – System-Wide Cost/Revenue Comparison for Model Year 2011

All Costs/Revenues	Reference	Yard Waste Scenario A (10% add'l diversion in 2011)	Yard Waste Scenario B (20% add'l diversion in 2011)
Total Tons Refuse	1,072,867	1,064,606	1,056,346
Costs	-64,452,531	-64,377,795	-64,368,960
Revenues	81,173,534	80,950,225	80,978,869
Net Revenue / Cost	16,721,003	16,572,430	16,609,909
Change from Reference		-148,573	-111,094

**Conclusion**

Based on the *WastePlan* scenario analysis described above, it is not financially beneficial for the County to divert more yard waste from the WTE facility to the mulching facility. This result is largely due to the structure of the County's contracts for operating the WTE plant and for the revenue from the sale of electricity, under which the County still receives higher net revenue per ton for waste sent to the WTE facility than for waste sent to the mulching facility.

Given the comparative results presented above, increasing diversion of yard waste from the WTE facility to the mulching facility does not appear as cost-effective as maintaining the existing diversion rate. However, it should be noted that the model averages electricity revenue equally across all waste materials. Given the moisture content of yard debris, the model is likely overestimating the contribution of yard waste to this source of revenue. To make increased diversion of yard waste financially beneficial, Pinellas County would need to lower mulching costs, charge more per ton for the sale of processed mulch/compost, or experience a change in the costs and revenues associated with the WTE facility.

**Note that the results of these scenario analyses are quite dependent on assumptions about how costs are inflated over time and about which costs and revenues are variable with tonnage. While the results indicate that it may not be cost-effective to divert more yard waste from the Single Family MSW and Commercial MSW Import streams, it would be prudent to develop a more refined knowledge of the variable costs before a decision on managing yard waste is made.**

### **Florida WastePlan Demonstration Project Alachua County Case Study**

## **Introduction**

Alachua County is a relatively rural, mid-size county with the City of Gainesville at its center. As of 2000, it had a population of nearly 217,000, including almost 105,000 residents in the unincorporated County. The County's solid waste management system comprises a mandatory collection area, which includes the unincorporated urban area surrounding the City of Gainesville, also known as the Municipal Service Benefit Unit (MSBU), and the rural unincorporated area. In addition, the County accepts commercial waste and other residential waste from the City of Gainesville, City of Alachua, City of High Springs, City of Newberry, City of Archer, City of Waldo, City of Hawthorne, Town of Micanopy, Gilchrist County, and the University of Florida at its solid waste facility, known as the Leveda Brown Environmental Park (LBEP). Figure 1 depicts the basic solid waste material flows in Alachua County.

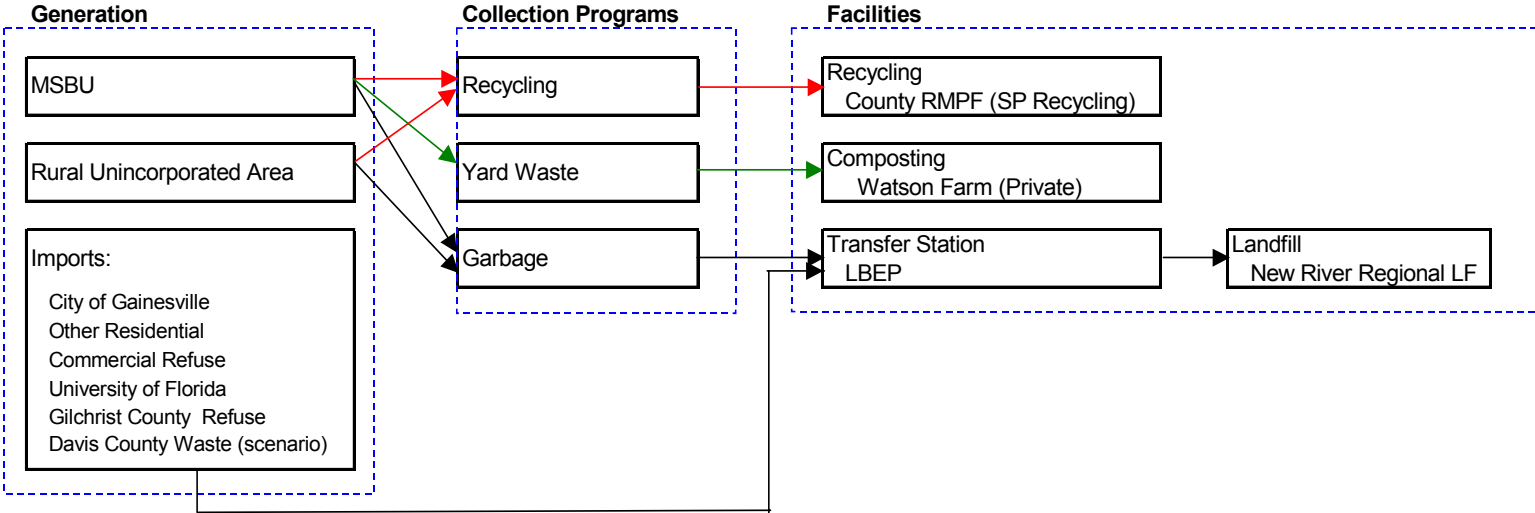
A volume-based waste collection program with variable user fees is employed in the County's MSBU area. Residential units in the MSBU pay an annual assessment, and the County contracts with Boone Waste Management (BWM) for once-a-week curbside collection of residential refuse, yard waste, and recyclables in the MSBU. All refuse collected in this program is delivered to the County's transfer station at the LBEP and yard waste is delivered to a designated facility, which is currently Watson Farm. The agreement also requires that all of the recyclable materials collected – commingled containers and commingled paper – be taken to the Alachua County Recovered Materials Processing Facility (RMPPF) at the LBEP, which is currently operated by SP Recycling, Inc.

The County also manages five Rural Collection Centers (RCCs), or drop-off facilities, located in the rural unincorporated areas. The RCCs are intended to serve the County's rural residents, who do not receive the benefit of curbside collection. County staff hauls refuse collected at the RCCs, using County-owned equipment, to the transfer station at the LBEP. The County initially contracted with BWM, and subsequently with SP Recycling for container rentals and transport of source-separated recyclables collected at the RCCs. The hauler is entitled to ownership of the

material once it has been removed from the RCCs, and historically recyclables have been delivered to the County-owned, SP Recycling-operated RMPF. Yard waste from the rural unincorporated areas is not collected or managed by the County.

In the unincorporated areas of Alachua County, commercial and multi-family waste is managed through a free enterprise or open market system, under which haulers compete to provide collection services. Similar systems exist in all of the municipalities except Gainesville, which has a nonexclusive franchise system for commercial waste, whereby haulers must follow specified requirements and typically pay a franchise fee, but then compete with each other for accounts. County officials believe that all garbage generated by commercial and multi-family properties within the County is taken to the transfer station at the LBEP.

**Figure 1 – Alachua County WastePlan Model Structure<sup>2</sup>**



Notes:  
 MSBU = Municipal Services Benefit Unit area  
 RMPF = Recovered Materials Processing Facility  
 LBEP = Leveda Brown Environmental Park  
 LF = Landfill

<sup>2</sup> Developed by Kessler Consulting, Inc.



Using County staff and County-owned equipment, the County receives 500-700 tons per day of garbage at the LBEP transfer station. The County has an inter-local agreement with the New River Solid Waste Association, operator of the New River Regional Landfill, to provide for reservation of capacity and the disposal of solid waste received at the LBEP through 2008. In response to increased disposal expenses, the County raised its rates at the LBEP and transfer station effective October 1, 2001.

#### Baseline Analysis

**The County provided data describing the quantity and flow of materials through its solid waste management system, as well as the State Full Cost Accounting Statement outlining costs and revenues associated with the system. Using this information and interviews with Alachua County's Solid Waste and Recycling Coordinator, Tellus constructed a baseline model that includes Fiscal Year 2000/2001 (Model Year 2001) as the Current System and a Reference Scenario that projects the status quo through 2011. Total Current System costs and revenues in the model were \$10,297,045 and \$10,107,821 respectively. These costs are consistent with the 2000/2001 cost data provided by the County. An increase in tip fees at the beginning of model year 2002 yields net system revenues in that year and 2003, but the system returns to operating at a net cost in 2004 and then through the end of the planning period.**

**The system was modeled as follows (capitalized terms generally refer to named model elements):**

#### Key Assumptions

An inflation rate of 3 percent was selected at the beginning of model development. For each cost and revenue included later in the model, a decision was made as to whether that cost or revenue should increase at the rate of inflation. Most of the Itemized Costs and Assessment Fees mentioned below were modeled to increase with inflation; however, the refuse tip fee was not since a step increase is included in the model.

#### **Generation**

The baseline model includes two local generating sectors that represent the MSBU and the Rural Unincorporated Area. The number of households, projected to rise 1.9% annually, and per household waste generation rates together drive the amount of waste entering the system from each sector. The types of waste generated by each sector are defined using one Waste Composition, derived from a 1996 single-family residential waste composition study and diversion data.

In addition, five import streams – Other Residential, Commercial Refuse, City of Gainesville, Gilchrist County, and the University of Florida – deliver waste to County facilities in the baseline model. “Davis County” is the fictitious county also identified as an import stream for the sake of scenario analyses, but is not used in the baseline. The quantity of waste for all imports is assumed to increase at 1.9% per year. With the exception of Commercial Refuse,

each of these import streams is assumed to have the single-family waste composition described above; the composition for Commercial Refuse is derived from a commercial composition study also conducted in 1996.

### **Collection Programs**

- Source Reduction

Alachua County tracks costs associated with its *Waste Alternatives* source reduction program. *Waste Alternatives* is included in the baseline model so the County can account for related expenses and set the stage for future estimates of associated tons source reduced.

- Recycling

The County contracts for collection of five materials for recycling – aluminum cans, glass containers, plastic containers, steel and bimetal cans, and mixed paper (including newspaper, corrugated cardboard, magazines, and junk mail) – from both the MSBU (through Curbside Recycling) and the Rural Unincorporated Area (through the Rural Collection Centers). In the baseline model, these contract costs are included as Itemized Costs. Other Itemized Costs are also included for Curbside Recycling (administrative expenses and public education) and the Rural Recycling Centers (County staff and operational expenses). On the Revenue side, the average MSBU Assessment is split among the three curbside collection programs (garbage, yard waste, and recyclables) based on the proportion of expenses incurred by each. The RCC Assessment is included as Revenue for Rural Recycling and is similarly split between the two rural collection programs (garbage and recyclables).

- Composting

Alachua County contracts for collection of yard waste at the curb from the MSBU. It is collected through the Curbside Yard Waste Collection Program in the baseline model. A portion of the average MSBU Assessment is allocated to the Program as Revenue, as described above. Itemized Costs include the contract collection costs, as well as administrative and public education expenses.

- Garbage Collection

Refuse from the MSBU is collected through the Curbside Refuse Collection Program, which is also allocated a portion of the average MSBU Assessment as Revenue, as described above. Itemized Costs for the Curbside Refuse Collection Program include the contract collection costs and administrative expenses. The Rural Unincorporated Areas' refuse is managed through the Rural Refuse Collection Program, and is similarly allocated a portion of the RCC Assessment as Revenue. Itemized Costs for the Rural Refuse Collection Program include County operators, supervisors, and attendants, as well as operational expenses.

### **Facilities**

- Transfer Stations

In the *WastePlan* model, refuse from Curbside Refuse, Rural Refuse, and each of the Imports is routed to Alachua County's transfer station at the LBEP. County tip fees are collected on the refuse arriving, and Revenues from the City of Gainesville, Other Residential, Commercial Refuse, the University of Florida, and Gilchrist County Refuse Imports are modeled as received by the transfer station. The model also reflects the increase in the refuse tip fee from \$34 per ton to \$40 per ton that occurred at the beginning of Fiscal year 2002. Additional Revenues include Assessment Fees collected from the City of Gainesville, Other Residential, and Commercial Refuse. Itemized Costs for the transfer station include County staff, repairs and maintenance, other operating expenses, self-insurance fund, depreciation, and indirect costs.

- Recycling

Recyclables collected from the MSBU and the Rural Unincorporated Areas through Curbside Recycling and Rural Recycling are routed to the County RMPF. The County leases the RMPF to SP Recycling, Inc., and receives revenue from this, which is itemized in *WastePlan*. There is no tip fee for recyclables at the RMPF, and no commodity revenue is paid to the County.

- Composting

Yard waste collected from the MSBU through the Curbside Yard Waste collection program is delivered to Watson Farm. There is no tip fee at or payment from the Farm, so the County has neither costs nor revenues associated with this facility or its operations.

- Landfill

All refuse managed at the LBEP is routed to New River Landfill, to which the County pays a per-ton tip fee for disposal.

#### Resource Conservation Benefits

Source reduction and recycling have benefits beyond the direct avoided disposal costs. These benefits include landfill space savings, avoided air emissions including greenhouse gasses (GHGs), energy savings, and forest acreage savings. *WastePlan's* Resource Conservation Benefits (RCB) Worksheets calculate the source reduction program potential and resource conservation benefits (RCB) associated with various solid waste management system practices and configurations. The results of the *WastePlan* Baseline Analysis for Alachua County in 2001 show a total of 4,772 tons of recycled material, comprising paper (3,162 tons), plastics (293 tons), glass (1,119 tons), and metals (198 tons), plus 2,331 tons of composted yard waste. There are no data or estimates on source reduction tonnage in Alachua County.

The resource conservation benefits associated with the recycling and composting described above include:

- over 487,000 cubic feet of saved landfill space;
- greenhouse gas reductions of 2,119 metric tons of carbon equivalent (MCTE);
- almost 68,000 million BTU of energy savings; and
- about 1,090 acres of trees saved.

**These benefits are primarily the result of the significant quantities of paper recycled, with yard waste composting also contributing to landfill space savings.**

*Scenario Analysis*

Officials from Alachua County decided to use *WastePlan* to examine whether or not it would be cost-effective to accept a new import stream from Davis County. To facilitate comparison with subsequent scenarios, the first scenario constructed – “Reference w/ per-ton LBEP costs (2002-2011)” – differs from the Reference Scenario projection of business-as-usual only in that it restates the three annual Itemized Costs at the LBEP – Depreciation, Indirect Costs, and Self Insurance – as per ton costs so they will scale with tonnage.

The remaining three scenarios are variations on a theme. Each assumes that a new import stream from Davis County comprises additional tonnage equal to a different fraction – 10%, 25%, and 50% – of the Current System refuse handled at the transfer station. In addition, each assumes:

- Davis County waste will be imported directly to the LBEP;
- imports will begin in Model Year 2004;
- the waste composition will be the same as that used for other residential generating sectors and imports in the model;
- import tonnage will grow 1.9% annually; and
- the tip fee charged at the LBEP will be the 2002 base rate (\$40/ton) plus \$3/ton surcharge.

Defining Davis County imports as a percentage of the Current System refuse tonnage arriving at the LBEP, allows for easy construction of additional scenarios around various quantities of Davis County waste imported in *WastePlan*. Because costs and revenues at the LBEP are expressed in per ton terms, the different revenues and costs generated with different quantities of imported waste can be assessed to indicate the cost-effectiveness of each scenario.

*Comparative Results*

Comparing the Reference scenario with the three Davis County Import scenarios yields the System-Wide Cost/Revenue Comparison for Model Year 2004, the first year in which waste would be imported from Davis County, presented in Table 1. The *WastePlan* results presented in Table 1 indicate that costs are nearly \$44,000 more than revenues even in the Reference scenario. This deficit continues the pattern that begins in the Current System and which persists in spite of the tip fee increase in 2002. Currently, the County covers this shortfall using reserves. They also demonstrate that the costs associated with adding a Davis County import stream are still greater than the associated revenue and yield a net cost that increases with the quantity of waste imported.

*Table 1 – System-Wide Cost/Revenue Comparison for Model Year 2004*

<b>All Costs/Revenues</b>	<b>Reference</b>	<b>Davis County Import = 10% of Base</b>	<b>Davis County Import = 25% of Base</b>	<b>Davis County Import = 50% of Base</b>
Total Tons Refuse	175,347	191,920	216,778	258,200
Costs	-11,973,614	-12,752,014	-13,919,613	-15,865,613
Revenues	11,929,902	12,642,502	13,711,403	15,492,902
Net	-43,712	-109,512	-208,210	-372,700
Change from Reference		-65,800	-164,498	-328,990

While the table above reflects all MSW system costs and revenues, the changes from scenario to scenario reflect costs that increase with tonnage at both the LBEP and the New River Landfill and tip fee revenue that also increases with tonnage. Table 2 presents only these selected costs and revenues, to isolate the changes and depict them in greater detail.

Table 2 – LBEP and Disposal Cost/Revenue Comparison for Model Year 2004

Selected Costs/Revenues	Reference	Davis County Import = 10% of Base	Davis County Import = 25% of Base	Davis County Import = 50% of Base
Total Tons Refuse	175,347	191,920	216,778	258,208
LBEP Costs (-\$19.51/ton)	-3,421,073	-3,744,399	-4,229,388	-5,037,702
Disposal Costs (-\$27.46/ton)	-4,815,081	-5,270,154	-5,952,765	-7,090,449
Tip Fee & Import Assessment Revenues	6,959,844	7,672,444	8,741,344	10,522,845
Selected Net	-1,276,310	-1,342,109	-1,440,809	-1,605,305
Change from Reference		-65,800	-164,498	-328,995

Notes:

- Additional tonnage in each scenario is based on the Current System (Base) year refuse tonnage (165,721 tons), not the 2004 Reference scenario tonnage.
- Average revenue per ton varies as the mix of tonnage sources (with differing fees) shifts.

### Conclusion

Table 2, above, indicates that the imports are cost effective only if the per ton revenue received exceeds the \$46.97 per ton cost associated with each ton of refuse that is handled at the LBEP. These findings suggest that it would not be cost effective to accept waste from Davis County for the proposed \$43 per ton tip fee and surcharge. The analysis also suggests that the fees received for Commercial Refuse, in addition to waste imported from Gilchrist County and the University of Florida, are insufficient to cover the associated costs. A fee of at least \$46.97 would be required to cover existing costs. However, Alachua County may want the tip fee for Davis County and other imported waste to include a contingency factor to cover any unforeseen costs, as well as an additional fee for the convenience of using the Alachua County services.

Note that the results of these scenario analyses are quite dependent on assumptions about how costs are inflated over time and that costs at the LBEP are 100% variable with tonnage, thereby increasing proportionally as tonnage increases. While the results indicate that it may not be cost-effective to import waste from Davis County and other sources at the current tip fee charged, it would be prudent to develop a more refined knowledge of the variable costs before a decision on managing Davis County refuse is made.

### Florida WastePlan Demonstration Project Highlands County Case Study

#### Introduction

Highlands County is approximately 1,100 square miles; however, 90-95% of the population lives within a 360 square mile area. The County is home to three municipalities, the Cities of Avon Park and Sebring and the Town of Lake Placid. Industry is primarily comprised of agriculture and livestock (cattle). As of 2000, approximately 87,000 people resided in

**Highlands County, almost 20,000 (23%) in the municipalities and over 67,000 (77%) in the unincorporated areas. This is a rapidly growing county, with a population increase of more than 18% during the 1990s.**

#### **Collection**

**Unincorporated Highlands County began mandatory refuse collection for residential units in 1990. Residents may request exemption from this mandatory collection if they can document to the County that they will self-haul their municipal solid waste (MSW). In 2000, the County provided collection service to almost 30,000 residential dwelling units (RDUs) in the unincorporated areas.**

The unincorporated County is divided into two franchise areas, which must be serviced by two different hauling companies. The franchise agreements became effective on October 1, 2000 for five years with an option to renew for an additional five years. The haulers provide twice-weekly curbside collection of refuse, twice-monthly curbside collection of yard waste, and twice-monthly collection of bulky wastes. If bulky waste is greater than two cubic yards, the hauler may charge the resident an additional fee as approved by the County. Franchise haulers must deliver all MSW, except for segregated yard waste, to the Highlands County Solid Waste Management Facility (HCSWMF).

The County bills owners of residential property a solid waste assessment fee, which covers the cost of collection and disposal. The County then makes monthly payments to the franchise haulers based on the number of RDUs serviced that month, less the tip fees incurred by the franchise hauler during that month. Residential property owners are responsible for providing their own refuse containers. Residential property owners may file for exemption of solid waste collection if they self-haul their MSW to the County facility and properly manage yard waste. If the exemption is approved, they are not charged an assessment fee, but pay a tip fee at the landfill. Less than twenty RDUs were exempt in 2000.

The three municipalities in Highlands County provide refuse and yard waste collection service to their respective residents using municipal staff and equipment. Although they are not obligated to do so, all municipalities deliver their refuse to the HCSWMF. Lake Placid also delivers its yard waste to the HCSWMF; however, Sebring and Avon Park operate their own Class III landfills where yard waste is ground and disposed.

In the unincorporated County, the franchise agreements grant exclusive rights to the two residential haulers to compete for commercial solid waste collection. All contracts with businesses must expire on the same date as the County franchise. All MSW, except recyclables and segregated yard waste, must be delivered to the HCSWMF. Single-family dwellings located on three or more contiguous acres and multi-family units may request to be treated as commercial properties. If approved, these RDUs will be removed from the solid waste assessment role. Commercial generators may be exempted from contracting for collection services if they document that they will self-haul MSW to the County landfill and properly manage yard waste and recyclables (several mobile home parks have been exempted). The County does not have data regarding the number of commercial units serviced.

The haulers bill the commercial property owners directly unless arrangements have been made to bill the occupants. The County establishes maximum rates that can be charged. The hauler is responsible for providing collection containers unless the business chooses to use a residential container, in which case the business is responsible for providing this.

Historically, the municipalities have each contracted with one of the County's franchise haulers to collect commercial solid waste within their respective service areas. Although it is not required, the County believes they are receiving all commercial refuse collected within the municipalities.

### Recycling

Recycling in Highlands County is voluntary. The County had operated 51 drop-off sites that accept newspaper, corrugated cardboard (OCC), magazines, aluminum and steel cans, three colors of glass, and plastics #1 and #2. The drop-offs are utilized by residents of unincorporated Highlands County as well as the municipalities. In fact, the County estimates that 35% of recyclables come from city residents.

As of October 1, 2001, the County implemented changes to its recycling program in order to decrease net costs. The County closed 31 of the sites that generate the lowest volume of recyclables. At the remaining 20 sites, which are located in more highly trafficked areas such as shopping malls, the County no longer collects glass or plastics; however, they placed additional bins for other currently collected recyclables to accommodate the anticipated increase of materials at these locations. The County estimates that 6,000-8,000 residents used the drop-off centers in 2000, and anticipates that the 2001 program changes will reduce use by 20-30%.

The County also modified its commercial recycling program October 1, 2001 by discontinuing its office paper recycling program. In addition, the County cut the number of sites it services OCC pickup from 50 to 37. Many of the remaining OCC locations are utilized by more than one business. The junk mail recycling program (at two post offices) was also cut.

The recycling program changes were intended to eliminate operations that incurred the greatest cost to the County. The County estimated that prior to the changes the recycling program cost about \$709,000 per year and generated revenue of about \$150,000 for a net annual cost of \$559,000. Approximately one third of costs are for collection and two thirds are for processing. The program changes are expected to reduce costs to \$465,000 per year and revenues to \$120,000 per year for an estimated net annual program cost of \$345,000, resulting in a net savings of approximately \$200,000.

Other recycling program changes were made in December 2001, including a County contract with SP Recycling to provide and service collection containers for newspaper at the 20 residential sites, at no cost to the County. The County estimates that this will further reduce the net annual program cost to \$192,500 since it will eliminate an additional position and reduce the frequency of servicing the drop-off sites. In all, these program changes are expected to decrease the tons of recyclables collected from a current estimate of 4,000 tons per year (3,200 tons of residential and 800 tons of commercial) to approximately 2,800 tons per year. The County does

not believe that this will significantly impact their countywide recycling rate since it is estimated that more than 50% of recycling is done by the private sector.

Recyclables are processed at a Material Recovery Facility (MRF) located at the old landfill site on Skipper Road, which is approximately 17 miles from the HCSWMF. The MRF is a pole barn and is currently at capacity. The MRF is a relatively low-tech operation utilizing balers, but no conveyors. Recycling operations are supported by the landfill tip fee. The County does not have any formal agreements for marketing recyclables. The MRF has no storage capacity, so recyclables must be moved quickly. All fiber is sold to SP Recycling.

The recycling program changes mean that only about 75% of the newspaper stream will be processed at the MRF since SP will transport newspaper from the five drop-offs in the northern County directly to its plant and newspaper from the remaining 15 sites to the County MRF. The newspaper delivered to the MRF will be cleaned then loaded into SP's trailers for transport by SP to their plant. The County receives \$22.50 per ton for the newspaper that is processed by the County and \$10 per ton for newspaper taken directly to SP's plant.

The County has explored other possible privatization arrangements, and has considered contracting with Florida Recycling Services to provide back-up service should the County be unable to service the drop-off sites for any reason.

#### Composting

**Clean yard waste, such as grass and leaves, that are received by the County are composted onsite by County staff, then offered to residents at no cost. Tree branches are ground for mulch, which is also offered to residents at no cost. Remaining residential yard waste is combined with other horticultural wastes and land clearing debris. These materials are ground periodically (approximately every two months) by Consolidated Resource Recycling, a company under contract with the County to grind wood waste for \$9.95 per ton. The material is then mixed 50/50 with sand, and utilized as landfill cover.**

#### Special Wastes

**According to County ordinance, construction and demolition (C&D) debris may be collected by any certified hauler; however, the County establishes maximum rates that may be charged for collection and disposal. The County believes they currently receive approximately 75% of the C&D debris collected within the County. C&D debris collected by large site clearing companies is likely taken to facilities operated by these companies outside of the County or to Polk County where the C&D tip fee is less expensive.**

**Highlands County charges a tip fee of \$20 per ton for C&D debris, except for roofing shingles, which are accepted at no tip fee. Site clearing vegetation received by the County is ground with yard waste and utilized as described above. Roofing shingles and clean concrete are used as road base at the landfill. Other inert C&D debris is landfilled.**

Because of the significant amount of agriculture in the area, the County has experienced problems with landfilling plastic film used in agricultural applications. They are currently collecting this material source separated and stockpiling it since they have not yet found an application for it. They are looking for a way to grind or bale it to create a usable form that a

market will accept. However, because of the level of soil contamination in the plastic, the County has been unable to find a market. If a market is not found soon, the County plans to permit the storage site as a Class III landfill.

Tires are accepted at \$100 per ton and shredded for use onsite. Lead-acid batteries that are segregated from self-haul loads are recycled through the County's household hazardous waste program. White goods are also segregated from self-haul loads and recycled. Scrap metals can be delivered directly to the County's MRF.

#### Disposal

**The current landfill opened in 1996 and has an estimated 140 years of capacity with a total estimated disposal of 15,200,000 tons. No out-of-county waste is accepted at the landfill.**

**The County's current tip fee for both residentially and commercially generated Class I MSW is \$45 per ton. The County has been collecting and treating leachate onsite, then dispersing it via sprayfields. In May 2001, they began leachate recirculation to increase decomposition and gain additional volume capacity at the landfill. The County can inject 30,000-60,000 gallons of leachate per day on a regular basis. With this process, the County believes it can reclaim up to 40% of the landfill cell volume during the operating life of the landfill.**

The County plans to begin recovering methane by using the leachate injection pipes to draw gas from the cell. The total system cost, including installation and engineering costs, is estimated at \$375,000. Once the landfill is large enough, the County plans to look into productive uses for the recovered gas, such as generating electricity.

The County also operates the only C&D landfill in the County. As mentioned previously, the Cities of Sebring and Avon Park also operate Class III landfills.

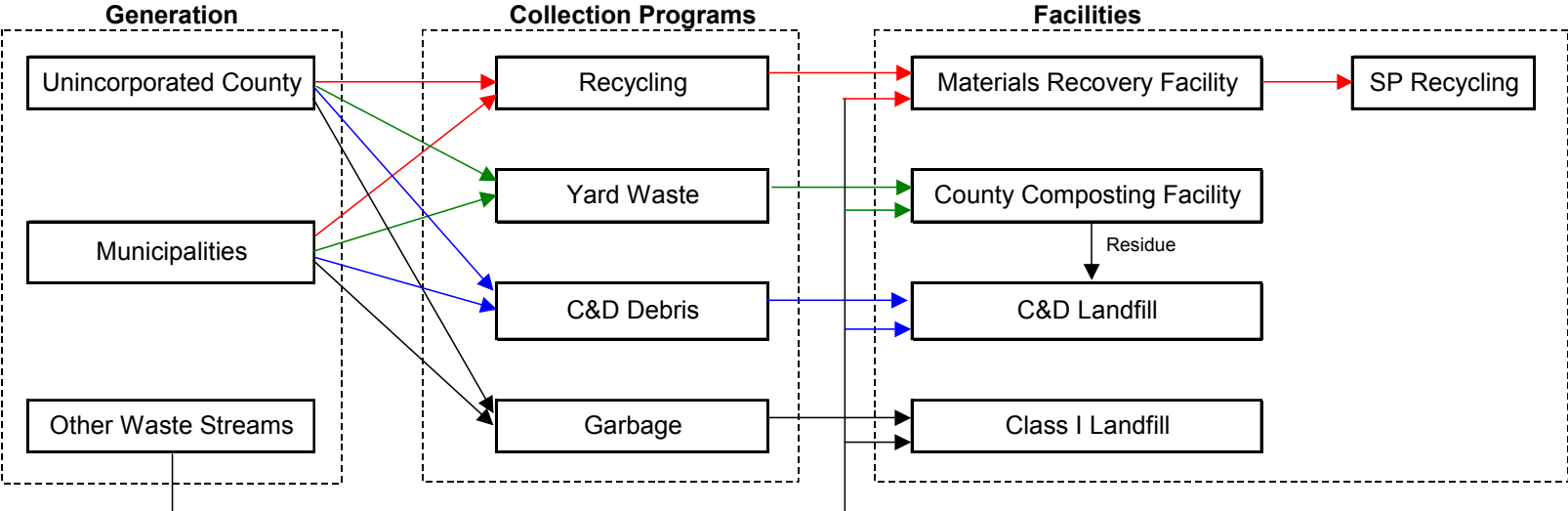
#### **Model Development**

**The County solid waste program is operated as an enterprise fund. In FY 99/00, the program employed 24 staff, which decreased to 20 in FY 00/01. The enterprise fund has no debt or debt service; however, approximately \$1 million is set aside each year for construction of the next landfill cell. In FY 00/01, \$400,000 will be transferred from the enterprise fund to the general fund, which is in addition to the approximately \$290,000 paid to the general fund for administrative services provided to the solid waste program. Capital costs associated with the landfill are depreciated annually based on the cubic yards of landfill space consumed each year.**

While Highlands County identified several potential *WastePlan* modeling objectives during the project kick-off meeting (e.g., source separating non-biodegradable material, decreasing the landfill tip fee, changing the size of the capital (cash) reserve fund, and increasing the cost-effectiveness of the recycling program), ultimately no specific scenarios were selected and only a baseline model was created in *WastePlan*.

Figure 1 depicts the basic solid waste material flows in Seminole County.

Figure 1 – Highlands County WastePlan Model Structure<sup>3</sup>



<sup>3</sup> Developed by Kessler Consulting, Inc.

### **Baseline Analysis**

**The County provided data describing the quantity and flow of materials through its solid waste management system, as well as costs and revenues associated with the system. Using this information, Tellus constructed a baseline model that includes Fiscal Year 2000/2001 (Model Year 2001) as the Current System and a Reference Scenario that projects the status quo through 2011. Total Current System costs and revenues in the model were \$6,688,951 and \$7,690,425 respectively. These costs are consistent with the 2000/2001 cost data provided by the County.**

**The system was modeled as follows (capitalized terms generally refer to named model elements):**

#### **Key Assumptions**

An inflation rate of 3 percent was selected at the beginning of model development. For each cost and revenue included later in the model, a decision was made as to whether that cost or revenue should increase at the rate of inflation. Most of the Itemized Costs and Assessment Fees mentioned below were modeled to increase with inflation; however, the tip fees and other revenues were not since step increases are included in the model.

#### **Generation**

The baseline model includes two local generating sectors that represent both residential and commercial generation in the Unincorporated Area and the Municipalities. Because the number of commercial units generating waste was not readily known in either of these sectors and the same haulers handle both residential and commercial waste with the same destination facilities, residential and commercial waste generation was combined and tied to a common Activity Unit, households. The number of households is projected to rise 2.3% annually in each of these areas. The number of households and per household waste generation rates together drive the amount of waste entering the system from each sector. The types of waste generated by each sector are defined using one Waste Composition, which is derived from a residential and commercial waste composition study and diversion data.

Haulers also bring waste that is collected from unknown sources to County facilities, so its composition is not well defined, with the exception of material that is diverted for recycling or composting. As a result, this import stream is assumed to comprise predominantly "Other Waste," with its composition derived from data on waste received at County facilities. The amount imported is assumed to remain constant.

#### **Collection Programs**

- **Recycling**

Highlands County receives materials for recycling in two ways: haulers and drop-off at County sites. Haulers bring agricultural film, tires, white goods, and C&D debris that is suitable for reuse in roadbeds, to County facilities from the Unincorporated Area, the

Municipalities, and the Other Import stream. Other recyclables, including paper and containers, are brought to County drop-off locations by residents of both the Unincorporated Area and the Municipalities. Recycled material was attributed to the Unincorporated Area or the Municipalities using either data on the source of the material diverted or the County's estimate that 35% of recyclables come from the Municipalities. The County incurs some costs associated with servicing the drop-off sites, but it was not possible to break them out from other expenses.

- Composting

Yard waste is brought to County facilities from the Unincorporated Area, the Municipalities, and the Other Import stream by haulers or is self-hauled. Fees paid to the franchised haulers for collecting yard waste in the Unincorporated Area are included in the model as Costs, and assessments collected from the RDUs for this service are modeled as Revenue.

- Special Wastes

The County receives C&D debris beyond that which is appropriate for reuse in roadbeds from the Unincorporated Area, the Municipalities, and the Other Import stream. This portion of C & D debris received is destined for the County's C&D Landfill.

- Garbage

All remaining waste collected from the Unincorporated Area by franchised haulers must be delivered to the County landfill. As with yard waste, Costs include the franchised hauler fees charged for this service, and Revenues include the RDU assessments associated with garbage collection. Municipal haulers also bring their refuse to the County, but Highlands County experiences neither costs nor revenues associated with this collection.

### **Facilities**

- Recycling

In addition to recyclables collected at the drop-off locations and processed at the County's MRF, the County manages other recyclables, including C&D debris, tires, and white goods. Collected fiber is marketed to SP Recycling and the other drop-off materials are sold or removed through informal arrangement. Recycling Revenue includes revenue from the sale of selected commodities, Recycling Grant funds, and a portion of assessment revenue allocated to recycling. In addition, the County incurs a portion of its personnel, non-personnel, and administrative costs through recycling operations.

- Composting

Yard waste collected is all routed to the County Compost/Mulch site. The County receives tip fee revenue of \$25/ton for yard waste received, and the County incurs a portion of its personnel, non-personnel, and administrative costs through composting and mulching operations. A portion of assessment revenue is also allocated to composting. Processed material is made available to residents free of charge.

- **Construction and Demolition Landfill**

C&D debris that is not managed as a recyclable for reuse in roadbeds is directed to Highlands County's C&D landfill. The County receives \$20/ton tip fee for this material, and a portion of assessment revenue is allocated to the C&D landfill. Personnel, non-personnel, and administrative costs are also associated with this operation, and it is allocated a portion of landfill closure program costs.

- **Landfill**

The Highlands County Landfill receives refuse from the residential and commercial haulers, as well as from the Other Import stream. In addition, compost residue is routed to the landfill. With the exception of that residue, the County receives \$45/ton tip fee for refuse received, and a portion of assessment revenue allocated to this Landfill. Personnel, non-personnel, and administrative costs are also associated with the facility and its operations. In addition, the Landfill is allocated a portion of landfill closure program costs, and incurs annual fixed capital costs for the refuse disposal system and landfill closure program.

### **Resource Conservation Benefits**

Source reduction and recycling have benefits beyond the direct avoided disposal costs. These benefits include landfill space savings, avoided air emissions including greenhouse gasses (GHGs), energy savings, and forest acreage savings. WastePlan's Resource Conservation Benefits (RCB) Worksheets calculate the source reduction program potential and resource conservation benefits (RCB) associated with various solid waste management system practices and configurations. The results of the WastePlan Baseline Analysis for Highlands County in 2001 show a total of 8,492 tons of recycled material, comprising paper (3,382 tons), plastics (943 tons), glass (211 tons), metals (94 tons), construction and demolition debris (3,438 tons), tires (366 tons), and white goods (58 tons). There are no data or estimates on source reduction tonnage in Highlands County.

The resource conservation benefits associated with the recycling described above include:

- over 486,000 cubic feet of saved landfill space;
- greenhouse gas reductions of 3,345 metric tons of carbon equivalent (MCTE);
- more than 65,400 million BTU of energy savings; and
- about 1,348 acres of trees saved.

These benefits are primarily the result of the significant quantities of paper recycled. Note that these resource conservation benefits are conservative estimates since they do not include those associated with C&D, tires and white goods because WastePlan's RCB Worksheets do not include benefits multipliers for these materials.

#### *Scenario Analysis*

**Due to data limitations, Highlands County and the project team determined scenario analysis would not yield representative results. As a consequence, scenario analysis was not performed.**



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