Tool Kit for Solid Waste Management

Intermountain Region - National Park Service

Environmental Protection Agency Region VIII
National Park Service
Intermountain Region

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NATIONAL PARK SERVICE
INTERMOUNTAIN REGION

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Solid Waste Management Resources

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Documents:
See **Toolbox 6** for EPA and NPS solid waste resource documents.
NPS Solid Waste Management Handbook, 1996
Greening of the Government Guide

For Hazardous Waste:
NPS Hazardous Waste Management Handbook and *NPS Pollution Prevention and Community Right-to-Know Training Manual*
NPS *Environmental Compliance Information System* (ECIS)

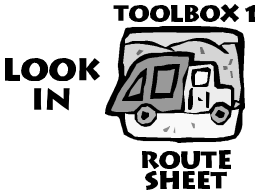
How to Use This Tool Kit

This manual contains the tools and information you will need to build a solid waste management program, including collection, landfilling, recycling, reuse, education, and waste reduction components.

The Tool Kit is designed as a companion document to the *NPS Solid Waste Management Handbook*, 1996, which contains more detailed information, examples, and resources for solid waste management programs. For a copy of the *Handbook*, contact Dr. Michael Schene, Environmental Program Manager, Intermountain Region, at **mike_schene@nps.gov**.

When you see this symbol throughout this Tool Kit, you can refer to the appropriate chapter or appendix in the *NPS Handbook* for more detailed information about the topic.

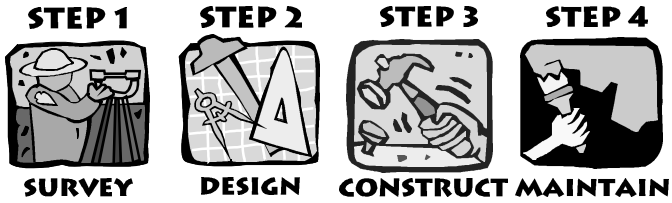
These symbols direct you to other pages in this Tool Kit where you will find related information, instructions, or worksheets.



Additional tools and resources are included in the "toolboxes" at the end of this manual. When you see these symbols throughout this Toolkit, you can refer to the appropriate toolbox for additional tools.

How Do I Begin?

The Tool Kit is organized in sequence for building a solid waste management program. Each step in the sequence is a separate section of the Tool Kit, identified with these symbols:



If you are developing your solid waste management program from scratch or preparing a solid waste program document, work through each section in order and refer to the resources and the *NPS Handbook* as noted.

This Toolkit will give you a broad framework for building and maintaining your Integrated Solid Waste Alternatives Program (ISWAP). You can use it to plan a new program or fine-tune a program that's already under way. If you're just beginning, use each of the tools in the tool kit to evaluate the alternatives available to you, then develop a fairly complete first draft of your plan. You'll want to present your draft to management for review and approval, then use the tool kit to work out recommended revisions and finalize your detailed plan for the alternatives you select.

If you have already completed some of the steps or are reevaluating an existing program, just skip to the relevant sections and proceed from there.

Introduction to Solid Waste Management

WHAT IS SOLID WASTE MANAGEMENT?

In the context of this document, solid waste includes all the solid materials generated in the parks, such as durable goods (appliances, furniture), non-durable goods (single-use, disposable products), containers and packaging, food wastes, yard wastes, and miscellaneous inorganic wastes (ceramic, rock) from residential areas, commercial and institutional operations, and public areas in a park.

While the definition of solid waste does ***not*** include hazardous wastes, such as spent industrial cleaners and solvents, paints, used oils, etc. Household hazardous wastes are often discarded along with other wastes and thus may be expected in small quantities in any load of mixed waste, and sometimes even in source-separated recyclables and compostables.

Solid waste does ***not*** include sewage sludge or wastewater.

Solid waste management is any of the work and programs to eliminate, collect, recycle, or landfill solid waste. These programs include efforts to reduce waste and reuse materials, as well as recycling, composting, trash collection, landfilling, and incineration. Procurement of recycled-content supplies and equipment and education are also part of solid waste management.

Integrated solid waste management considers all of the work and programs in solid waste as part of one system. By considering solid waste management as an integrated system, you can recognize that spending money on one program may save even more money in another program. For example, a little money spent on public education could save a lot of money on litter collection, reducing overall solid waste management costs. The Environmental Protection Agency has established a hierarchy of solid waste management practices that places the highest priority on source reduction and reuse, followed by recycling and composting, then by waste-to-energy, and finally landfilling.

Advantages to your park of integrated solid waste management:

ENVIRONMENTAL BENEFITS

- prevents waste
- reduces waste sent to the landfill, which may have negative impacts on groundwater and air quality
- saves energy, which reduces consumption of oil and gas and reduces air pollution
- supports the National Park Service role as wise stewards of the land and its natural resources

SAFETY BENEFITS

- improved services and increased monitoring of solid waste management practices reduces lifting, handling and other potentially injurious or dangerous practices.

ECONOMIC BENEFIT$

- increased efficiency reduces costs and saves staff time
- reduced trash volumes reduces collection and landfilling costs
- improved services means greater value for same cost
- an integrated solid waste alternatives plan will help you get budget money to implement solid waste management and diversion programs from NPS, and potentially allow you to benefit from additional money and participation from other partners in your solid waste management system.

EDUCATIONAL BENEFITS

- demonstrates to visitors and decision-makers your good stewardship of natural resources
- encourages visitors to participate in preserving the environment both in the park and in their own communities

Your Goal

The NPS has developed an Integrated Solid Waste Alternatives Program (ISWAP) to provide coordination and guidance to parks on integrated solid waste management practices. The priorities of this program are developing park ISWAP plans, developing waste reduction and reuse efforts, promoting buy-recycled practices, increasing public education supporting solid waste alternatives, and developing park recycling programs.

The NPS has also adopted three system-wide goals in response to 1993 Executive Order 12873 (Federal Acquisition, Recycling and Waste Prevention, October 20, 1993), which mandates ". . . waste prevention and recycling in [each] Agency's daily operations and work to increase and expand markets for recovered materials through greater federal government preference and demand for such products." The three NPS national goals are

Goal #1:	*By September 30, 1998, complete a study of the Integrated Solid Waste Management Opportunities (Alternatives) available at the Park. Develop ISWAP Plans, of varying complexity, to supplement the study.*
Goal #2:	*By 2002, achieve a 5% decrease in total solid waste levels (including both trash and recyclables) from the amount generated in the parks in 1998.*
Goal 3#:	*By 2002, recycle and/or compost at least 40% of all waste materials generated in the parks that year, and each year thereafter. In states where the recycling and/or composting rate has been set at a level higher than 40%, the higher rate shall be used as the park's goal.*

Your goal is to build an integrated solid waste management program that minimizes the amount of solid waste generated at your park and improves the efficiency of collection and management of the solid waste that is generated. Use this toolkit to help you build your ISWAP program and document your program.

By documenting your program, you can meet the first goal to develop a plan. The degree to which your park's solid waste program can meet the second two goals will depend on your location, available markets and resources, and what is reasonable to achieve given your park's specific circumstances. Improving your solid waste program will move your park and the entire National Park system closer to meeting all three goals.

On September 14, 1998, Executive Order 13101 was signed, which strengthened the federal government's commitment to waste prevention, recycling and federal acquisition of recycled products. Executive Order 13101 also requires each federal agency to establish goals for solid waste prevention, recycling or diversion, to be achieved by January 1, 2000, and to establish long range goals to be achieved by 2005 and 2010. Goals for increasing procurement of products made with recovered materials and environmentally preferable products and services. These goals are to be incorporated into each agency's Government Performance Results Act (GPRA) annual performance plans.

INTERMOUNTAIN REGION GOALS

To promote the NPS ISWAP program and its goals, and to maintain consistency in complying with the requirements of Executive Order 13101 and GPRA, the Intermountain Region has developed regionally-specific goals for parks in this region to use in developing their ISWAP plans and information. The three Intermountain Region goals are:

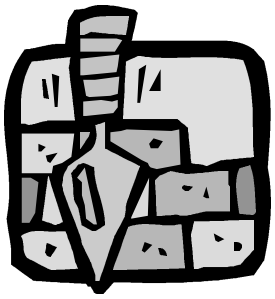
Goal #1: *By 2000, Intermountain Parks will have completed a Waste Generation and Waste Composition Baseline Profile; Parks will use these data to identify the need for development of an Integrated Solid Waste Management Alternative Program plan.*

Goal #2: *By 2005, Intermountain Parks will achieve a 5% decrease in total solid waste levels (including both trash and recyclables) from the amount generated in the parks in 2000.*

Goal 3#: *By 2005, Intermountain Parks will recycle and/or compost at least 25% of all waste materials generated in the parks that year, and each year thereafter.*

To meet these goals, you will build an integrated solid waste management program that minimizes the amount of solid waste generated at your park and improves the efficiency of collection and management of the solid waste that is generated. Use this toolkit to help you build your ISWAP program and document your program.

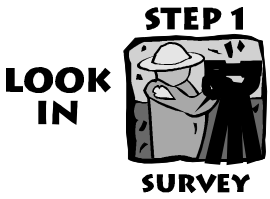
By documenting your program, you can meet the first regional goal to develop a Waste Generation and Waste Composition Baseline Profile. The manner in which your park's solid waste program meets the second two regional goals will depend on your location, available markets and resources, and what is reasonable to achieve given your park's specific circumstances. Improving your solid waste program will move your park and the entire National Park System closer to meeting all three regional goals, and help your park and the National Park Service comply with the requirements of the Government Performance and Results Act.



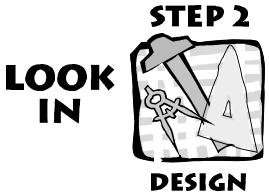
Building your integrated solid waste alternatives program

TOOLS AND TECHNIQUES FOR BUILDING AN ISWAP BY HAND

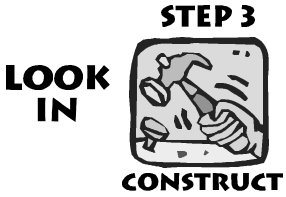
Building your ISWAP can be compared to building a house. Several distinct activities must take place, and you need the right tools at each step along the way. First, you survey the land the house will be built on. Next, you design the house to fit the land's characteristics and your budget, then build the house, and finally move in and maintain it.



Those same steps also apply to your ISWAP. First, you **survey** your existing solid waste management practices and programs to determine waste generation and composition and to determine what you have to build upon. Step 1: Survey describes the tools to do these activities.

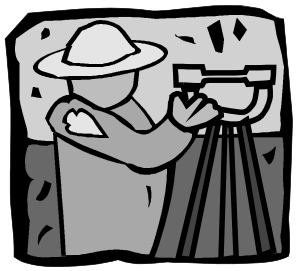


Then you **design** new solid waste management practices and programs to meet your new goals. Step 2: Design describes the tools used to design your program.



After you have your design, you can **construct** your new solid waste management programs and make them operational. Step 3: Construction describes the tools to do these activities.

Finally, you will **maintain** your solid waste management programs, to keep them operating efficiently. These tools are described in Step 4: Maintenance.



Step 1: survey

What is the Survey?

The survey is the first step in constructing your solid waste management system. The survey identifies what your current situation in solid waste management is, and what you have to build upon. The survey tools include **estimating the cost of the solid waste management system, estimating waste generation, estimating the waste composition, calculating how much of your solid waste is being diverted (recycled and/or composted) and describing all of your current solid waste management programs.** Each of these tools is described in this section.

Cost Estimates of the Solid Waste Management System

The cost estimate shows you your current costs and revenues for the solid waste management system. While you already have overall maintenance cost estimates, you should also be able to prepare a separate estimate of solid waste costs distinct from other maintenance departments. The benefits are:

- **tracking complete costs** for solid waste will help justify budget requirements;
- **documenting complete costs** will let you charge accurate fees for services, track future savings and demonstrate improvements in efficiency;
- **tracking solid waste and recycling costs separately** will help demonstrate savings and revenues from recycling and other diversion programs.

Tools for Estimating Solid Waste Management Costs in Parks

Estimating Costs

The following table lists the major cost categories you should be able to track for solid waste management programs in your park. These can be annual costs or fiscal year costs, depending on your park's accounting practices.

Costs	
Labor including:	
Roadside Collection Labor	$
Compactor Truck Collection Labor	$
Other Labor	$
Solid Waste Disposal	$
Contract Fees	$
Service Fees (Revenues from Collection Services)	$
Equipment including:	
Vehicle Operation & Maintenance Cost	$
Vehicle Purchase or Amortization/Depreciation Cost	$
Container Maintenance	$
Container Purchase or Amortization/Depreciation Cost	$
Materials including:	
Trash Bags	$
Signs	$
Educational Materials	$
Concessionaire Costs	$

- **All of the cost categories** can also be tracked separately for a recycling collection program, or composting collection program.
- **For a recycling program**, any revenues from the sale of recyclable materials should also be tracked.
- **In addition to revenues**, avoided costs can be estimated and added to your program's revenues. You may have avoided costs by conducting source reduction and reuse programs. You may avoid disposal costs by source reduction — by not creating materials that must be disposed of later — and you may avoid the purchase cost of new materials by reusing old or recovered materials.

SEPARATING COSTS

Your current accounting system may not separate solid waste management costs from other maintenance department costs. And your maintenance staff and equipment may be used for a number of maintenance activities, including solid waste management activities. How do you separate solid waste management costs from other maintenance costs?

- **If your park uses a maintenance tracking system** such as MMP (Maintenance Management Program) or MMS (Maintenance Management System), new activity codes can be used to separately track solid waste management activities. The *Handbook* includes an example of using MMP with new activity codes in **Appendix H**.
- **If your park uses MMS**, you can use new activity codes or new location codes for separate tracking of solid waste management costs. A new activity code, such as "Garbage Collection, 3291" will allow you to include labor, materials and equipment costs associated with garbage collection activities. Separate codes for recycling collection can also be used to separately track recycling costs.
- **If your park uses another system**, you can separate costs "manually" by estimating how much time and materials are used for solid waste management activities. If maintenance staff spend a portion of their time on solid waste collection, estimate the percent time and split their salary and benefits costs by that percentage. You may also want to include a percentage split of overhead costs. If vehicles or other equipment are used for solid waste management activities, estimate the percent time and split their operating and maintenance costs, as well as amortized purchase or depreciation costs, by that percentage.

EXAMPLE

Grand Teton National Park used their cost tracking system to identify cost saving ideas and to justify budget allocation for equipment purchase. By separately tracking solid waste collection labor costs, they showed that the cost of two laborers to ride on the rear of a packer truck was around $18,000 per year plus housing space, for each truck. The "shotgun packer riders" could be replaced by a camera-operated truck vision system, at an equipment cost of around $1,500 plus installation, with a savings in the first year of about $15,000. By tracking their costs, Grand Teton National Park was able to identify a way to reduce the collection costs and demonstrated the advantages of purchasing new equipment.

FIRST TERMS, THEN MORE TOOLS

A **waste generation estimate** is an estimate of how much solid waste is created in your park. This includes solid waste from park operations, from visitors, and from concessionaire operations within the park. Knowing how much waste is generated will allow you to track future waste quantities. It is the first step in surveying your solid waste programs for building improvements.

Source reduction and **reuse** are ways to keep waste from being created or generated. "Source reduction" means reducing the quantity or toxicity of solid waste at its source—in this case, your park. It includes the design, manufacture, purchase, or use of materials (such as products and packaging) to reduce the amount or toxicity of garbage generated. Source reduction can help reduce disposal and handling charges because it avoids the costs of recycling, municipal composting, landfilling, and combustion.

Reuse is a component of source reduction that involves using materials again in their original form, often in creative but practical ways. The blank side of used office paper can be used for scratch pads, for example, or foam egg cartons can be used in the park maintenance shop to store small hardware items. Even old wood and other building materials can often be put to good use in new construction in the park.

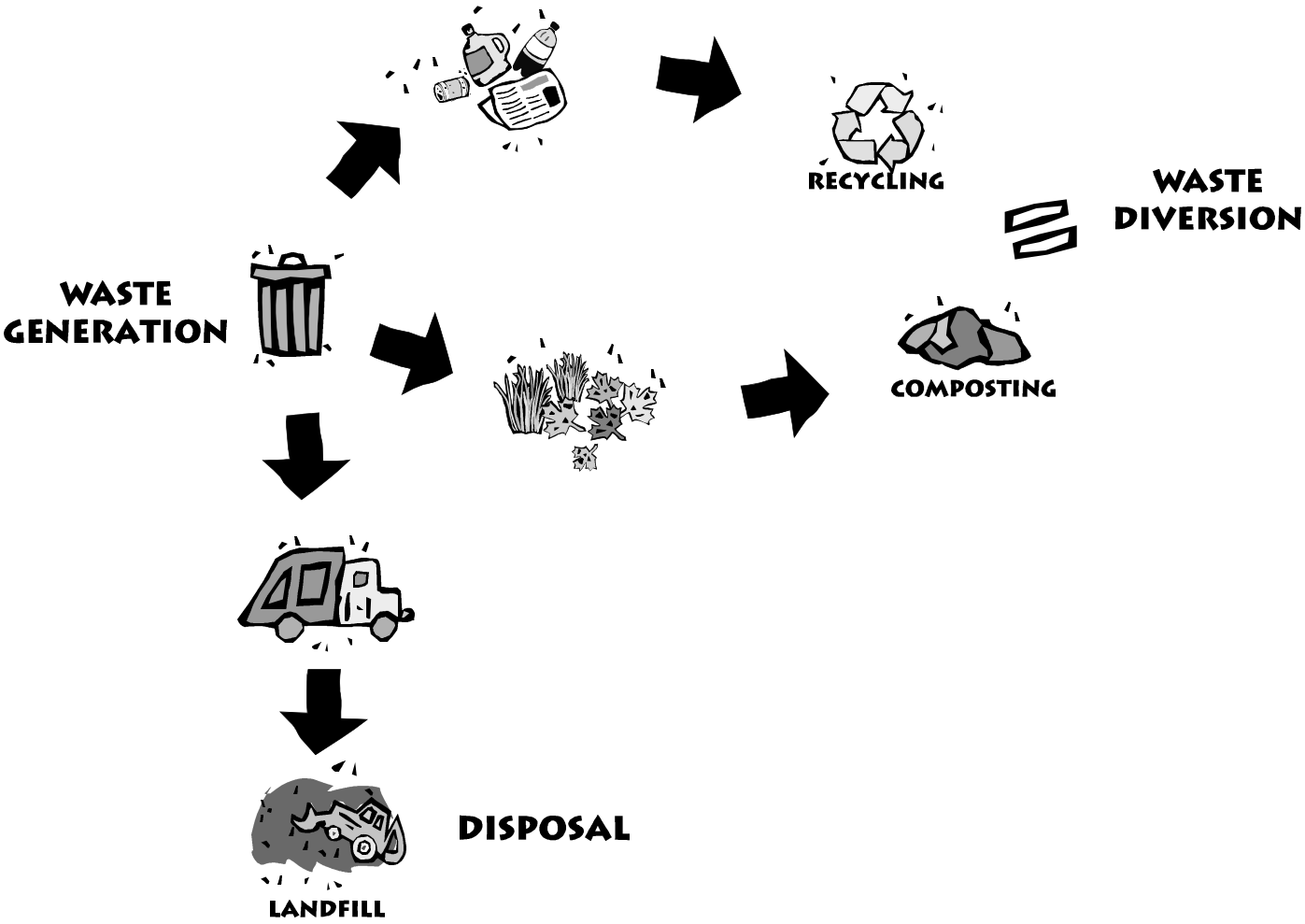
As spelled out in Regional Goal 2, by 2005 parks must reduce by an additional 5 percent the amount of waste generated in 2000. The amount of waste generated includes both trash and materials diverted for recycling, and should be divided by the total visits for that year to show the pounds of waste generated per visitor. In this way the waste generation rate will not be affected by an increase or decrease in visits to your park.

Waste diversion means removing material from the waste stream that would otherwise end up in a landfill. Wastes may be diverted in many ways, including recycling and composting.

Recycling is the collection, separation, processing, and remanufacture of materials in the solid waste stream to make new products.

Composting is the collection, and processing of organic materials in the solid waste stream to break down the materials through bacterial decomposition to reduce volume and to create a usable soil amendment product, called compost. Composting is considered a form of recycling.

Waste is the portion of the solid waste generated that is sent to the landfill. It does not include any solid waste materials that are diverted from the landfill by recycling or composting.



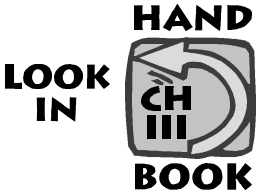
Tools for Estimating Waste Generation in Parks

How to Use the Tools

You can use a number of methods to estimate how much waste is generated in your park. The best method is the one that gives you the most accurate estimate for the least effort.

You will need to estimate the *tons per year* of solid waste generated in your park. Weight-based estimates like *tons per year* give you accuracy, let you compare year to year and material to material, and let you calculate diversion, reduction, and landfilling rates.

Volume is a function of how your solid waste is collected: in cans, toters, Dumpsters®, and rolloff containers. The key to good estimating is to accurately convert *volume* (cans, toters, Dumpsters®) to *weight* (*tons per year).*



Chapter III of the *NPS Handbook* lists five different waste generation methods. Each method uses different information to make the estimate, and each method will be better for some parks than others. How do you decide which method to use?

Review the methods for estimating solid waste generation listed below. If you can answer yes to each question, that method may work for you.

Method 1: Contractor Estimates

This method uses your solid waste collection contractor to make the estimates.

Questions:

- ✓ **If you use a contract hauler, does the contractor collect all the solid waste generated in the park? If not, who collects the rest?**
- ✓ **Does the contractor collect solid waste from inside the park in separate routes and trucks, without collecting waste from other customers at the same time? If not, can he track each source separately?**
- ✓ **Does the contractor have access to scales to accurately weigh your collected solid waste in each truck?**

How to Use Method 1: If you answered yes to all the questions, you can ask (or contractually require) your contractor to provide records of the quantity of solid waste collected. See your procurement officer to change contractor contracts to include this requirement. The contractor should provide complete records throughout the year to account for seasonal variations in solid waste generation in your park. Monitor the contractor's activities and the estimates, and know how to verify the accuracy of the contractor's estimate.

METHOD 2: LANDFILL WASTE TICKET ESTIMATES

This method uses the weight receipts from your landfill to estimate the quantity of solid waste.

Questions:

- ✓ **Do you or does your contractor collect all the solid waste generated in the park? If not, who collects the rest?**
- ✓ **Do your or your contractor collect solid waste from inside the park in separate routes and trucks, without collecting waste from other customers at the same time?**
- ✓ **Do you or your contractor have access to scales at the landfill to accurately weigh your collected solid waste in each truck?**

How to Use Method 2: If you answered yes to all the questions, arrange to receive the scale tickets for all of your park's solid waste collected. Keep and track the quantities listed on the tickets, recording the date, quantity (in tons if possible), and vehicle identification (to record where the solid waste came from). Track the weights for an entire year if possible to account for seasonal variations in solid waste generation in your park.

METHOD 3: AVERAGE VOLUME PER CONTAINER

For most parks, this method will provide the most accurate estimates. It will tell you where the solid waste is being generated, and how much. This method uses information collected by the truck drivers while they are collecting solid waste, so they need to record the size and fullness of each container on that day.

Question:

- ✓ **Can park staff or your contractor's drivers complete a form while on their collection routes?**

How to Use Method 3: If you answered yes to this question, develop a route survey form like the one on page 16 for drivers to record the size, number, and level of fullness (percentage) for all solid waste containers collected. Train your drivers (or the contractor's drivers) how to fill out the route sheet accurately. You may need to require the contractor to provide the route sheets as a part of the contract. See your procurement officer to change contractor contracts to include this requirement. You can track all routes throughout the year for the most accurate estimate, or just complete route sheets one week per month to get a representative estimate with less effort. Whichever approach you use, be sure to conduct periodic spot checks to make sure your contractor is reporting quantities accurately.

METHOD 4: MAINTENANCE MANAGEMENT PROGRAM TRACKING SYSTEM

This method uses information collected by the park if it has a computerized tracking system to track costs.

Questions:

✓ **Do NPS crews perform all solid waste collection in the park?**

✓ **Does the park use the Maintenance Management Program (MMP)-based system for tracking solid waste management costs?**

How to Use Method 4: If you answered yes to both questions, see **Appendix H** of the *Handbook* for details on how to track solid waste with the MMP program.

METHOD 5: AVERAGE POUNDS PER VISITOR

This method uses an average generation rate for visitors to estimate the quantity of solid waste.

Question:

✓ **Does your park have accurate records of visitor rates?**

How to Use Method 5: If you answered yes to the question and you cannot use any of the other, more accurate methods, use an average rate from another park. The following are "average pounds per visitor" rates determined for other parks. Select a park that is most similar to yours in size, facilities, and visitor patterns to get the most appropriate rate, or average the rate from several parks.

Grand Canyon	**1.31 lbs/visitor**
Prince William Forest	**2.54 lbs/visitor**
Yosemite	**2.70 lbs/visitor**
Rocky Mountain	**1.42 lbs/visitor (1996)**
Bryce Canyon	**0.61 lbs/visitor (1996)**
Glen Canyon	**2.76 lbs/visitor (1996)**

Tools and Resources

SAMPLE ROUTE SHEET:
METHOD 3, AVERAGE VOLUME PER CONTAINER

You can create a route sheet like the one below for each solid waste collection route in your park. Before giving the sheet to the driver, fill in the name of the route, all the container locations, and the container sizes for the route. If you don't have size and weight information on containers in your park, use the typical values in the conversion factors table (bottom of this page) for your estimates. The drivers can fill in the date and the percentage full for each container as it is emptied.

ROUTE				DATE
Container Location	**Container Type, Size (CY)**	**No. of Containers this Location**	**Estimated Percent Full**	**Total for this Location**
Longs Peak CG, #1	**2 CY Dumpster**	1	75	2 X 1 X .75 = 1.5
Longs Peak CG, #2	**2 CY Dumpster**	1	70	2 X 1 X .70 = 1.4
Longs Peak CG, #3	**2 CY Dumpster**	1	100	2 X 1 X 100 = 2.0
Lily Lake VC	**32 gal. can**	2	100	.15 X 2 X 100 = .30
Tuxedo Park	**2 CY Dumpster**	4	80	2 X 4 X .80 = 6.4
			TOTAL	11.6 CY

You will need to train the drivers how to estimate percentages and fill out the form accurately. As a training exercise, take the drivers out on a route and have each one visually estimate how full some of the containers are, then accurately measure the contents and compare everyone's guesses with the actual volume. Repeating this exercise a few times should give everyone a good basis for estimating volumes more accurately.

GO TO TOOLBOX 1 ROUTE SHEET

Toolbox 1, Route Sheet, has a blank version of the form that you can photocopy and customize for the routes in your park. An electronic version of the route sheet is also included on the diskette in **Toolbox 5**.

OTHER CONVERSION FACTORS

GO TO TOOLBOX 5 FLOPPY DISK

If you don't have size and weight information on containers in your park, you can use these typical values for your estimates.

P 1 Cubic Yard = 202 gallons • **32 gallon can = 0.15 cubic yards** • **60 gallon toter = 0.30 cubic yards** • **90 gallon toter = 0.45 cubic yards**	**P Compaction ratios for trash** • **3:1 (typical)** • **4:1 (higher-compaction vehicles)** **P Compacted trash = 600 to 1100 lbs/CY, average 800 lbs/CY** **P Yellowstone's estimate of compacted trash = 500 lbs/CY**

See **Appendix E** of the NPS *Handbook* for more conversion factors.

Waste Composition Estimates

FIRST TERMS, THEN TOOLS

A waste composition estimate is an approximation of the materials and proportions of materials in the solid waste collected. Typical materials categories include paper, plastic, metals, glass, wood, food waste, and miscellaneous. A waste composition estimate can be done for one part of the park, such as solid waste from park operations, from visitors, or from concessionaire operations within the park; or the composition estimate can be done for the entire park. Knowing the composition of the solid waste will allow you to identify materials that could be diverted to recycling and composting programs, and knowing the composition from a particular part of the park will allow you to design recycling and composting program for that specific part.

Tools for Waste Composition Estimates

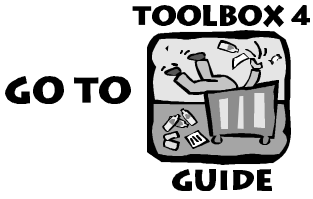
Three methods can be used to estimate the composition of solid waste in your park. Knowing the materials that make up your park's trash is essential to designing your solid waste management program. The methods involve different levels of effort or cost and may depend on whether or not you use a contractor to develop the estimate. The best method is the one that gives you enough information at the lowest effort or cost.

Review the methods listed below. Select the level of accuracy you need and pick the most cost-effective method for your park.

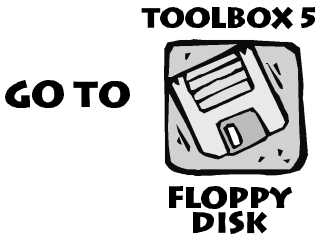
THE FIELD SORT METHOD—HIGH ACCURACY

A field sort involves physically separating solid waste into different materials categories.

- Because of the possibility of encountering hazardous materials in solid waste, consult with your Park Safety Officer and Hazardous Materials Coordinator for safety procedures before conducting the field sort.



- Typical categories include paper, plastic, metals, glass, wood, food waste, and miscellaneous. **Note**: the example forms show only broad categories; depending on your waste stream, you may want to break down materials into subcategories of paper, plastics, metals, and organics. The reproducible worksheet in **Toolbox 4** provides these subcategories. You can also print the worksheet from the computer file in **Toolbox 5, Floppy Disk**.



Name			Date
Material	**Sample 1 (lb)**	**Sample 2 (lb)**	**Average (lb)**
Paper			
Plastic			
Glass			
Metals			
Organics			
Other			

- The basic steps to conducting a field sort are:

  A. Determine the location and number of samples to sort

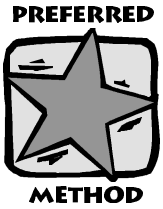
  B. Pick all samples from the same location if you want to determine the composition of one operation, such as campground waste. Pick samples from a variety of locations if you want to determine an average, or overall composition.

  C. With proper safety and weighing equipment, select a sample, empty the container, open bags and spread out the contents, sort them by material category and weigh each sorted material.

  D. Record the weight data and prepare an analysis of the totals, averages and individual materials category percentages, and any other statistics of interest.

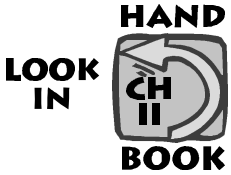
A **Dumpster Diving Guide** with more details on the steps to conducting a field sort is included in **Toolbox 4**.

Park staff can conduct a field sort, or you can hire a contractor to do it. A university, solid waste hauler, or consultant could be a suitable contractor, but should have experience and capabilities to perform a field sort accurately.



THE COMBINED COMPOSITION ESTIMATE—MEDIUM ACCURACY

This method is an analytical estimate that involves no field sorting, and is not dependent on the time of year the estimate is made. Using composition estimates from other field sorts and other studies, you assume a waste composition for each operation in the park (such as park offices, campgrounds, restaurants, retail stores, and hotels). With this information and an estimate of how much of the total waste stream is generated by each operation, you can develop a combined solid waste composition estimate. For more information on this estimating method, see **Chapter II** of the **NPS Handbook**.



The example on the following pages shows how to make a combined composition estimate, and **Toolbox 2,** contains a blank worksheet to use in making this estimate for your park.

This method will also tell you who are the major generators of solid waste in the park, what are the most common materials, and where they are generated. This will help you when you design your new programs, and it is explained further in the Design section.

THE VISUAL SURVEY—LOW ACCURACY

Like a field sort, visually sorting waste separates materials into different categories. Typical categories include paper, plastic, metals, glass, wood, food waste, and miscellaneous. A visual sort is different from a field sort in that you just look at the solid waste sample to estimate how much is in each material category. This method is therefore much easier, faster, and cleaner than a field sort, but not as accurate.

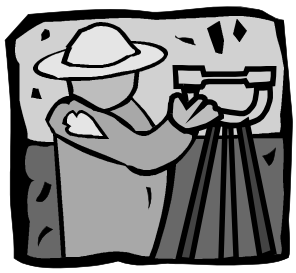
Park staff or contractors that collect solid waste on a regular basis probably do this informally during their collection routes, so they probably have a general idea of what materials are in the solid waste. To conduct a visual sort more systematically, use the same forms as are used in the field sort. See **Toolbox 6, Resources**.

Use two or more people to look at a sample of solid waste in a can, Dumpster® rolloff, or truck. Spread the waste in a thin layer, so you can easily identify all the components. Pick a material from the list and have everyone estimate the percentage of that material. Average your results and enter the percentage as the estimate for that material.

Proceed through the list of materials, adjusting the estimates as you go along, to match with what you see. This approach works best with only a few categories. It is useful for checking a specific material, such as aluminum cans for recycling, to verify that your solid waste contains a reasonable quantity of that material.

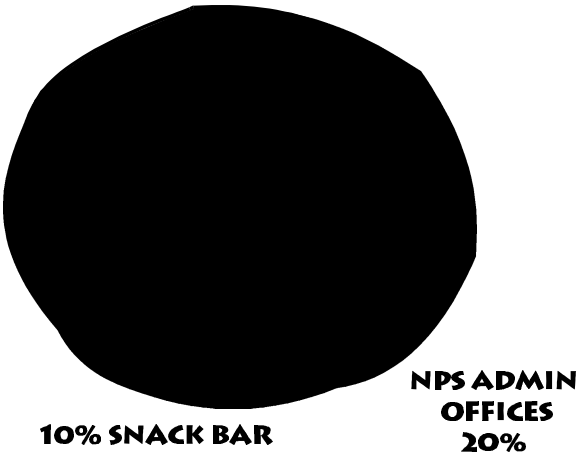
OTHER TOOLS AND RESOURCES

The *EPA Business Guide for Reducing Solid Waste* contains a detailed description of how to conduct a field sort. Call the RCRA hotline at (800) 424-9346 and ask for document 530-K-92-004. EPA resources are listed in **Toolbox 6**.



Calculate a "Combined" Waste Composition

Example: This park has estimated its total waste stream to be 1,000 tons per year. The three primary waste generators are estimated to produce



A Calculate the fraction of the total waste stream created by each generator in tons.

B Calculate the waste composition for each generator **(% x** b**).**

C Calculate the combined waste composition for the entire park (add up each material).

Convert to percentage estimate (c ÷ total waste stream).

	NPS Admin Offices 20% of waste stream = a tons		*Campground* 70% of waste stream = A tons		*Snack Bar* 10% of waste stream = a tons		Combined Parkwide Tonnage Estimate	Combined Parkwide Percentage Estimate
	%	x ___ tons	%	x ___ tons	%	x ___ tons		
Paper	74.8	B	22.0		32.5		C	
Plastic	6.6	b	8.0		7.0		c	
Glass	2.4	b	13.0		4.4		c	
Metals	2.3	b	8.0		2.7		c	
Organics	13.5	b	30.0		52.9		c	
Other	0.4	b	19.0		0.5		c	

TOOLBOX 2 TO

Note: this example shows only broad categories; depending on your waste stream, you may want to break down materials into subcategories of paper, plastics, metals, and organics. The reproducible worksheet in **Toolbox 2** provides these subcategories. An example of a completed waste composition estimate appears below.

	NPS Admin Offices 20% of waste stream = 200 tons		*Campground* 70% of waste stream = 700 tons		*Snack Bar* 10% of waste stream = 100 tons		Combined Parkwide Tonnage Estimate	Combined Parkwide Percentage Estimate
	%	x ___ tons	%	x ___ tons	%	x ___ tons		
Paper	74.8	149.0	22.0	154.0	32.5	32.5	336	33.6
Plastic	6.6	13.2	8.0	56.0	7.0	7.0	76	7.6
Glass	2.4	4.8	13.0	91.0	4.4	4.4	100	10.0
Metals	2.3	4.6	8.0	56.0	2.7	2.7	63	6.3
Organics	13.5	27.0	30.0	210.0	52.9	52.9	290	29.0
Other	0.4	0.8	19.0	133.0	0.5	0.5	134	13.4

TOOLBOX 2
GO TO

COMPO-SITION

Note: this example shows only broad categories; depending on your waste stream, you may want to break down your park's materials into subcategories of paper, plastics, metals, and organics. The reproducible worksheet in **Toolbox 2** provides these subcategories.

TOOLBOX 5
GO TO

FLOPPY DISK

You can also print the worksheet from the computer file in **Toolbox 5, Floppy Disk**.

Calculate a Diversion Rate

Calculating a diversion rate for your park will identify your success at diversion, help you establish goals for new solid waste management programs, and let you track progress toward your goals.

TERMS

Waste diversion turns some of the solid waste into useful products through recycling or composting, thus diverting it from the landfill.

Diversion rate is the percentage of solid waste generated that is diverted.

TOOL FOR CALCULATING DIVERSION RATE

$$\text{DIVERSION RATE} = \frac{\text{TONS RECYCLED} + \text{TONS COMPOSTED} + \text{OTHER TONS DIVERTED}}{\text{TONS GENERATED}}$$

or

$$\text{DIVERSION RATE} = \frac{\text{TONS RECYCLED} + \text{TONS COMPOSTED} + \text{OTHER TONS DIVERTED}}{\text{TONS DISPOSED OF} + \text{ALL TONS DIVERTED}}$$

EXAMPLE

A park that landfills 1,000 tons of waste per year operates:

- an aluminum recycling program that collects 20 tons per year
- a campground container recycling program that collects 100 tons per year
- and a paper recycling program that collects 100 tons per year

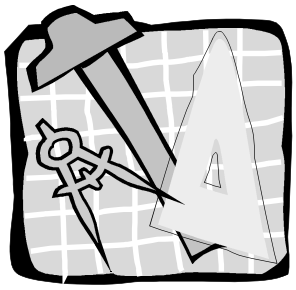
The snack bar concessionaire also operates a cardboard recycling program that collects 100 tons per year, and the park's maintenance operation estimates that it collects 180 tons per year of tree limbs and wood waste, which it chips for use on hiking paths.

Calculate the total waste materials generated in the park and the diversion rate for the park, including the concessionaire's materials:

$$\frac{(20 + 100 + 100 + 100 + 180)}{1000 + (20 + 100 + 100 + 100 + 180)} = \frac{500}{1500} = 0.33 = 33\%$$

OTHER TOOLS

The ISWAP Waste Diversion Worksheet in **Appendix C** of the *NPS Handbook* is another useful tool for computing your diversion rates. The worksheet also includes a list of materials to *exclude* from your calculations.



Step 2: Design

Now that you have identified solid waste management costs, waste quantities, composition, current diversion, and your current solid waste programs (in **Step 1: Survey**), you can build on this information to design an improved solid waste management program, target the largest generators and the most common materials for effective options for diversion programs, and establish realistic goals for solid waste diversion and reduction. Your design tools include **establishing program goals; performing the who, what and where analysis; evaluating options; identifying resources needed to achieve goals; developing a schedule; and preparing an ISWAP document.**

DESIGN TOOLS

ESTABLISHING PROGRAM GOALS

The three NPS goals (ISWAP planning, 5% reduction, 40% recycled/composted) can be used as guides for establishing specific goals for your park. Establishing goals will help you design programs and measure their progress. Your goals may be to implement specific programs, to complete closure of landfill sites, to increase diversion and lower costs, or any combination of these. What is achievable in your park will be affected by your location, park services, type of waste stream, and availability of markets for the recyclables, and other services. You should consider these factors as you select your goals.

Example goals are:

- add procurement and education programs to the park to improve source reduction, reaching a 5% source reduction goal by 2002.
- add recycling programs for campgrounds, park offices, and lodge areas to recover paper, cardboard, aluminum, and steel cans. The goal may be to recycle an additional 10% through these programs by 2002.
- add composting programs for organic wastes including yard waste, food waste, waste paper, etc. to divert an additional percentage by 2002 while producing a useful product for park landscaping and revegetation projects.
- add visitor education programs to increase awareness of recycling and source reduction efforts. The goal is to have recycling messages in all visitor information areas (park newsletter, Internet web site, campground and visitor area signs and park ranger informative talks) by 2000.

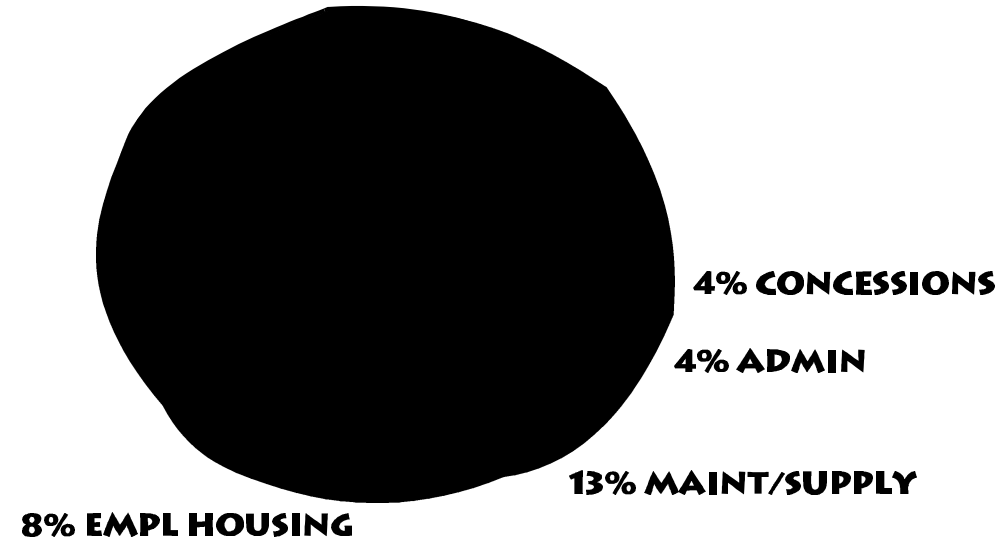
EVALUATING OPTIONS: WHO, WHAT, AND WHERE ANALYSIS

For designing new diversion programs, such as recycling and composting programs, as well as waste reduction programs, it is helpful to know where the greatest benefit can be achieved. The quantity and composition estimates you prepared in **Step 1: Survey** can be combined to answer the questions:

- **who** are the major solid waste generators in the park? (campgrounds, lodging, restaurants, park offices?)
- **what** are the most common materials in the solid waste from these generators? (paper, metals, food waste, cardboard?)

With this information, you can target the largest generators and the most common materials for effective diversion and source reduction programs, and answer the third question:

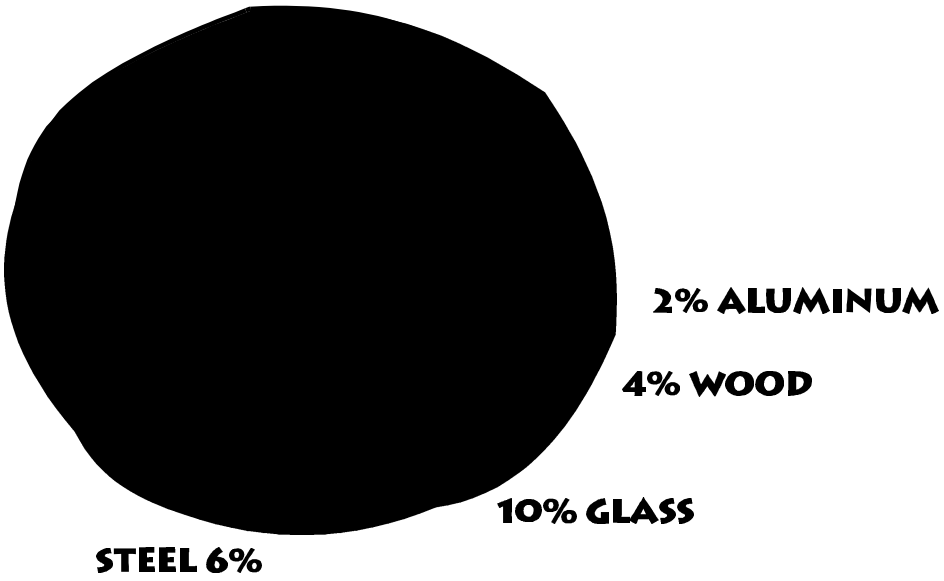
- **where** in the park should diversion programs be established? (recycling containers from campgrounds, composting food waste from restaurant operations, recycling paper and cardboard from park offices?)



EXAMPLE

Rocky Mountain National Park used their waste quantity analysis to show that 71 percent of all solid waste generated in the park was generated in the campgrounds. This answers the **who** question.

The waste composition analysis showed that the two largest materials in the waste stream were paper and food waste, followed by glass.



This answers the **what** question.

By combining the who and what, the park estimated that:

- 92% of all food waste is generated in the campgrounds;
- 56% of all paper is generated in the campgrounds;
- 93% of all glass is generated in the campgrounds.

This is the answer to the **where** question. The park can get the most diversion with the fewest programs by designing diversion programs to address these three largest materials types in campgrounds, the largest solid waste generator in the park.

EVALUATING OPTIONS: PROGRAM DESIGN

Now you are ready to select and design specific programs for your park. You will most likely want to improve or create programs for purchasing recycled content products, for education of staff and visitors, for source reduction as well as for diversion programs, such as recycling or composting. You will most likely also want to look for ways to reduce solid waste collection costs, or to improve the efficiency of solid waste collection and disposal operations.

The following descriptions will provide some help in designing each of these program types. Examine the options below to select program types, identify costs, equipment, and staffing requirements. Then compare the options' effectiveness in reaching goals within your overall cost and resource requirements. Select the best for use in your plan.

P Before you implement any collection, disposal, recycling, or composting program, be sure you comply with all applicable state and local requirements and obtain all

necessary permits and licenses. In some areas, all types of waste management facilities, even those dealing with "clean" materials, are subject to siting and environmental restrictions.

- Don't overlook opportunities to join forces with concessionaires and nearby communities in combined collection, recycling/composting/source reduction, and reuse efforts. Some programs, for example recycling, may become more economical with larger volumes of materials. Or waste exchange programs with local agencies may or private firms are a good way to acquire or dispose of materials. Also, the federal government may be a good source of used equipment (see pages 10).

DESIGNING PROCUREMENT PROGRAMS

Procurement is an essential part of an effective ISWAP. Purchasing recycled-content products conserves natural resources; buying in bulk where appropriate helps to reduce packaging waste; effective inventory control helps reduce waste of products.

The key personnel in the procurement chain are the Administrative Officer or others who have direct authority to authorize a purchase. Also, individuals purchasing supplies and materials on the spot with a government credit card should receive appropriate training to buy recycled. Be sure to identify and keep these people up to speed on the applicable regulations and product preferences.

A formal procurement plan will steer purchasing decisions to products and services that support your solid waste management objectives.

Your procurement program should:

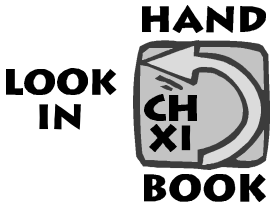
- Educate every employee who makes purchasing requests and decisions to always ask if there are source-reduced, reused, recycled-content, or nonhazardous alternatives.
- Provide product information on source-reduced, reused, recycled-content, and nonhazardous alternative products for every park service employee who makes purchasing decisions.
- Include inventory control to limit waste of materials.
- Incorporate EPA guidelines for purchasing selected types of products made with recycled content, including equipment and construction materials as well as supplies.

OTHER TOOLS AND RESOURCES

- GSA specifically notes which include recycled content in its Environmental Products Guide, and at GSA-Advantage (GSA on-line shopping mall, www.fss.gsa.gov.)

- Materials suppliers can often provide information on recycled-content products.

- *Comprehensive Procurement Guidelines*, EPA Publication (see Toolbox 6**, Resources)**.
- *Buy Recycled Training Manual, 5th ed.* Northeast Maryland Waste Disposal authority (410/974-7524)
- *NPS Solid Waste Management Handbook,* **Chapter XI: Affirmative Procurement**.



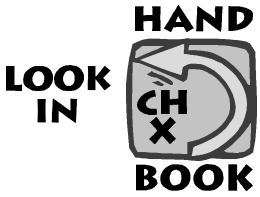
DESIGNING EDUCATION PROGRAMS

Education—of park staff, concessionaires, and visitors alike—will be essential to the success of your ISWAP. Education can change behavior to reduce or eliminate costly maintenance, it can increase visitor participation in park waste reduction programs, and it can inform visitors about the park's efforts to conserve natural resources and reduce the amount of waste sent to landfills.

Your education options are almost limitless. For park staff, simple reminders at staff meetings, regular training sessions, memos, and frequent newsletters can introduce new information and reinforce old messages. If time and budget permit, consider appointing an education coordinator.

Newsletters and fliers are effective tools for educating concessionaires. Pointing out the benefits, such as reduced operating costs, will help assure concessionaires' continuing cooperation—not just their compliance.

One park has used promotional tools like coffee mugs, T-shirts with the NPS recycling symbol, and coloring books to spread the word about its program. These products, distributed to employees and visitors alike, have been very popular and extremely successful in promoting recycling and waste reduction in the park.

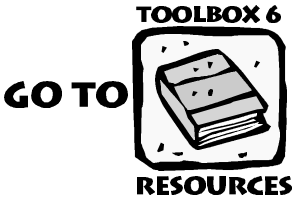


Park rangers can give special tours describing the park's solid waste management system and how it helps maintain the park's natural environment and wildlife. Rangers should stress the visitor's role in preserving the park's beauty by properly disposing of waste materials in appropriate receptacles while they are in the park. Well designed and placed signage can help reinforce the message and stimulate desired behavior.

Solid waste reduction messages can also be incorporated into park maps and tour guide talks. If you have a web site, explain your program briefly there and include links to other environmental sites dealing with solid waste.

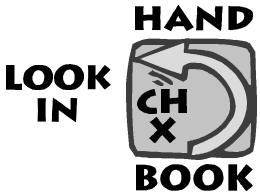
Whatever form your education effort takes, remember the KISS principle: *Keep It Short & Simple*. Use pictures rather than words wherever possible, make it easy for visitors to

participate by providing well-placed containers, and repeat the information frequently and consistently.



OTHER TOOLS AND RESOURCES

- Olympic National Park prepared a number of materials for public education, including an 8" x11" laminated campground sign for posting on exhibit boards, covering recycling and wildlife habitat, a children's activity guide distributed at concessionaire restaurants, called "Recycling Adventure", and a school curriculum guide called "Recycling for Wildlife and Habitat."



- EPA publications. See **Toolbox 6, Resources.**
- *NPS Solid Waste Management Handbook*, **Chapter X: Educating Visitors and Staff About the Park's Program**

SOURCE REDUCTION AND REUSE PROGRAMS

"Source reduction" means reducing the quantity or toxicity of solid waste at its source — your park. It includes the design, manufacture, purchase, or use of materials (such as products and packaging) to reduce the amount or toxicity of garbage generated. Source reduction can help reduce disposal and handling charges because it avoids the costs of recycling, municipal composting, landfilling, and combustion. Source reduction and reuse can be the most cost-effective forms of solid waste management, because materials that are reused or are never created don't become waste that must be managed. For that reason, source reduction and reuse have the same impact on your park's 5 percent waste-reduction goal.

Source reduction conserves resources and reduces pollution. Source reduction requires foresight and planning to keep materials out of the waste stream.

Reuse is a component of source reduction that involves using materials again in their original form. Office file folders can be saved and reused. Boxes, foam peanuts and other packaging materials can also be saved and reused.

Source Reduction Examples:

- Solid waste generated by the park can also be reduced through effective procurement. Every Park Service employee and concessioner who makes purchasing decisions should have product information for reuse and reduced-packaging products.

- Visitors should practice source reduction before they arrive at the park. Education for source reduction should target media and information that visitors can receive before leaving home. For example, you can encourage visitors to bring food and beverages in coolers and insulated containers, rather than fast-food foam clamshells, bottles, and cups.
- Concessionaire restaurant operations can use refillable bulk dispensers for cleaners and other supplies. Condiments and other food products can be purchased in bulk to reduce single-serve packaging.

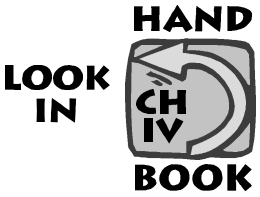
Reuse Examples:

- Old equipment, furniture, electronic goods can be donated to a charity for reuse rather than disposal.
- During a demolition project, many materials from old buildings can be salvaged and reused, saving a significant disposal cost.
- Concessionaire restaurant operations can use washable dishware, silverware and linens rather than disposable types. Condiments can be purchased in bulk and served in reusable containers.
- When you're in the market for equipment, the General Services Administration has Area Reutilization Specialists, staff members who search out, screen, and transfer property. Contact your local GSA representative to take advantage of their screening abilities.
- The Property Exchange cc-mail bulletin board (NPS BB) has provided a great way for park areas to post excess property and for others in the service to benefit. Some park areas even have personnel whose duties are to screen excess property from a variety of sources and post items to the board. Keep viewing and utilizing this great resource conservation device.
- Also look into the DRMO (Defense Reutilization Marketing Organization). The Defense Department operates the DRMO system to dispose of surplus, unneeded, or used equipment and material. Inspection of the property is advised, as codes can be confusing. You may be able to contact a local park near the DRMO site to have them look at the item you want.

OTHER TOOLS AND RESOURCES

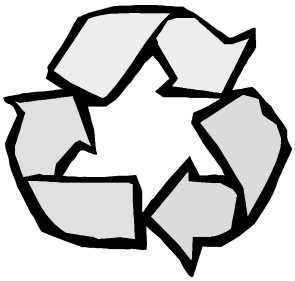
- Intermountain NPS contacts who've done it: The warehouse manager at Rocky Mountain National Park has developed a number of source reduction and reuse activities in the park warehouse, including reusing boxes and packing materials, donating old electronic equipment and computers to charities, and purchasing office supplies with recycled content.

- EPA publications (see **Toolbox 6, Resources**).



- *NPS Solid Waste Management Handbook*, **Chapter IV: Source Reduction and Reuse**.

RECYCLING PROGRAMS



Targeting materials for recycling is just the first step. Your recycling program design should include a design for collecting, transporting, processing, and marketing the recyclable materials.

Starting small and gradually expanding is a good approach for building a comprehensive recycling program. For instance, you might start with readily marketable, high-value materials like aluminum cans that are abundant in your waste stream. Once that program is in motion, you can add materials like plastic bottles and corrugated cardboard, which are more vulnerable to price fluctuations. Do your homework: check into available markets in your area and transportation costs to more distant ones.

Identifying markets or local processors to take the recyclable materials you collect is critical to the success of your program. For local processors, check the yellow pages of local communities under Recyclers and Trash Haulers. Local processors may be able to accept loose recyclable materials, then process and sell them to larger markets. Local haulers may offer recyclables collection and even processing services. Also check with your state solid waste program for staff and resources to locate markets and processors in your area. In the southwestern states of Arizona, New Mexico, Colorado and Nevada, the Southwest Public Recycling Association may be able to help locate markets and processors as well. See **Toolbox 8, Markets**, for more contacts and resources.

Concessions can be excellent locations for recycling programs. Commercial solid waste tends to be more uniform and higher in specific recyclable materials, such as cardboard, aluminum cans, steel cans, and glass. It is also often generated in one location or facility, making separation and collection of larger quantities of recyclables easier.

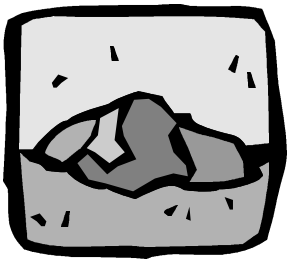
OTHER TOOLS AND RESOURCES

- Intermountain NPS contacts who've done it: Jim Erickson, Facility Manager, Big Bend National Park - Big Bend is constructing a transfer station for recyclable materials in the park. This will allow them to bale materials in the park, increasing their value, and replace inefficient local transportation with semi-trailer loads of recyclables which

can be transported to larger markets. The project should increase the revenues from recyclable materials and reduce transportation costs.

P *Decision Makers Guide to Solid Waste Management*, EPA Publication No. 530-R-95-023. (See **Toolbox 6, Resources)**.

COMPOSTING PROGRAMS



Composting can be an important component of your waste reduction plan, because it has the potential to divert large quantities of organic waste and yield a useful product at the same time. Your composting program design should include collecting, transporting, processing, and marketing compostable materials.

- Grass, leaves, and animal manure are the materials most commonly composted. They compost with a minimum of handling requirements and odor or animal vector problems, and they make a clean compost product.
- Food waste and soiled paper can also be composted, but they require additional processing, create harder to manage odor problems and may attract animal vectors. As foreign materials in the park, compost from these sources may not be suitable for in-park soil amendment uses.
- Processing food waste for hog feed is another option in some agricultural areas where feedlots operate.
- Woody wastes can also be chipped or shredded for use as mulch, trail cover, erosion control or compost amendment.
- Co-composting municipal solid waste and sewage sludge also may be an alternative.

Before you begin any composting program, be sure you comply with all applicable state and local requirements and obtain all necessary permits and licenses.

EXAMPLE 1:

Yellowstone National Park began participating in a cooperative project to explore the possibility of composting wastes in 1995, with five Montana counties and two cities. The group developed initial program concepts and obtained funding for a feasibility study to explore the projects costs and benefits. In 1998 the group developed intergovernmental agreements to provide funding for further project development. The project would compost organic materials separated from solid waste, creating a compost product and saving costs compared to traditional collection and disposal of solid waste. The project is currently continuing development.

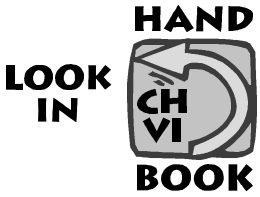
EXAMPLE 2:

At North Cascades National Park, a residential-sized enclosed composting drum is being used to compost all food waste from five households at a remote ranger station in the northern district of the park. The composting drum is powered by solar photovoltaic electricity, controls odors and can hold all the food waste the ranger

station will generate during a summer season. The composting project should reduce waste and hauling costs and eliminate odor problems in stored trash.

OTHER TOOLS AND RESOURCES

- Intermountain NPS contacts who've done it: Tim Hudson, Yellowstone National Park, has developed a large food waste composting program for park waste in cooperation with several area counties and municipalities.



- *NPS Solid Waste Management Handbook*, **Chapter VI: Composting.**

SOLID WASTE COLLECTION PROGRAMS

Collection will always be an essential part of the integrated solid waste management program and should be designed to support and complement the other programs. Because trash collection and disposal is probably the largest part of your solid waste management budget, improving the efficiency of this service can save significant money and staff resources that could be reapplied to new recycling or composting services.

- Waste collection sites offer a good opportunity to give visitors environmental information and to encourage them to participate in recycling, composting, and reduction programs.

- Replacing multiple cans with Dumpsters® or roll-offs can reduce collection costs and centralize recycling opportunities. But always try a pilot program before making a major cost commitment to new collection methods or containers.

- Removing cans from difficult to service locations and relocating them to more convenient areas can save significant collection time. Remote trailheads can be converted to “pack-it-in, pack-it-out” areas. Campgrounds can replace smaller cans located in campground loops with larger containers located at the entrance station or at restroom facilities.

- If the park provides solid waste collection services to concessionaires within the park, establish fees that encourage efficiency. Volume-based fees charge by the amount of waste disposed and create an incentive for the concessionaire to generate less trash. Provide service fee reductions for using automated collection containers such as Dumpsters® rather than smaller cans or bags. This will improve the park’s overall collection efficiency and reduce manual handling of containers.

EXAMPLE

Bryce Canyon National Park removed all 30-gallon trash cans from their campground loops and replaced them with larger Dumpsters® located at the entrance to the campgrounds. With good public education and proper signage, they have not

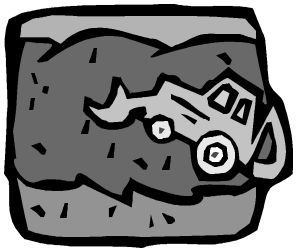
experienced a litter problem and have significantly reduced collection costs, and eliminated manual lifting of trash cans — a common source of worker injury. Bryce estimates they have saved approximately $25,000 per year from their maintenance budget by making this improvement to their solid waste collection program.

OTHER TOOLS AND RESOURCES

- Intermountain NPS contacts who've done it:
  - Michael Castagnetto, Facility Manager, Bryce Canyon National Park - Bryce Canyon replaced cans with Dumpsters® in campground loops without litter problems.
  - Poly Barella, Safety Officer, Petrified Forest National Park - Petrified Forest evaluated the fill rate of solid waste containers throughout the park and is removing containers from underused areas, reducing collection costs.
  - Glenda Hammond, Maintenance Supervisor, Padre Island National Seashore - Padre Island removed solid waste containers from beach areas where they were difficult and expensive to collect, and moved them to fewer beach access areas, saving in collection costs and in beach cleanup costs.

- *NPS Solid Waste Management Handbook*, **Chapter VII: Trash Collection Practices.**

LANDFILL DISPOSAL



Landfilling will remain an essential part of the integrated solid waste management program. Landfilling costs should be arranged to allow for savings when the quantity of solid waste is reduced.

The ISWAP plan should consider the price, capacity, and regulatory changes that may affect disposal practices.

Alternative landfill disposal sites should be planned well in advance (at least five years) of needing them. Transfer stations could be a good alternative if local landfill capacity is limited or too costly.

OTHER TOOLS AND RESOURCES

Intermountain NPS contacts who've done it:

- Dan Bishop, Facility Manager, Glen Canyon National Recreation Area - Glen Canyon is investigating the development of a transfer station for solid waste. With the closure of the local landfill, transportation costs and disposal costs have increased significantly, making the transfer station alternative potentially more cost-effective.

- *NPS Solid Waste Management Handbook*, **Chapter VIII: Disposal Facilities.**

RESOURCES NEEDED TO ACHIEVE GOALS

For the options that you picked, be sure to account for all requirements to construct your plan:

- equipment
- staffing
- contractors
- product markets
- materials value
- transportation
- education
- funding resources

NPS FUNDING INFORMATION

The funding for projects comes from monies allocated through a centralized fund administered by the Park Facility Management Division, Hazardous and Solid Waste Program. Recently, the Intermountain Region decided to remove the Environmental Management program from SEPAS priority setting process. There will still be a process to ensure that there is adequate field review of all projects.

National program guidelines are now being revised for all funding types within the Hazardous and Solid Waste area. For the present, parks should submit solid waste projects under the general title: *Hazwaste/Waste Reduction and Storage*. Parks should continue to use the Project Management Information System (PMIS) for entering projects. Projects can be entered at this time during the fiscal year, but parks will be notified at least 60 days in advance of any "call" for hazardous and solid waste projects, so that they can prioritize their lists.

Solid waste priority funding criteria are under development. We suggest that parks contact the Intermountain Region, Denver Support Office, Environmental Management Program, for assistance. Parks should assume that planning and implementation projects, including infrastructure projects, would continue to be eligible for funding under the program. It should be noted that there will be increasing emphasis on *only* funding projects based on some analysis, particularly a park-approved Integrated Solid Waste Opportunity Assessment.

CONSTRUCTION SCHEDULE

A schedule of when the steps and tasks required to construct your facilities, programs or new services is an important construction tool. The schedule will help to keep the

project organized, make work assignments, order materials and equipment, develop contracts, and make budget requests.

- The schedule can be general or specific, but should include the task, the time frame the task must be performed, the responsible person or department, and resources required, such as budgets, equipment or other staffing.
- Set up your schedule to coincide with the park's calendar or fiscal year and recognize the timing of annual staffing assignments and budget requests.
- Describe all the tasks in your schedule in accountable terms, with a deliverable product, so that you and others can tell if the task was completed. For example, describe an education task as "place public education signs in each park building," rather than "expand public education."

The following table is an example schedule, showing one year's scheduled resources and tasks for an ISWAP plan.

Rocky Mountain National Park Schedule of Resources - Baseline Year (1998)			
Action	**Cost**	**Personnel/ Equipment**	**Responsible Agency**
Administrative and General Establish complete and accurate ISWAP baseline Revise/finalize performance tracking and reporting procedures Monitor and adjust as required Park's ISWAP Plan		No Addl. Equip. Total for All: 6 Person Days	Facil Maint Division Facility Manager Facil Maint Division
Solid Waste Management Implement reduction in roadside, remote area trash containers and replacement of cans with Dumpsters®		5 Person Days	Facil Maint Division
Reuse - Source Reduction Expand Park staff's and concessionaire's existing reuse and source reduction efforts		12 Person Days(4)	Chief of Resource Management
Recycling Improve Campground recycling container identification and signage - include sidebar in Park newspaper	$500	4 Person Days	Facil Maint Division
Composting P Develop composting program requirements if necessary			
Total	**$500**	**27 Person Days**	

PREPARE AN ISWAP DOCUMENT

Preparing a written ISWAP plan will document your work in planning and designing a new solid waste management program. A written plan will make your park meet the first NPS goal, and can be used to demonstrate your planning work when you request funding. The following is a suggested outline for an ISWAP plan:

1. **Introduction**: write a brief description of your park here, note the size, location, main features, facilities, size of staff and visitation

2. **Description of Current Solid Waste Management Practices**

   P **Waste Generation Estimate**: insert your waste generation estimate from the Survey tools. Describe the method used to develop your estimates and show your calculations.

- **Waste Diversion Estimate:** insert your waste diversion estimate from the Survey tools. Describe the method used to develop your estimates and show your calculations.
- **Waste Composition Estimate:** insert your waste composition estimate from the Survey tools. Describe the method used to develop your estimates and show your calculations.

3. **Potential Influences on the Solid Waste Program:** add a brief mention of your visitation levels – are they projected to increase? Other influences could be a nearby landfill closing, an increase in landfill fees, a change in concessionaire operations, or how much visitation increases in summer versus winter.

4. **Program Goals/GPRA Outcomes:** To comply with the requirements of the Government Performance and Results Act (1993), the NPS has developed a GPRA Strategic Plan. This Plan includes GPRA mission goals. Your park is developing an annual GPRA performance plan and tracking accomplishments to demonstrate compliance with the GPRA Strategic Plan. Your environmental management work, including solid waste, can be included in your park's GPRA performance plan under the GPRA mission goal "Provide for the Public Enjoyment and Visitor Experience of Parks". Your park's solid waste management "GPRA outcome" or long-term goal should include elements such as:

   - Collection efficiency and resulting reduced costs
   - Emphasis on source reduction activities
   - Recycling and composting that can be sustained long-term
   - Development of partnerships and sharing of resources
   - Visitor education that contributes to global sustainability

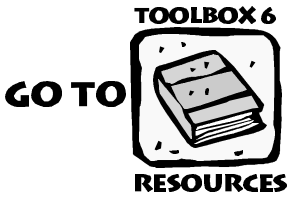
   Parks can use their outcome statements to construct annual goals, develop baseline data, and track accomplishments. They will also be able to establish levels of effort and outside assistance needed to accomplish the goals. Contact Dr. Michael Schene, Environmental Program Manager, Intermountain Region, Denver Support Office, for further assistance in developing their GPRA goals.

5. **Evaluation of Options**: Briefly describe the new programs and program changes you would like to have to help reach your goals. Include the information you developed in Design tools, including the who, what and where analysis, and program options selected.

6. **Resources Needed to Achieve Goals/Outcomes**: this would be based on the programs suggested in the above section, and would be a listing of equipment, labor

and other needs you would have to be able to implement the programs above. Some may cost money and be budget items, others may a free, cooperative effort.

7. **Implementation Schedule**: a brief description of when the new programs will start, what needs to be done before they can start. Use the Design tools for the construction schedule.



OTHER TOOLS AND RESOURCES

Contact Dr. Michael Schene, Environmental Program Manager, Intermountain Region, Denver Support Office, for further assistance in developing their GPRA goals.

NPS Resource Documents:

- NPS *Solid Waste Handbook*
- NPS *Hazardous Waste Management Handbook*
- NPS *Pollution Prevention and Community Right-to-Know Training Manual*
- NPS *Environmental Compliance Information System* (ECIS)
- *Envirofacts* (to be released)
- *Buy Recycled Training Manual, 5th ed.* Northeast Maryland Waste Disposal authority (410/974-7524)
- **Other NPS ISWAPS**: Rocky Mountain National Park, Bryce Canyon National Park, Glen Canyon National Recreation Area

Step 3: construction

How to Build Your Programs

By now, you have designed your programs. Now they are ready to be built and put in place. Building a program will involve getting the resources you need—vehicles, containers, staff, even signs or posters—assembling them in the right place at the right time, and getting them up and running. Your construction tools may include **new work assignments for park staff, new equipment and supplies, new contractor services and new concessionaire programs and services**.

Construction Tools

The Construction Crew: Work Assignments for Park Staff

Put larger assignments in writing, make them part of the job description, and include assignment-specific goals such as:

- purchase 10 recycling containers of a size and design in accordance with the park's ISWAP recommendations.
- have containers selected, purchased, delivered and installed at all park recycling locations by June 1, 1998 for the start of recyclables collections.
- coordinate with the staff person in charge of purchasing the collection vehicle to ensure the containers are compatible with the collection vehicle.

Include park administration in design and construction to get support for staff assignments. To supplement staff, consider using interns, park volunteers, or community service organizations for some specific assignments.

Construction Materials: Purchasing Equipment and Supplies

NPS funding opportunities and procedures for equipment and supplies include the annual budget cycle, end-of-year monies, benefits of ISWAP for funding, and special equipment funding for solid waste management.

Always buy products with recycled content if possible. Look for the highest post-consumer content when doing so.

- Before committing to the purchase of any equipment, conduct a life-cycle cost analysis of the costs of a product, including capital, installation, operation,

maintenance, and disposal, amortized over the item's useful life. This important planning step helps assure adequate funding for purchase and upkeep throughout the item's useful life. You should also consider its lifetime environmental impacts, including raw material extraction, transportation, manufacturing, use, and disposal.

- Before you implement any collection, disposal, recycling, or composting program, be sure you comply with all applicable state and local requirements and obtain all necessary permits and licenses. In some areas, all types of waste management facilities, even those dealing with "clean" materials, are subject to siting and environmental restrictions.

- Research thoroughly the specifications for equipment. For larger equipment purchases, such as a chipper, collection vehicle, or baler, test the equipment before purchasing. Also contact others who use the equipment to discuss its operation and effectiveness. Place your order early enough for your order to be filled and transported to the park, so it will be available when you need it.

- Consider cooperative purchasing of major equipment items with another park or other partner. You may be able to save a major portion of the equipment cost and still have adequate use of the equipment for your program.

CONTRACTING FOR SERVICES

Contact your park's Purchasing Officer for specific contracting requirements. For most service contracts, such as a contract for preparation of an ISWAP plan, the contract must be put out to competitive bid if over $2,500 in value. A bond requirement may apply if the contract value is over $25,000. An example statement of work for a service contract to prepare an ISWAP plan is provided in **Toolbox 7, Contracts**.

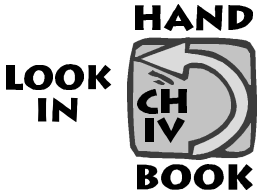
WORKING WITH CONCESSIONAIRES

Focus on win/win approaches. Most concessionaire operations, such as lodging, restaurants, and retail stores, generate solid waste typical for such commercial businesses, which is more uniform and contains more recyclable or compostable materials than residential or visitor-generated solid waste. Recycling and composting programs for these materials are often more cost-effective and may save the concessionaire operations money over their current landfilling costs. Focusing on these programs for concessionaire participation can provide a financial incentive for the concessionaire to participate.

But be sure to back those incentives with formal policy. Contracts can be written to specify waste prevention goals or requirements, and you can also contractually require concessionaires to measure and report quantities of materials generated and recycled.

OTHER TOOLS AND RESOURCES

- Intermountain NPS contacts who've done it: Micheal Castagnetto, Facility Manager, Bryce Canyon - Bryce developed a recycling program for cardboard and other materials that allows the lodge and restaurant concessionaire to participate, saving the concessionaire disposal costs and significantly increasing the park's overall diversion rate.



- *NPS Solid Waste Management Handbook*, **Chapter IV: Source Reduction and Reuse**, page 6 contains an example of concessionaire solid waste requirements.

Step 4: Maintenance

How to Keep your Programs in Peak Condition

You have designed and built your integrated solid waste management system, and the programs are operating. Now, as time passes, you need to re-evaluate them to see if they can be improved or adjusted to accommodate changes in the park. You also need to check the performance of your programs, and document progress towards your park's regional goals and GPRA Outcomes. Your maintenance tools include **tracking diversion, tracking costs, and improving efficiency and services.**

Maintenance Tools

Tracking Diversion Tool

Every year, recalculate your diversion rate. The tools described in the Survey section for calculating a diversion rate can be used each year to track your progress towards your diversion goals. If diversion is not increasing, you need to re-evaluate your programs and make improvements, such as increasing education and promotion, or expanding the number of locations for recycling. You can also repeat the baseline quantity and composition estimates to determine whether your solid waste reduction goals are being met, and if programs need to be added or changed to divert materials which are still being landfilled .

Tracking Costs Tool

Every year, monitor all costs of all programs in the integrated solid waste alternatives program. Set up a tracking system to determine whether costs are within budgets and whether your anticipated cost savings are being realized. Are the programs effective? How can you change the programs to reduce costs?

Improving Efficiency and Services Tool

GO TO P 20

Every year, repeat the "who, what, and where" questions: are the programs doing what they were designed to do? If they are not, the "who, what, and where" check should indicate where you need to make adjustments to increase diversion. Are some parts of the solid waste stream being handled ineffectively? How can you change that? Can you add new programs to encourage better visitor participation?

Establish an annual evaluation of the program in coordination with the park's annual budget cycle to review diversion rates, costs and the quality of services. Schedule administrative review of annual results, with the opportunity to propose changes and budget for them in the upcoming fiscal year.

Conclusion

By working through this Tool Kit and following the sequence of steps of Survey, Design, Construction, and Maintenance, you should be able to accomplish several important steps. You should be able to develop your solid waste management program with changes and improvements in education, procurement, collection, reduction, recycling, and composting. You should be able to document the steps you went through to develop your program and satisfy the regional solid waste goal #1and meet GPRA reporting requirements. And you should be able to continue to track solid waste management in your park and monitor and maintain your solid waste management programs and facilities in the future.

Toolboxes

t o o l b o x 1

Annual Volume per Container Method: Route Sheet

Average Volume per Container Method

Route Sheet

Route Name				Date
Container Location	**Container Type, Size (CY)**	**Number of Containers at This Location**	**Estimated Percent Full**	**Total for Location***
Total Cubic Yards Collected				

***For each row, multiply size (cu.yd.) X number of containers X percent full (decimal form, 0.00) = Total Estimated Cubic Yards Collected.**

Toolbox 2

Combined Waste Composition Estimate Work Sheet

COMBINED WASTE COMPOSITION WORKSHEET

A Fill in the percentage for each material. Use standard composition or modified based on park-specific information.

B Estimate the percentage of total waste for each generator.

C Calculate in tons the fraction of the total waste stream created by each generator.

D Calculate the waste composition for each generator **(% x B).**

E Calculate the combined waste composition for the entire park (add up each material).

	NPS Admin Offices B % of waste stream = C tons		*Campground* B % of waste stream = C tons		*Snack Bar* B % of waste stream = C tons		*Concessioners* B % of waste stream = C tons		*Others* B % of waste stream = C tons		Combined Parkwide Tonnage Estimate	Combined Parkwide Percentage Estimate
	%	x ___ tons	%	x ___tons	%	x ___ tons	%	x ___ tons	%	x___tons		
Paper												
Cardboard	A	D									E	
News	A	D									E	
Office	A	D									E	
Mixed	A	D									E	
Plastic												
PET	A	D									E	
HDPE	A	D									E	
Film	A	D									E	
Polystyrene	A	D									E	
Other	A	D									E	

	NPS Admin Offices B % of waste stream = C tons		*Campground* B % of waste stream = C tons		*Snack Bar* B % of waste stream = C tons		*Concessioners* B % of waste stream = C tons		*Others* B % of waste stream = C tons		Combined Parkwide Tonnage Estimate	Combined Parkwide Percentage Estimate
	%	x ___ tons	%	x ___ tons	%	x ___ tons	%	x ___ tons	%	x ___ tons		
Glass												
Containers	A	D									E	
Other	A	D									E	
Metals												
Ferrous	A	D									E	
UBC	A	D									E	
Other aluminum	A	D									E	
Other metals	A	D									E	
Organics												
Yard	A	D									E	
Food	A	D									E	
Wood	A	D									E	
Other org.	A	D									E	
Other	A	D									E	

Standard Waste Composition Data

Material	Yosemite (campground)	Yosemite (Housing Areas)	Yellowstone (All Areas)	Jasper (Canada) (Campgrounds)
Paper	**22%**	**26%**	**29%**	**23.3%**
Mixed	14%	17%	7.2%	14.6%
Newspaper	2%	2%	4.1%	n/a
Corrugated	6%	7%	16.1%	7.7%
Other	n/a	n/a	1.7%	n/a
Plastic	**8%**	**7%**	**6.6%**	**7.2%**
PET	<1%	<1%	0.2%	7.2%
LDPE	2%	1%	n/a	n/a
HDPE	1%	1%	0.6%	n/a
Other	5%	5%	5.8%	n/a
Metal	**8%**	**4%**	**5.2%**	**6.6%**
Ferrous	5%	4%	1.9%	4.1%
Aluminum	3%	<1%	1.8%	2.5%
Misc.	n/a	n/a	1.5%	n/a
Other inorganics	13%	2%	n/a	Ash 28%
Glass	13%	7%	8.7%	12.4%
Wood	<1%	12%	n/a	n/a
Food waste	25%	11%	36.9%	11.9%
Other organics	4%	13%	n/a	4.2%
Yard waste	<1%	7%	n/a	6.7%
Misc.	6%	10%	13.5%	<1%

t o o l b o x 3

ISWAP Tracking Worksheet

ISWAP Tracking Worksheet

Park_____Completed
by_____ Phone _____

Item/Task/Goal	1998	1999	2000	2001	2002	Notes
1 Visits (# visitors/year)						
2 Estimated Waste Reduction (tons)						
3 Estimated Waste Generated (tons)						should equal sum of lines 4 and 5
4 Estimated Waste Diverted (tons)						total of recycling, composting
5 Estimated Waste Disposed (tons)						
6 Current Diversion Rate (%)						line 4 divided by line 3
7 Current Generation Rate (pounds/visitor)						line 3 times 2000, divided by line 1
Goals (include brief description in notes)						
Planned Program Changes (include brief description in notes)						

t o o l b o x 4

Dumpster Diving Guide

DUMPSTER DIVING GUIDE

A field sort involves physically separating solid waste into different materials categories. Because of the possibility of encountering hazardous materials in solid waste, consult with your park safety office and Hazardous Materials Coordinator for safety procedures before conducting the field sort.

Equipment you'll need:

1. safety glasses, gloves, protective clothing, knife, poker, tongs, or large pliers.

3. weighing scale, either hanging type or platform type, accurate to 1 ounce or 0.10 pounds.

4. containers for sorted materials - kitchen-size plastic bags work with hanging scales, plastic trash cans, 5-gallon buckets or laundry baskets work with platform scales.

The basic steps to conducting a field sort are:

A. Determine the location and number of samples to sort. Pick all samples from the same location if you want to determine the composition of one operation, such as campground waste. Pick samples from a variety of locations if you want to determine an average, or overall composition. You should be able to sort several from each location to get reasonable accuracy. Each sample should be as large as possible, ideally over 50 pounds each. Be sure to take the samples during the busy season for that location, to get a representative sample of what the majority of trash will be like.

B. With proper safety and weighing equipment, select a sample, empty the container, open bags and spread out the contents, sort them by material category and weight each sorted material. Use the knife, pliers and poker to open bags and spread out materials. If uncertain as to which category something falls into, you can put it under "Other," but be consistent with all samples.

C. Record the weight data and prepare an analysis of the totals, averages and individual materials category percentages, and any other statistics of interest.

DUMPSTER DIVING HEALTH AND SAFETY PLAN

PURPOSE

The purpose of this Dumpster Diving Health and Safety Plan is to ensure a safe working environment. This plan describes minimum safe work practices,

personal protective equipment, and training that must be implemented during Dumpster diving activities.

SAFE WORK PRACTICES

Confined Spaces

Regular Dumpsters used for park waste disposal are considered confined spaces. A confined space as defined by OSHA contains the following characteristics:

a) Any space that is large enough for an employee to enter and perform work.

b) Any space that has limited or restricted means for entry or exit

c) Any space that is not designed for continuous employee occupancy.

Since park procedures require hazardous materials and wastes to be properly stored before disposal, these materials should not be found in park Dumpsters. Therefore, park Dumpsters should not contain hazardous atmospheres. In addition, park Dumpsters should not contain other hazards which could cause death or serious physical harm. Since park Dumpsters do not contain hazardous atmospheres and conditions which can cause death or serious physical harm, the National Park Service has classified park Dumpsters as Non-Permit Confined Spaces.

If Dumpsters containing hazardous materials or waste are found on park site, these Dumpsters must not be entered by park employees. They are classified as Permit Required Confined Spaces and must comply with the regulations specified in 29 CFR 1910.146.

HAZARDOUS ENERGY SOURCES

If park employees must enter Dumpsters with a built in trash compactor, shredders or other sources of hazardous energy, the Park Safety Officer must be contacted and OSHA lock out / tag out procedures must be implemented in accordance with 29 CFR 1910.147 before entry.

DUMPSTER DIVING SAFE WORK PRACTICES

A. Park employees, contractors or volunteers must not enter a Dumpster unless there is at least one attendant outside the Dumpster when the entry is made.

B. Before entry begins, the entrant and the attendant must visually inspect and the Dumpster and note any potential physical hazards.

C. If leaking containers of hazardous materials are sighted during the pre-entry inspection, the Park Safety Officer must be immediately contacted. Entry cannot be made until the material is identified and additional work practices and/or personal protective equipment are utilized.

D. If the entrant or attendant notices the presence of hazardous chemicals in the Dumpster, the entrant must immediately evacuate and contact Park Safety Officer. Possible signs indicating the presence of hazardous chemicals include unusual smells such as that of solvents, corrosion, a change in temperature, unusual sounds such as that of a leaking gas canister.

E. To the extent feasible, provision shall be made to ensure ready entry and exit by preventing obstruction of the opening or passageway during the work procedures.

F. If ladders are utilize to enter Dumpsters, they must have safety feet and be free from sharp edges and splinters.

G. All Dumpsters must be located outside to ensure proper ventilation during entry.

H. During the actual Dumpster diving procedure, the entrant must be in voice contact with the attendant at all times. If the entrant shows any signs of chemical exposure such as rash, eye irritation, dizziness, giddiness, nausea or tiredness, the attendant will immediately order the entrant to evacuate the Dumpster. The Park Safety Officer must immediately be contacted for further instructions.

I. No smoking or open flames of any kind are allowed within 100 feet of a park Dumpster during Dumpster diving activities.

J. Dumpster diving activities may not take place during thunderstorms or when lightning is seen.

K. During Dumpster diving activities, the Dumpster must be properly illuminated.

PERSONAL PROTECTIVE EQUIPMENT

During Dumpster diving activities, all entrants must be equipped with the following:

A. Long pants and a long sleeve shirt and/or Tyvek® suit.

B. Leather work gloves.

C. Work Boots or steel toed boots.

D. Safety glasses.

Respirators must not be used unless specified by the Park Safety Officer. If respirators are used, all entrants must have a proper pulmonary function test, medical evaluation, and respirator fit test prior to wearing the respirator for Dumpster diving activities. In addition, all OSHA respirator regulations must be followed in accordance with 29 CFR 1910.134.

If hazardous chemicals are found in the Dumpster, entrants must immediately evacuate and the Park Safety Officer must be immediately contacted. Depending upon the chemicals found, additional personal protective equipment such as respirators and chemical protective clothing might be needed.

TRAINING

All employees performing Dumpster diving activities must receive training on the following:

A. Identification of potential physical and chemical hazards which may be found in Dumpsters. These include but are not limited to: Sharp objects, flammable materials, and hazardous materials which were improperly disposed of.

B. Identification of possible signs of chemical exposure. These include but are not limited to: rash, eye irritation, dizziness, giddiness, nausea, or tiredness.

C. Information on the safety use of ladders.

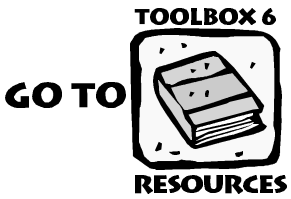
D. Information on proper means of egress into and out of the Dumpster.

E. Information on the proper use of personal protective equipment.

Training records should be kept in the file of each employee performing Dumpster diving activities.

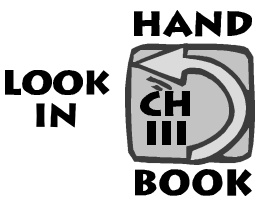
ADDITIONAL INFORMATION

For additional on health and safety issues related to Dumpster diving activities, please contact Mike Schene, Environmental Protection Officer, Intermountain Region - Denver Support Office at (303) 969-2877.



OTHER TOOLS AND RESOURCES

The *EPA Business Guide for Reducing Solid Waste* contains a detailed description of a field sampling and estimating procedure. Call the RCRA hotline at (800) 424-9346 and ask for document 530-K-92-004. You'll find more useful information about waste composition in **Chapter III** of the *NPS Solid Waste Handbook.* Also see **Toolbox 6, Resources**.



Waste Composition - Data Collection and Calculation Sheet								
MATERIALS	**Sample 1**		**Sample 2**		**Sample 3**		**Average - All**	
	Wt (Lb)	**%**	**Wt (Lb)**	**%**	**Wt (Lb)**	**%**	**Wt (Lb)**	**%**
PAPER								
Corrugated Cardboard (OCC)								
Newspaper (ONP)								
Office Paper (OP)								
Mixed Paper (MP)								
Other								
PLASTIC								
PET								
HDPE								
Film								
Polystyrene (PS)								
Other								
GLASS								
Containers								
Other								
METALS								
Ferrous								
Aluminum								
Used Beverage Container (UBC)								
Other								
Other								
ORGANICS								
Yard Waste (YW)								
Food Waste (FW)								
Wood Waste (WW)								
Other								
OTHER WASTES								
TOTAL								
NOTES:	1 -							
(Location, date and details of sorts)	2 -							
(Model calculates average of all	3 -							
samples from one to all six.)	4 -							
	5 -							
	6 -							

t o o l b o x 5

Floppy Disk

Floppy Disk

You can photocopy the worksheets from Toolboxes 2, 3, or 4 or you can print them from the enclosed floppy disk, which contains these worksheets:

Toolbox 2 *Combined Waste Composition Worksheet*

Toolbox 3 *ISWAP Tracking Worksheet*

Toolbox 4 *Waste Composition Data Collection & Calculation Worksheet*

The worksheets are combined in single files in three formats:

forms.wpd WordPerfect 6/7/8 format

forms.doc Word 6 format

forms.pdf PDF format (needs Adobe Acrobat reader)

The WordPerfect and Word files can be edited if you need to customize the forms for your park.

The PDF file can only be printed, and you will need the Adobe Acrobat Reader (2.1 or higher) to view and print the forms. If you don't have Acrobat already, go to the Adobe Web site (**www.adobe.com**) and click the "Download Acrobat" button at the lower left corner of your screen. The file is about 4.7 MB, and it's free.

t o o l b o x 6

Resources

EPA/NPS Publications

- Municipal Solid Waste Publications, 1997
- *Decision Makers Guide to Solid Waste Management*, EPA Publication No. 530-R-95-023
- NPS *Solid Waste Management Handbook*, 1996
- NPS *Hazardous Waste Management Handbook*
- NPS *Pollution Prevention and Community Right-to-Know Training Manual*
- *Executive Order 13101, September 14, 1998, Greening the Government through Waste Prevention, Recycling, and Federal Acquisition.*

EPA Telephone Resources

- RCRA Hotline 800-424-9346

Advisors and Mentors

For questions about the Intermountain Region ISWAP program and related issues, contact:

NPS Intermountain Region Solid and Hazardous Waste Program Manager
Michael Schene
National Park Service
PO Box 25287-PM
12795 West Alameda Parkway
Lakewood, Colorado 80225
Phone: (303) 969-2877
Fax: (303)969-2063
Email: mike_schene@nps.gov

For questions about EPA and pollution prevention, contact:

EPA Region 8 Pollution Prevention Project Manager
Suzanne Stevenson
Environmental Protection Agency
8P-P3T
999 18th Street, Suite 500
Denver, Colorado 80202-2466
Phone: (303) 312-6122
Fax: (303) 312-6044
Email: stevenson.suzanne@.epa.gov

For questions about the National Park Service ISWAP and environmental programs, contact:

Your NPS WASO Program Manager

Shawn Norton
National Park Service
(MS-7253)
1849 C Street NW
Washington, DC 20240
Phone: (202) 565-1244
Fax: (202) 565-1266 fax
Email: shawn_norton@nps.gov

For how-to information from facility managers who've already built their own ISWAPs, contact:

NPS Pilot Program Participants

John Gibson/Glenda Hammond
Facility Manager/Maintenance Supervisor
Padre Island National Seashore, 9405 S.P.I.D
Corpus Christi, TX 78418
Phone: (512) 949-8173 x240
Email: john_gibson@nps.gov

Poly Barella
Safety Officer
Petrified National Forest
Phone: (520) 524-6228 x248
Email: polly_barela@nps.gov

Mark Seaton
Facility Manager
Great Sand Dunes National Monument
11500 Highway 50
Mosca, CO 81146
Phone: (719) 378-2312 x205
Email: mark_seaton@nps.gov

Jim Erickson
Facility Manager
Big Bend National Park
P.O. Box 129
Big Bend National Park, TX 79834
Phone: (915) 477-1114 x114
Email: jim_erickson@nps.gov

Bill Gowett
Facility Manager
Grand Teton National Park
P.O. Drawer 170
c/o Moose Warehouse
Moose, WY 83012
Phone: (307) 739-3347
Email: bill_gowett@nps.gov

Other Resources

- The Internet: Countless sites devoted to environmental issues. Here are a few launching pads for finding solid waste information on the Web. Start with the NPS site, which contains a wealth of information, documents, and links to help you develop and manage a sustainable ISWAP
- **ParkNet**, NPS home page. http://www.nps.gov/
  Green Toolbox — Documents and links on energy and sustainability regulations, renewable energy, energy conservation, water conservation, alternative transportation fuels, building materials, office supplies, reuse, source reduction, recycling, much more. http://www.nps.gov/toolbox/;
  Sustainability case studies http://www.nps.gov/renew/case/
  NPS Facility Web Site http://www.nps.gov/facilities/
  The National Park Service Guide to Providing Appropriate Facilities http://www.nps.gov/dsc/dsgncnstr/toolbox.html
- **DRMO (Defense Reutilization Marketing Organization)**. Possible source of equipment for reuse, this Web site lists materials available by category and has a search function http://www.drms.dla.mil
- **Waste exchange links** http://www.enviroworld.com/Resources/matexchs.html
- **EnviroTech On Line** The largest catalog of environmental sites on the World Wide Web! http://www.envirotech.org/
- **GreenLink**, the environmental starting point. http://www.nwlink.com/~van/greenlnk.html
- **Amazing Environmental Organization Web Directory**. Bills itself as "Earth's biggest environmental search engine." http://www.webdirectory.com/Recycling/
- **FedWorld**, the jumping-off place for federal information resources. http://www.fedworld.gov/
- **Department of Energy**. DOE's home page. http://198.124.130.244/
- **Environmental Protection Agency**. EPA's home page. http://www.epa.gov/;
  Solid Waste Info. http://www.epa.gov/epaoswer/non-hw
- **National Technical Information Service** Services for Federal Agencies to help you organize and keep track of your scientific, technical, engineering, and business related information and reach U.S. business and industry leaders as well as the public at large. http://www.ntis.gov/ntisserv.htm

t o o l b o x 7

Contracts:
Sample Statement of Work for ISWAP Plan

1996

BRYCE CANYON NATIONAL PARK

Statement of Work

Prepare an Integrated Solid Waste Management Plan

Introduction

Solid waste in Bryce Canyon National Park is generated in public use areas such as campgrounds, overlooks, lodging facilities, in employee operations and residential areas. Bryce Canyon has initiated a recycling and waste reduction program as part of their overall integrated waste management strategy. These programs are popular with the public, and in most cases, are a overall cost-saver when compared with disposal options. As park budgets tighten and disposal costs increase, it is clear that more must be done to ensure that the solid waste program is the most efficient possible in terms of cost, labor, requirements, and ease of use by the public and employees. It must be a practical plan, be doable for existing operations and also meet the needs of the future. Improvements can be made to prevent waste at its source, thereby reducing both materials use and expenditures on waste disposal and diversion programs.

The goal of this project is to identify and describe more economical, efficient, and environmentally sound waste management strategies for Bryce Canyon National Park and surrounding communities. Development of an Integrated Solid Waste Management Plan (ISWMP) will provide the management tool for this goal. The plan will analyze current operations, evaluate the costs of existing and proposed future solid waste/recycling systems, determine ways to reduce costs, and identify solid waste management options available for the future. This project will also focus on ways to simplify program management and promote the importance of public education and awareness of recycling and waste reduction programs in the park and surrounding communities.

The benefits of such improvements are multiple. A more efficient solid waste collection system will decrease litter and reduce costs. Changes in procurement practices can reduce the quantity of materials which are destined for the landfill (either through longer life or reduced quantities) needed. Modifications to collection frequency and improved processing and disposal will reduce vehicle congestion and reduce costs. With increased recycling participation, more materials will be diverted from landfills and the need for virgin materials will be reduced. The larger the volume of materials collected, the more cost effective the recycling program becomes, even without changes in collection patterns. With more efficient collection, either through improved routes or frequency, the costs of recycling are reduced and the social benefits of recycling are increased.

Scope of Work

Developing an ISWMP will include a review and cost analysis of the components of the current solid waste system in the park, including concessioner facilities and surrounding area. These components include source reduction, recycling, public education programs, trash and recycling collection, waste processing, and final disposal. Each of these systems is necessarily interrelated and cost improvements in one will likely affect other components.

The contractor will identify cost-effective integrated solid waste management strategies. The contractor will utilize past visitation and waste generation data for forecast future waste generation levels for the park. The contractor will evaluate waste composition, waste collection (routes, schedules, equipment

and manpower), and waste disposal (equipment, manpower and materials). The contractor will then use waste stream data from other NPS facilities to determine potential recovery rates and identify the materials which are the best candidates for diversion (via recycling, composting, or waste-to-energy). Finally, the contractor may offer recommendations for improvements in the collection and disposal of trash and material recovery. As appropriate, the may include the preparation of cost and manpower estimates. All findings will be formulated in language that can be readily used in future solid waste and recyclable collection contracts issued by the park.

The contractor will evaluate waste reduction and recycling opportunities for the park and concessioner. The review will encompass both specific work practices and park-wide policies that promote waste prevention. The contractor will conduct walk-through site assessments and advise park and concessioner staff on techniques they can use to identify and evaluate additional waste prevention opportunities on their own.

The contractor will work with park procurement staff to discuss steps they can take to complement the parks' recycling/waste prevention program, as well as help them comply with the Executive Order mandating "GREEN" procurement. The contractor will also work with the park concessions specialist to discuss steps the park can take to enhance the recycling or waste prevention efforts of park concessionaires. These waste prevention/source reduction initiatives will be identified in the Integrated Solid Waste Management Plan (ISWMP).

The contractor will prepare an ISWMP for the park. The ISWMP format will follow the NPS Washington Office recently revised Managers Guide. The key requirements of an ISWMP include: a description of the current and projected waste collection and disposal system, the costs of the system (i.e., vehicles, manpower, collection and disposal frequency, container requirements, etc.) A description of feasible alternatives for solid waste management, the preferred strategy, and cost estimates and timelines for implementation of the preferred strategy. The work will be documented in a manner to allow for easy revision in the future.

The Project Coordinator will collect relevant data from the parks Maintimizer program, Resource Management staff, CCR, collection contracts, and other sources on the current monthly cost of waste and recycling management and on visitation and long-term park management plans. To the extent possible, NPS staff will also request information from the concessioner on the quantities and costs of each material managed by each concessioner. The contractor will provide the Project Coordinator with a list of data needs three weeks prior to the site visit. If this information is not available, the contractor will make informed judgements about the costs and quantities of waste handled by each of these systems.

The NPS Project Coordinator(s) will present the final ISWMP plan to park management. Park procedures will be followed for plan approval and implementation.

<u>On-site Visit</u>

The contractor will conduct a two-day visit to the park to collect data, meet with park and concessioner staff, and tour facilities. The contractor will set up this visit at least two weeks in advance and notify the following persons: Chery Schreier, Hazardous Waste Coordinator/Concessions Liaison and Project Coordinator (801) 834-4103, NEW PERSON, Recycling Coordinator (801) 834-XXX, Richard Bryant, Resource Manager (801) 834-4900, Michael Castagnetto, Facility Manager and COTP (801) 834-4200. The Concessions Management Specialist will be notified of all meetings with park concessionaires. Any of these persons may accompany the contractor during the park visit.

The contractor will also conduct a presentation to park staff, residents, local communities, concessionaires, other parks and partners concerning the benefits or waste reduction and recycling as well as the economic advantages. A listing of these contacts is provided to assist in developing the ISWMP.

Work Products

the contractor will provide reports to the Contracting Officer's Representative (COTR) and Park Coordinator for each milestone listed in the attached table. These reports can be submitted by electronic mail.

Two written products will be produced: a draft and final ISWMP. In addition, the contractor will prepare briefing materials for meetings with park management. The final ISWMP will incorporate all park comments and edits as necessary and will be delivered at the end of the contract. The contractor will furnish to the Project Coordinator, Bryce Canyon national Park one hard copy of each of the draft and final ISWMP documents. Any special formatting, such as binding, table formatting, etc., if necessary will be performed by the NPS, and the contractor will provide one camera-ready copy of the document in this format.

The contractor will furnish to the park Project Coordinator a copy of the final ISWMP on 3 ½ 1.44 Mb disk. The disk will contain an index of material contained, labeled with the contractor's name, address, phone, project, contract number, and date. Word processing will be compatible to Word Perfect 5.1 format.

The project timeline is 120 days from Notice to Proceed to completion and submittal of the final ISWMP. This timeline allows two weeks for NPS review of the draft ISWMP.

Toolbox 8

Markets

Regional Market Contacts

Southwestern Public Recycling Association (for Arizona, Nevada, Utah, Colorado and New Mexico)
P.O. Box 27210
Tucson, AZ 85726-7210
(520) 791-4069
(520) 791-5242 fax

State Market Contacts

Arizona:
Arizona Recycling Coalition
101 S. Central
Phoenix, AZ 85004
(602) 256-3170

Southwestern Public Recycling Association
Arizona Office
(520) 791-4069

Colorado:
Colorado Recycles
8745 W. 14th Ave, Suite 216
Lakewood, CO 80215-4850
(303) 231-9972

Southwestern Public Recycling Association
Colorado Office
(303) 640-7497

Montana:
State of Montana
Waste Management Division
P.O. Box 200901
Helena, MT 59620-0901
(406) 444-1430

New Mexico:
State of New Mexico
Energy, Mineral and Natural Resources Department
2040 S. Pachecho Street
Santa Fe, NM 87505
(505) 827-5993

Southwestern Public Recycling Association
New Mexico Office
P.O. Box 1645
Bernalillo, NM 87004

(505)867-3964

Oklahoma:
Oklahoma State Department of Health
1000 NE 10th
Oklahoma City, OK 73117-1299
(405) 271-7353

Texas:
Texas Natural Resource Conservation Commission
Recycling Section
P.O. Box 13087
Austin, TX 78711-3087
(512) 239-6013

Recycling Coalition of Texas
3112 Canyon, Suite 200
Dallas, TX 75226
(214) 670-4475

Wyoming:
Wyoming Recycling Association
P.O. Box 539
Laramie, WY 82073
(307) 777-7752

Specific Materials Market Contacts

Glass:
Glass Packaging Institute
1627 K Street, N.W., Suite 800
Washington, DC 20006
(202) 887-4850
(202) 785-5377 fax

Glass Packaging Institute
4825 South Peoria, Suite 4
Tulsa, OK 74105
(918) 742-8343
(918) 742-8342 fax

Paper:
American Forest & Paper Association
111 19th Street, N.W., Suite 800
Washington, DC 20036
(202) 463-2700
(202) 463-2785 fax

Corrugated Packaging Council
(800) 879-9777

McKinley Paper Company
10501 Montgomery N.E., Suite 300
Albuquerque, NM 87111
(505) 271-7500
(505) 251-7510 fax

Weyerhaeuser
Recycling Business Headquarters
Federal Way, WA
(206) 924-2905
Colorado Collection Center
Denver, CO
(303) 297-2312
Oklahoma Collection Center
Oklahoma City, OK
(405) 670-1441
Texas Collection Centers
Carrolton, TX
(214) 418-1703
Grand Prairie, TX
(214) 988-0555
San Antonio, TX
(210) 662-0600

Plastic:
American Plastics Council
1801 K Street, N.W., Suite 701L
Washington, DC 20006-1301
(202) 974-5400
1-800-2HELP-90
(202) 296-7119 fax

NAPCOR
1420 5th Avenue, Suite 2200
Seattle, WA 98101
(206) 224-7464
(206) 224-2880 fax

Steel:
Steel Recycling Institute
823 Congress Avenue, Suite 1104
Austin, TX 78701
(512) 472-3276
(512) 472-7026 fax

Toolbox 9

Sample ISWAP Plan