Promoting the development and growth of successful recycling programs in West Virginia is an integral part of a SWA’s responsibilities. Recycling is the process by which recovered products are transformed into new products, and includes the collection, separation, recovery, and sale or reuse of metals, glass, paper, tires, lead-acid batteries, and other materials.

The Legislature has determined that many citizens of West Virginia want a recycling program in order to conserve limited natural resources, reduce litter, recycle valuable materials, extend the useful life of solid waste landfills and reduce the need for new landfills, according to W. Va. Code §22-15A-1-(f.)

The Legislature established clear recycling goals for the reduction of municipal solid waste based on the amount of per capita solid waste disposed in 1991. Those goals were:

- January 1, 1994 20%
- January 1, 2000 30%
- January 1, 2010 50%

Not only did the Legislature set waste reduction goals, it prescribed the preferred method by which recycling would take place. It found that recycling programs are most successful when encouraging, and in certain instances requiring, the source separation of solid waste and the subsequent curbside collection of recyclables.

**RECYCLING PROGRAMS**

There are several different types of recycling programs. The most common include the following:

**Source separated/curbside** programs require recycled materials be separated from other solid waste and placed at the curb for collection. Some communities have special plastic recycling containers in which recyclables are placed. The separated materials are then sorted into bins in a special recycling truck. Other communities have designed programs where recycled materials are co-mingled or placed jointly into plastic recycling bags. In some cases, communities have designed programs where one recycled item is picked up per week. For example, newspapers one week, glass another, and metal the next. While source separated/curbside programs can have their own unique design, they share several common elements:

1. Recycled material must be separated from the waste stream by the individual or business generating the waste.
2. Recyclable items must be placed at the curb.
3. Waste generators separate their own recyclables. By doing this, they realize how much waste they create and will become more attuned to waste reduction in their own homes or businesses.
4. The quality and quantity of recyclables received from curbside programs can reach high levels through proper education and promotion.

**Drop-off** programs are where recyclables are dropped off at a recycling station, container or community collection site. These programs can be very effective in collecting large amounts of recyclables. In many cases, rural areas have opted for this
type of recycling program. It is not uncommon to see recycling containers in major retail parking lots. This type of recycling program is generally not as convenient as a curbside program. People have to collect their recyclables and drive to the drop-off site. Participation in drop-off recycling is generally lower than curbside programs.

Drop-off sites can be either manned or unmanned. Unmanned sites generally have more problems with contamination (non-recyclable items and/or garbage deposited into the container).

The size and the design of the recycling containers can pose problems for the individuals transporting and unloading the containers. Drop-off container sites must be well maintained or they will soon end up as eye sores with blowing bags, paper and broken glass.

**Dual programs** have both a curbside collection program and drop-off centers. This type of program provides for maximum participation and allows for greater flexibility in designing a recycling program.

To help accomplish the recycling goals, the Legislature mandated that municipalities with a population of 10,000 or more establish and commence implementation of a source separated and curbside collection program. Each governing body is to adopt an ordinance requiring each person, partnership or corporation to separate at least three recyclable items from other solid waste.

Municipalities having a population greater than 30,000 may, by ordinance, establish a Material Recovery Facility (MRF) in lieu of or in addition to the mandatory recycling program. Materials entering the MRF must be source separated prior to collection according to W. Va. Code §22-15A-18-(h).

**KEY ELEMENTS FOR SUCCESSFUL RECYCLING**

The major components of any recycling program are education, participation, collection, processing and marketing. The strength of any recycling program is only as strong as its weakest component.

Marketing is an important element to consider when establishing any recycling program. Collectors must consider what materials can be marketed and how they must be prepared.

**TYPES OF MARKETS**

When marketing recyclable materials, there are a number options available. They include scrap dealers and processors, scrap brokers, marketing cooperatives and end users.

**Recycling Materials Processor:** Using scrap dealers/processors is an efficient way to get materials into the recycling stream when materials are sold on an “as collected” basis. The scrap dealer/processor collects recyclable items, grades incoming materials and sorts and packages them to the specifications of end users, usually through baling or some other method so that the transportation costs are minimized.
**Recyclable Materials Broker:** A scrap broker may be an appropriate channel for recycling programs if processing equipment is in place and the program has a proven track record of making a quality product. A scrap broker markets materials without acquiring title to them by arranging a transaction or series of transactions between suppliers of recyclable materials and end users. The broker earns a fee in this process.

Scrap brokers are knowledgeable about the transportation of the materials they market. Typically they will arrange for material to be picked up at the supplier’s location and delivered directly to an end user.

**Marketing Cooperative:** A marketing cooperative is a group of public or private recycling organizations with similar interests joining together to create a pool of recyclable materials and increasing their leverage in the marketplace. When entities band together, their bargaining position increases. Cooperatives tend to center around recycling programs or operations that are similar in size and materials recycled.

Some of the most successful marketing cooperatives exist in rural communities because they are so far from the industrial centers that purchase the recyclable materials.

**End Users:** An end user is usually a manufacturing company that uses recyclable materials and converts them into new products or new materials. Three key ingredients must exist when considering dealing directly with end users:

1. A large volume is needed to deal with end users directly. For example, a secondary fiber paper mill might use 300 to 900 tons per day of raw material, and the purchasing department might not find it efficient to deal directly with any supplier with less than 150 tons per month. The secondary fiber mill might not have a staff large enough to manage relationships with more than 75 to 100 suppliers. For aluminum cans, however, it is possible to ship to an end user in units of five tons of material because the suppliers are highly fragmented and the purchasing departments of most aluminum companies are set up to handle a great many suppliers.
2. Know the specific grades of material your program produces and how it will be packaged and shipped. For example, many mills will want the paper baled into 1,000-pound bales or greater to minimize their material handling costs.
3. Be a reliable supplier. If the purchasing agent wants a certain tonnage of high-quality materials, the program should keep the standards and volume high month after month. A good relationship will develop for both parties if the program demonstrates reliability.

**MOST COMMONLY RECYCLED ITEMS**

**Glass:** The primary glass product in the municipal solid waste stream is the glass container, which is commonly clear, brown or green. Only glass containers are considered 100% recyclable. Other glass products including Pyrex, cookware, dishware, windows and specialty glass, each with different chemical compositions, are considered contaminants in glass container production and are generally not recycled. Of the commonly produced colors of glass, clear has the largest number of applications and is usually in greatest demand by glass manufacturers. Brown and green glass are used in products where degradation may occur when exposed to sunlight. Lack of markets has made glass increasing difficult for most SWAs in West Virginia in the past several years.

**Scrap Metals:** Scrap metals are commonly divided into two major categories, ferrous metals and non-ferrous metals. Non-ferrous metals are non-magnetic and include
aluminum, brass, copper, lead and zinc. By far, the most common recyclable of this group is the aluminum beverage can. Ferrous metals include cast iron, stainless steel, industrial scrap, car bodies and household appliances. In the residential waste stream the tin-plated steel food can is the largest volume ferrous metal product discarded.

**Plastic:** Since World War II, plastics have been used in an increasing number of products. Plastic packaging has seen the most growth, with the plastic soda bottle being introduced in 1979. Plastic resins are synthetic materials made from oil and natural gas that are combined in a polymerizing process. Each resin has a different molecular structure that gives the material unique qualities and its value as a material.

The primary types of plastic resins used in containers include the following:

- “PET,” polyethylene terephthalate.
- “HDPE,” high-density polyethylene.
- “PVC,” polyvinyl chloride.
- “PP,” polypropylene.
- “LDPE,” low-density polyethylene.

**Waste Paper:** Recyclable paper is marketed on the basis of grade, according to the type and quality of fiber. Waste paper is often categorized as:

1. Low-grade fiber, such as newspaper (ONP) and old corrugated containers (OCC).
2. High-grade fiber, such as printing, writing and computer paper.

The grade of waste paper is defined and specified by the Paper Stock Institute of America in Paper Stock Standards and Practices, which is accepted and used throughout the paper industry. Mixed recyclable paper is considered the lowest grade of paper because of the lack of uniformity of the fibers. It presents the greatest difficulty for reuse. The Paper Stock Institute of America lists specific guidelines that define different grades of materials based on the type of paper as well as how it is to be prepared for sale. While over 48 types of waste paper are marketed, the most common categories are newspaper, old corrugated containers, office paper and mixed paper. A brief description of each category follows.

- **Old Newspaper (ONP):** Old newspaper is primarily used in manufacturing paperboard, newsprint, roofing felt, construction paper, cellulose insulation and molded paper products.

- **Old Corrugated Containers (OCC):** Corrugated paper is mainly used in the manufacture of boxboard, linerboard and dripboard.

- **Office Paper:** This type of paper, categorized as high-grade waste paper, includes printing, writing and computing paper and is used to produce printing, writing, and computing paper as well as exterior liner of waxboard.

- **Mixed paper** is composed of different grades of recyclable paper. Its quality is not uniform and therefore has a very low value. This type of paper is used mainly in the manufacture of boxboard and chipboard.

**Composting:** Composting is a natural process. The process is the decomposition or rotting of organic waste. During this process, heat, water vapor and carbon dioxide are given off and the resulting organic matter is known as compost. The organic matter generated from composting is a valuable soil amendment for lawns, flower beds,
gardens and houseplants. Organic matter increases the water-holding capacity of the soil, improves soil structure and increases the soil's ability to hold plant nutrients.

Yard waste, which traditionally includes grass clippings, leaves and brush, can be composted by the homeowner in the backyard or by municipalities in a centralized composting operation. US EPA estimates that approximately 12.1% of the waste stream is yard waste. If other organic waste (paper, food waste and other wood waste) are included, the volume of material which can be composted jumps to over 50% of the waste stream. This indicates that composting has the potential to significantly reduce the volume of waste going into landfills.

**Poultry Litter:** The need to recycle is not limited to normal household items. WV has a thriving poultry industry and a growing need to dispose of poultry litter in an environmentally acceptable manner. In response to this problem, the Legislature passed House Bill 4380. This Bill amended the definitions for Tax Credit for Agricultural Equipment, W. Va. Code §11-13K-2, and the policy for state purchase of recycled materials in the Recycling Program, W. Va. Code §22-15A-23. Its intent is to promote the beneficial use of poultry litter by (1) allowing a tax credit for its use as an agricultural fertilizer, and (2) requiring that the use of composted or deep stacked poultry litter products be given priority by all state agencies in their land maintenance and landscaping activities.

**PROCESSING**

Following are typical end user processing requirements for glass, scrap metals, plastic and paper. Potential buyers may have specifications different from those below.

**Glass:**
1. Glass must be free flowing and non-caking.
2. Glass must be free of any organic or inorganic contaminants. A maximum of 2% organic content is allowable.
3. Glass cannot contain any metal. In some cases, foil or metal rings or enclosures are permitted but not encouraged.
4. Glass, if separated and sorted, must contain:
   - Flint (clear): 95-100% flint glass.
   - Amber: 90-100% amber glass.
   - Green: 80-100% green glass.
5. Glass should be relatively free of moisture.
6. Glass should be able to pass through a two inch mesh screen.
7. Plate glass, light bulbs and ceramic dishes are not acceptable.

The primary piece of equipment used to process glass is the glass crusher. The glass crusher is used to break glass into small pieces. The crushed glass is then shipped in containers such as barrels, Gaylord boxes or open dump trailers.

**Aluminum:**
1. It should be free of grit and sand. In particular, no glass may be present.
2. It must be free of organic contaminants.
3. It must be free of iron contaminants. Less than 1.7% is preferred.
4. It must have a low surface to volume ratio and should be flattened or baled.

The typical piece of equipment used to process aluminum and steel cans is a can flattener or crusher/densifier. The densifier is a special type of baler designed to make
concentrated bales of aluminum or steel cans. Magnetic separators are sometimes used to sort out bi-metal cans.

**Scrap Steel:** Steel scrap is often accepted baled or loose. In general, the material should be free of all aluminum cans, loose tin plates, plate scrap, dirt and garbage. Steel aerosol cans may be recycled if emptied.

**Plastic:** The most marketable plastics are soda bottles (PET) and Milk Jugs (HDPE Natural). Processing will be greatly simplified if residents are asked to recycle plastics by their commonly used names (i.e. milk containers, soda/pop bottles, detergent bottles). Although each potential buyer of plastic has its own set of specifications, the following basic requirements will be generally acceptable:

1. Absolutely no PVC contamination accepted.
2. No foreign material in bottles.
3. No caps (metal or plastic).
4. Bale weight is usually set by each market. Consult buyer for bale weight specifications.
5. Clear PET bales: clear soda bottles only.
   - Green PET bales: Green soda bottles only.
   - Custom PET bales: No soda bottles.
6. HDPE Natural: Primarily milk and water containers.
7. HDPE Colored: Bottles with necks, laundry detergent and bleach bottles; considered contaminants if mixed in with HDPE Natural.

The most common equipment used to process plastics to meet end user requirements is a baler. A perforator places holes in the plastic before it is baled. This allows air to escape the bottles and makes the baling process somewhat easier. Baling plastics can be difficult, and training is suggested.

**Newspaper:** The following basic requirements will be generally acceptable:

1. Clean, dry and not yellowed;
2. Slicks should be separated;
3. Bales should be fastened with wire in one direction only. The suggested minimum weight is 1,000 pounds. It should be noted that loose shipments may be accepted;
4. Cardboard headers may or may not be allowed. Check with the market.

**Universal Waste:** Batteries, pesticides, thermostats, and mercury-containing lamps (fluorescent lamp bulbs) are generated by both businesses and households and all fall under the designation of universal waste. The Universal Waste Rule was first promulgated by the EPA and later adopted by the State of West Virginia, as 33CSR20 Section 13 Legislative Rule. This rule gives businesses and individuals the option of disposing of these items as either universal waste or hazardous waste. The rule streamlines the requirements related to notification, labeling, marking, prohibitions, accumulation time limits, employee training, response to releases, offsite shipments, tracking, exports and transportation. The Universal Waste Rule is designed to both reduce administration costs and encourage recycling of these designated materials.

**Volume and Weight Conversions:** In setting up a recycling program, a good knowledge of how materials are measured and what kind of weights or volumes are generally obtained can be extremely useful. The US EPA has a Standard Volume-to-Weight Conversion Chart available on their website which can be used to plan and evaluate materials for your recycling activities. Website: [www.epa.gov](http://www.epa.gov).
RECYCLING COLLECTION AND PROCESSING EQUIPMENT

One of the key elements of a successful recycling program is having the proper equipment for collection and processing. Determining what equipment to use is most commonly based on the type of collection program you choose and the processing requirements of your potential buyers.

Some other things to consider when choosing your equipment is pricing, future expansion of the program, additional transportation of the products and space in your facility. A brief overview of the most commonly used equipment, national pricing average and usage for each has been included at the end of this chapter (see Attachment 7-A).

RECYCLING COORDINATORS

The emergence of the position of recycling coordinator has rapidly developed as communities all over the United States have expanded their recycling activities. SWAs should carefully examine the role this position can play in meeting solid waste reduction goals.

The first real question any SWA needs to answer: “Is the role of a recycling coordinator being carried out now?” In many cases, extension agents, city planners or solid waste managers may be carrying out these responsibilities.

The SWA should also examine its role in managing solid waste or recycling when making the decision to hire a recycling coordinator. A SWA that operates a recycling program may need a different kind of coordinator than a SWA that wants a coordinator to increase public awareness and education on recycling. Some general skills a recycling coordinator should have include the following:

1. Good knowledge of solid waste and recycling issues and commitment to recycling.
2. The ability to interact with the public and make general presentations.
3. Good interpersonal skills to mediate differences.
4. Basic computer or typing skills.
5. Good mechanical skills, if being hired to run a recycling facility or drop-off program.
6. Motivation and a good sense of humor.
7. Bookkeeping skills if the coordinator will also be the individual doing grant management and accounting.

SWAs can help their recycling coordinators succeed by following a few simple steps.

1. Give the coordinator clear objectives and goals.
2. Subscribe to solid waste journals and encourage attendance at conferences and other training opportunities that might have some importance to the SWA.
3. Have the recycling coordinator make monthly written reports on their activities, successes and failures.
4. Have an annual performance evaluation. People want to know if they are doing their job properly.
QUESTION AND ANSWERS ON RECYCLING

Q. Where can I get information on recycling?

A. There are a number of information sources available to SWAs on recycling. Local private recyclers, scrap yards and solid waste haulers may know about local recycling markets.

Q. Does the SWA have to provide recycling services?

A. No. SWAs do not have to provide recycling services directly. They do have an obligation to promote source reduction, recycling and reuse and to help plan and coordinate these activities. Some SWAs operate recycling centers or drop-off programs others work with private recyclers.

Q. How can a SWA help fund the implementation of a local recycling program?

A. Grants are available from the SWMB and the DEP.

Q. What are some of the common problems SWAs encounter when they undertake recycling activities?

A. The most common problems with recycling programs are lack of public participation, availability of markets, collection, processing capability, storage and transportation and lack of funds.