RECYCLING FOR A CLEANER MARINE ENVIRONMENT

A Guide for Marinas, Ports, & Terminals

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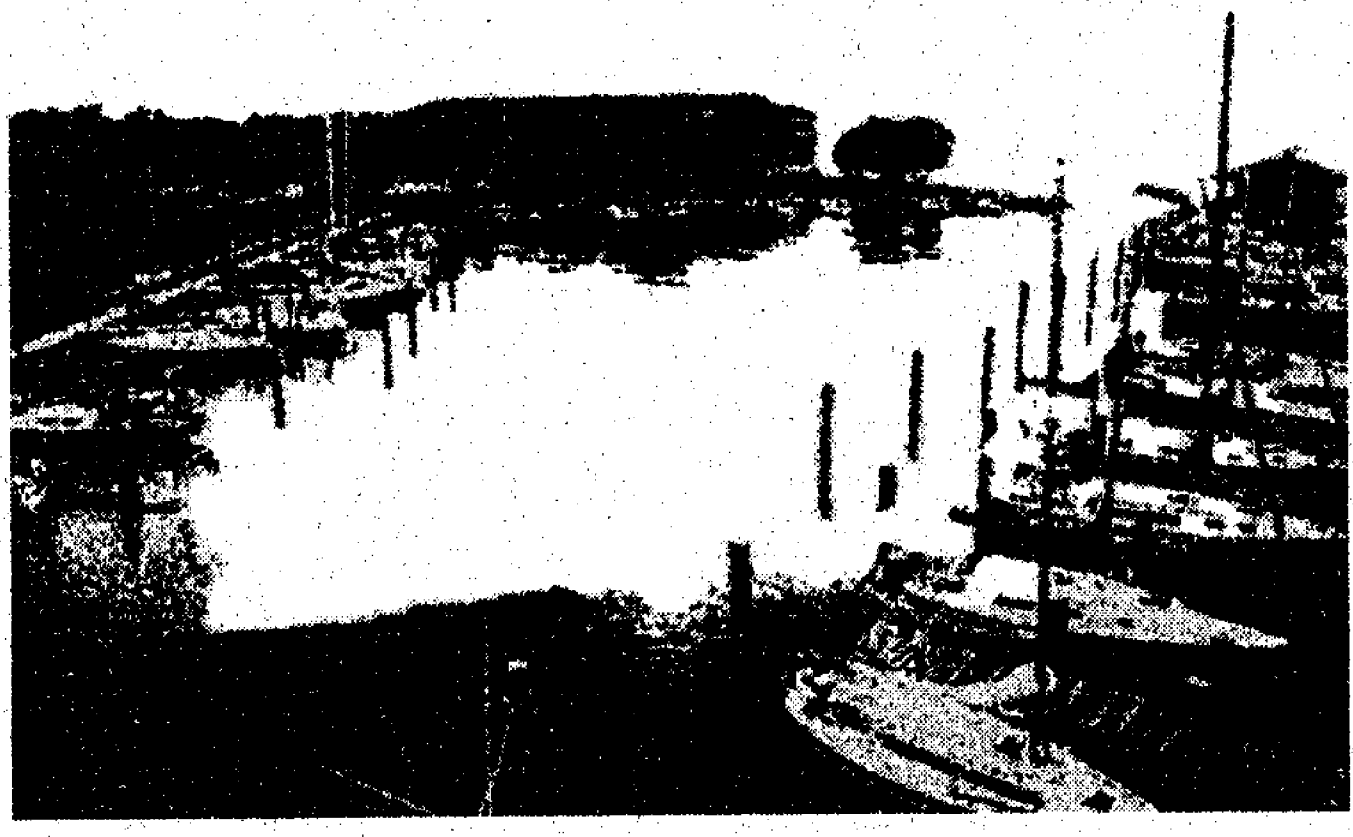

TEXAS A & M UNIVERSITY

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A Guide For Marinas, Ports, and Terminals

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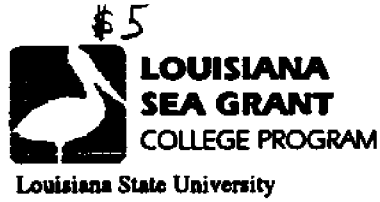

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INTRODUCTION

Humans are in a unique position, as the most dominant and manipulative animals in the marine environment, to protect, conserve, and even enhance that environment or cause it's demise. When humans realized that throwing debris and dumping pollutants into the oceans harms marine animals by poisoning, maiming, or choking them, laws were passed to correct the damage and change the harmful behavior. These laws gave ports, marinas, and terminals responsibility for protecting the marine environment which is critical to each facility's livelihood by offering vessels various acceptable disposal options. Those port and marina operators who take the lead in providing alternatives to dumping waste and pollutants — plastics, beverage cans, galley waste, raw sewage, paper, maintenance chemicals, oil and fuel — into the sea can contribute to perserving the marine environment,while, at the same time, secure for themselves and their businesses a more positive public image. This book is intended to help the managers of all ports, marinas, and terminals, and the ships agents along the Gulf Coast identify means and methods for pollution and marine debris abatement in order that their livelihoods may be preserved and perpetuated.

INTRODUCTION TO RECYCLING

The Laws

Methods of Implementation

Reasons for Recycling

About This Guidebook

Before waste disposal legislation was instituted in the 1970s, the U.S. Environmental Protection Agency (EPA) documented that the world's merchant shipping fleet discarded 4,800,000 metal, 300,000 glass, and 450,000 plastic containers at sea every day! The Navy estimates that their ships can generate more than three pounds of solid waste per person *per day* (a typical ship carries about 5,000 persons). Recreational boaters and fishermen can produce about 1.5 pounds of solid waste per person per day, according to the Coast Guard. (EPA Marine Debris Action Agenda For the Gulf of Mexico, pp. 13-14.)

Laws To Perpetuate the Marine Environment

Because the elimination of marine pollution is a major goal of the International Convention for the Prevention of Pollution from Ships (MARPOL) and the Marine Plastic Pollution Research and Control Act (MPPRCA), vessel waste management has become a major consideration. Crews are now discouraged from indiscriminately throwing galley waste, vessel operational or maintenance waste, and cargo waste or dunnage overboard. Since 1988, the at-sea disposal of plastic materials has been prohibited, and the indiscriminate dumping of all other waste materials has been regulated by MARPOL. Private and public ports and terminals, including recreational boating marinas, are now required to provide adequate reception facilities or services to dispose of vessel waste. (A marina is considered to be the same as a terminal under this law when it provides wharfage and/or other services for 10 or more vessels at the same time.) Fines can be levied for non-compliance.

Three research projects conducted by Texas and Louisiana Sea Grants, concerning compliance with MARPOL regulations along the coast of the Gulf of Mexico, indicated that vessel operators are, indeed, aware of the international treaty and supporting U.S. laws. Some are storing waste on board and bringing it ashore in compliance. Analysis of these surveys shows a great variety in the waste

The volume of waste entering ports and marinas is increasing.

management processes, costs, and facilities at marinas, ports and terminals across the Gulf Coast. Differences even occur in the same state.

Different Waste Management Methods To Implement Laws

To some extent, the differences in waste management processes are the result of the differences between ports, terminals, and marinas. A port is an aggregate or collection of terminals. This public entity, directed by a port commission or authority, serves as a landlord and/or a business facilitator. The terminals within a port may be publicly or privately or jointly owned. Each port should have a waste management plan that provides appropriate waste reception facilities or services for the port or at each terminal for a variety of vessels.

Shallow-draft ports along the Gulf Coast are comprised primarily of terminals serving barge tows or offshore oil support vessels. Deep-draft ports are mostly involved in international commerce and handle large ships. Because the composition and volume of the waste generated by these vessels is dictated by the vessel size and type, the waste management plan at each facility is different.

By far the largest number of docking facilities along the Gulf Coast are small, private terminals or recreational marinas. Recreational marinas serve power boats, sail boats, and sportfishing boats. Small, private terminals are usually owned by a corporation — a towing firm, logging company, or oil company, for example, — and serve the vessels that are used in that firm's operation. Commercial fishing terminals, often located at a processor's dock, also fall into this category.

The vast majority of Gulf Coast ports and terminals contract with third parties to offload and dispose of ship-generated waste. A limited number use a combination of port and third-party handling and disposal. Offshore staging operations, doing business with vessels similar to those using ports and terminals, either contract with third parties or handle their own waste.

In contrast, most of the commercial fishing terminals and recreational boating marinas manage the garbage that is placed in their general waste dumpsters, although they may contract with a waste disposal firm or municipal hauler to regularly empty the dumpsters. (Hollin & Liffmann, Use of MARPOL ... A report to Texas General Land Office, Sept. 1991) A study conducted by the Eastern Research Group for the Department of Transportation in 1988 indicates that the waste generated by these two groups is particularly significant for two reasons: (1) they generate almost three-fourths of the waste at sea, and (2) most of it will appear in marinas and fishing terminals. Although they are small and independently generate a small amount of trash, the large number of recreational boats in U.S. waters together generate about 1,300 cubic tons of trash per year — 62.7 percent of the total garbage generated by U.S. vessels at sea.

Fishing vessels generate 260 cubic tons per year, 12.5 percent. In the vast majority of cases, the recreational boats operate within three miles of shore where all at-sea waste disposal is forbidden. A significant percent of fishing vessels also fall into this category. (Personal communication, Lt. Cdr. Mike Farley, U.S.C.G.)

In a recent (1994) survey, about 47 percent of the marinas that responded repoted that they have a recycling project or participate in community wide-recycling as part of their waste management plan. They type and size of these endeavors vary. Recycling is not the norm. Many responding marina operators indicated reluctance to implement recycling in their waste management programs because of space con-straints at the marina, or experiences with boaters who failed to separate and place items for recycling in the appropriate receptacles.

Of the 21 major ports along the Gulf Coast responding to our 1994 survey, 11 have no recycling program at all, although all are involved in waste management. Very few ports, unlike marinas, absorb waste management costs. In 12 ports, the shipping line who's vessel is using the port pays the waste haulers directly; in most of the other ports, the shipping line pays the port for waste hauler services. Only one port responding to our survey has a program to recycle vessel waste, but over a third of these ports recycle waste generated in the port offices and staff areas. Reasons for a lack of recycling programs in ports are primarily business/ operations oriented: insufficient staff to operate and maintain a recycling system, concerns over liability, and expenses involved in such a program. In ports where ships agents manage vessel waste, the port has no contact or control over the process.

Few terminal owners or operators have individually implemented recycling programs. One notable exeption, Texaco Inc., has developed an extensive recycling program that uses a company-owned and operated south Louisiana terminal. Texaco officials report that the initial investment was substantial, but that this cost is being recovered in the program. Several other Gulf Coast oil and gas drilling companies are studying the potential of implementing some type of recycling program independently or cooperatively. Besides expenses, their concerns are similar to those of port operators: staff requirements, and possible liabilities.

Although these surveys show that current practice at most docking facilities along the Gulf Coast does not include recycling, concern for the perpetuation of the marine environment prevails among the operators of ports, marinas, and terminals. Consequently this manual has been developed to assist port, terminal, and marina operators (with ten or more slips) in establishing a recycling program — one part of the port or terminal's comprehensive solid waste management system.

WHY RECYCLE IN MARINAS AND PORTS?

Waste reduction at the source is already being encouraged.

Recycling reduces the amount of waste that must be incinerated or dumped in a landfill.

Recycling can reduce the amount paid for hauling waste to landfills.

A small income may also be generated.

Public attitude is already focused on recycling.

Why Recycling Instead of Dumping?

The EPA defines four options for solid waste management: source reduction, recycling, combustion, and landfill use. The compact nature of all boats encourages passengers and crew to generate as little waste

as possible — to reduce the waste volume at the source. Even offshore platforms have made changes. For example, grocery deliveries to offshore platforms previously generated much waste, i.e., from the wrappers on all types of foodstuffs to large cardboard boxes for transporting them. Some brands of grocery items are now chosen, in part, because they have less wrapping. Goods are now delivered in reusable plastic containers rather than cardboard boxes, reducing the volume of cardboard that the platforms has to dispose of every week. Thus, **source reduction is already being encouraged.**

Since MARPOL and MPPRCA directly, and the Clean Water Act, Clean Vessel Act, and the Resource Conservation and Recovery Act (RCRA) indirectly, demand careful operation and waste disposal, the amount of waste brought ashore is increasing. At the same time, the number of public landfills and incinerators available to absorb that waste has decreased. The remaining, generally private landfills have become difficult and expansive to operate because of the requirements in the Clean Water Act, Clean Air Act, and RCRA. The result is fewer facilities to dump more waste, and, those that continue to operate pass on their added expenses in the form of higher tipping fees. (A tipping fee is the dollar amount a hauler pays each time he/she tips his/her truck bed so that the waste therein falls into the landfill. Sometimes the fee is determined by the weight or volume of the load, sometimes the fee is standarized no matter the size of the load.) For example, New Orleans waste haulers in the summer 1994 paid a $12 per ton tipping fee for waste hauled to the landfill, which is less than many landfill fees across the Gulf Coast. In January 1995, that fee is expected to increase as high as $30 per ton because the city's landfill will be closed, and the trash will have to be hauled elsewhere, according to Lynn Wiltz (Source: Personal Communication, Recycling Manager for the New Orleans Department of Sanitation). Each docking facility, from port to marina, currently pays a fee for some type of dumpster and for emptying and pickup service which is based on that tipping fee. All of these fees will probably increase as the landfills continue to face restrictions or close. **Recycling reduces the amount of waste that must be burned in the incinerator or dumped at the landfill.**

Recycling is economically, as well as physically, the best alternative to disposing of the increased volume of waste. In past years, port, marina, and terminal waste disposal expenses were comparatively fixed, listed in the budget as an operating utility. Management paid a municipal or private service a regular fee to haul away a comparatively consistent amount of garbage generated by the harbormaster's office and those vessels regularly using the facility. Logically, additional vessel waste brought to port in compliance with these applicable laws will increase this expenditure and make it fluctuate according to the number and type of vessels entering the port. And this cost could increase due to the reduced number of landfills and increased number of regulations limiting their use. **Recycling might help ports and marinas reduce the amount paid for hauling waste to landfills,** because it can reduce both the weight and the volume of solid waste designated to go to the dump.

In some cases, **a small income may also be generated.** In recycling, solid waste is returned to industry as a raw material. If a facility chooses to market the recyclable waste directly to a manufacturer, income can be generated.

Port or marina management may prefer to contract with a broker or waste recycler to haul recyclable materials away. This broker earns a profit by processing and selling the waste, as recycled raw material, to a manufacturer. All port, terminal, and marina recycling programs can reduce the expense of hauling an increasing volume of trash to the landfill, but income from

the sale of waste as raw materials is not guaranteed. Income is generated only when the port or marina directly markets recyclable materials.

Public attitude is already focused on recycling as most municipalities and many rural communities have instituted the process locally. Environmental activism has stimulated concern for a cleaner environment, urged recycling to conserve resources, and promoted the habit of sorting recyclable materials from the household waste stream.

Some consumers actively seek products made from recyclable materials; others trade first with environmentally-conscious businesses. Public opinion has persuaded at least 41 states, representing more than 80 percent of the U.S. population, to establish waste recycling goals. By the end of 1991, nearly 4,000 curbside recycling programs were operating in the U.S., an increase of over 250 percent since 1988. (Lund, 2.1) Implementation of MARPOL and MPPRCA has requred vessel owners and operators to devise waste management plans, and raised the consciousness of port and terminal operators to the need for preserving the marine environment. Because of the growing public focus on recycling, port and terminal facilities may be able to easily develop their recycling programs by taking advantage of local programs and services already in place.

About This Manual

Each port or marina will implement the marine debris laws differently, but these laws assign all ports, terminals, and marinas the responsibility for providing adequate waste reception for vessels. Port, terminal, and marina managers are required to develop and implement a waste management plan. This book is intended to help with one portion of that plan: recycling.

The waste stream at each facility differs according to the boats; i.e., commercial fishing vessels, military vessels, recreational boats, tugs and barges, commercial passenger vessels, offshore oil service vessels, or ocean-going carriers, berthed or serviced. But, the responsibility for preserving the marine environment by diverting that waste stream is constant. Neither the largest port nor the smallest marina will continue to do business if the sea becomes a garbage dump, or the people stop using vessels. Some facilities, especially recreational marinas and small terminals, will have the responsibility for dealing with all vessels' wastes; others will simply have to help the manager contract for or physically offload his/her waste onto a garbage truck or recycling vehicle. Regardless, all waste management plans will include some provision for preserving the marine environment by preventing littering and careless waste disposal. This manual, therefore, is for every facility — from the largest municipal port to the smallest 10-boat recreational marina.

To establish and operate your program, use this manual as a reference rather than a blueprint. It will help you custom-design a waste recycling program or facilitate direct recycling between vessels and waste haulers that assures the preservation of the marine environment.

Because the first two chapters of the manual cover basics common to most recycling programs, we urge you to carefully read them. Subsequent chapters focus on considerations for recycling individual waste materials. Use those that apply to the waste stream generated by your operation and by the vessels bringing waste into your port or marina.

Chapter 1
HOW TO GET STARTED

Audit the Waste Stream

The people in the United States are projected to generate a total of 190 million tons of solid waste in the year 2000 — that is almost four pounds of trash per person per day, according to the EPA. How much of that trash is being dumped at sea or into the dumpster in your docking facility? Can some of it be recycled?

Two of the most important questions that must be answered before a waste recycling plan can even be considered are: What kind or type of, and how much solid waste do you have? Vessel waste comes from the galley, vessel operations and maintenance, or activities at sea. The waste you are already handling will fit into the same categories.

- The vast majority of recyclable waste comes from the **galley** — aluminum cans, plastic and cardboard containers, and glass bottles.
- The second largest volume of recyclable waste comes from **vessel operations or maintenance** — used engine oil, batteries, opened cans of paint, antifreeze, spent fuel and oil filters.
- Recyclable waste from **specialized activities** is more difficult to identify. These products — monofilament fishing line, worn fishing nets, or dunnage — are associated with a specific type of boat. The large volume of office paper generated in large ports can be included here. Don't ignore this category of waste, however, because its volume is typically significant in the waste stream.

Which types of this waste are actually handled in your existing waste stream? Managers of large ports may never see these items and may have to guess at their composition because a ship's agent arranges for trash collection along with chandler's services. A closer look, conferences with agents and with ships' masters, might reveal some interesting facts. For instance, do the ships using your port have a difficult time disposing of a particular type of waste or pay an unusually high fee to dispose of it? Could this problem be solved by diverting that item toward a recycler if the port offered to accumulate the item until disposal was more cost-effective? You won't know the answers to these questions without a careful audit of your waste stream.

HOW TO GET STARTED

Audit The Waste Stream

Learn About Local Waste Handling and Hauling Services

Seek Help From Recycling Laws and Associated Agencies

Explore Resources of Waste Exchange

Set Waste Management Goals

Managers of terminals might be able to combine some of the more profitable recyclable materials — like aluminum cans — from all vessels and reduce the cost or break even on waste disposal of that item for the company. A marina operator, faced with a housekeeping chore, as well as regular waste removal, might be able to do the same. Neither can make a decision or take action without auditing the waste stream.

To audit the waste stream in your port or marina, you must take two steps — assess and sort.

TYPES OF RECYCLABLE WASTE

Galley Waste: aluminum cans, plastic containers, newsprint, cardboard containers, glass bottles.

Vessel Operation and Maintenance Waste: used engine oil, filters, batteries, paint, antifreeze, spent fuel.

Specialized Activities Waste: monofilament fishing line, worn fishing nets, cardboard and wood dunnage.

Assessing Waste Stream Generators

You can estimate the types and volumes of waste by **reviewing the sizes and types of vessels** using your docking facility. Small vessels that make day trips will have a day's galley waste, and only infrequently have vessel operations and maintenance waste. Larger boats, like offshore oil service vessels or tour and gambling boats, will have a larger volume of galley waste, depending upon the crew and passenger sizes and length of time underway. Offshore service boats may also be carrying waste cargo from offshore platforms. Worn fishing nets will be returned to the port on commercial fishing vessels; used monofilament fishing line, generated primarily by sportfishermen, will appear in a marina's waste stream. Cardboard boxes and lumber come from large cargo ships. Large cruise ships generate volumes of galley waste which, in some cases, are already being sorted for recycling. Day-sailing dinner and gambling boats can carry hundreds of passengers. Using the EPA's figure of four pounds of trash per person per day, a large amount of galley and vessel operations and maintenance waste from one of those will far exceed waste from a 20-foot sailboat or a 6-passenger sportfishing boat.

Next, review the frequency of waste types. You can assume that galley waste will always be present, but vessel operations and maintenance waste and activities waste are only possibilities. For example, if most of the boats using your terminal or marina regularly generate activities waste, you will need to consider activities products in your recycling plan. If activities waste comes from only one or two boats, recycling it is not practical. Dunnage or wooden pallets from cargo vessels might also be recyclable if the frequency of that waste type is high. Look for patterns in the presence of ships in port or boats using the terminal. If more than one of a certain type of boat or ship dock within a tight time frame, you may be accumulating specific recyclable waste at regular intervals. Sometimes a certain type of boat uses your marina during the week, and a different type on the weekend. Is the waste they generate similar, or should you expect an influx of one item — like aluminum cans or fishing nets — on a particular day?

Vessel operations and maintenance waste is more likely to be generated by vessels regularly using your terminal or marina. Almost every commercial boat or ship must regularly dispose of used engine oil; those with

Recycle Internally

In the Port of Corpus Christi, wood from the break-bulk ships in port seldom enters the port waste stream. This form of dunnage is recycled by the stevedores, or the boat has a direct contract with a waste hauler to remove it. "It's our business to assist the port customer to handle waste as efficiently as possible," explained Paul Carangelo of the port staff.

keel coolers will also have an occasional quantity of antifreeze. Recreational boats generate less of this type of waste because they are generally serviced once a year.

Port records can help management determine vessel size, type, and docking frequency. General experience, conversations with ships' masters, and conferences with agents will all contribute to a good assessment of the waste stream generators. Look at this estimate to see how the port can better serve ships or cruise lines. Through recycling, you might be able to generate goodwill or provide a service that will increase your business.

AUDIT THE WASTE STREAM BY:

(1) Assessing the waste stream generators by size and type of vessels, by frequency dockside, frequency of waste types.

(2) Sorting the items in a typical dumpster or landfill load.

Marina operators may have to devise a worksheet, similar to the one at the end of the chapter, to assess the waste stream generators. If your marina is used by one type of vessel, this assessment will be easy to do. But those facilities that serve a wide variety of vessels, many on an irregular or one-time basis, may have to record each vessel type and docking frequency on the calendar for a period (for example, a month) to more accurately determine these details.

Now that you have a rough estimate of volume and the pattern in which the waste comes into your terminal, you need a more accurate picture of the specific items in each type of waste. This list will help you determine whether you actually have materials which can be recycled, benefiting the marine environment, your customer, and ultimately, your business.

Sorting the Waste

To find this information, a port manager or a designated employee can ask the ship's master for a copy of the ship's waste management plan, required by U.S. Coast Guard implementation of MPPRCA and MARPOL. Talk to the galley employees who take care of the waste to obtain specific descriptions of the type and volume of products in it. Look at the method used to store waste that is brought to port for disposal. Is it sorted, compacted, and/or washed? Make a list of the specific types of waste the vessel discards at sea. Ask for an estimate of the dumping frequency. Be sure tocollect these details about vessel operations and maintenance, and special activities waste as well as galley materials.

Large ports might choose to devise a one or two page questionnaire or survey about waste management which a ship's officer can complete with little effort. Similar surveys can be distributed to agents. After this information has been gathered, a port employee should be designated to sort a typical dumpster on the premises to discover the types and volumes of waste which are already part of the port's waste management program. Port management can then determine whether some of the vessel waste, currently being individually removed from specific vessels by haulers, can more profitably or more efficiently be recycled through a new recycling program.

Although marina operators can learn some similar details about waste stream contents by talking to boat operators, someone on the marina staff will have to physically *sort* a typical dumpster or trash barrel on site to secure a true picture. Rubber gloves and a face mask can reduce the discomfort of this project. After dividing the entire barrel into two piles, recyclable and nonrecyclable, further sort the former into piles of aluminum, glass, paper, plastic, vessel operations and maintenance items, and activities waste.

What product dominates the waste stream? Is it recyclable galley waste like aluminum cans, dunnage like cardboard, vessel operations and maintenance materials like containers of used engine oil, or activity waste like monofilament fishing line? This dominant product is a primary candidate for recycling. Because it is generating the greatest volume or weight in the waste you are now sending to the landfill, recycling it has the potential for saving you money on landfill fees. This product becomes the cornerstone of your recycling program.

The marinas surveyed in these projects found galley wastes (bottles, aluminum cans, plastics) in general dominating the trash pile, or a combination of galley waste and used engine oil. Ports generally found one or two common products which might lead to a profitable service. The process of collecting, processing, and disposing of galley wastes differs from the same process for vessel operations and maintenance or specialty wastes. Although you may, at this point, begin to see the possibility of a recycling program, you need to be certain that there are waste handling services available to implement your program.

Learn About Local Waste Handling and Hauling Services

Now that you know what recyclable materials you have, you are ready to explore options for disposing of them. Take your time and explore all options.

Although you already do business with a waste hauling service, this utility or trash collection agency might not be able to help you with recyclable materials. If your marina or port is in a municipality, get information on <u>all</u> of the waste hauling services available to commercial entities from the city/county waste management office. These governments may already be operating or have in their jurisdiction drop-off centers or buy-back centers that accept recyclable materials. The city or county might also have recycling hauler services other than the general trash hauling option you have used for years.

Locate independent waste haulers and recycling brokers through the Yellow Pages. In most phone books, these are listed under Recycling, Waste, and Garbage. Visit some or invite them to your port, marina, or terminal to learn how their operations fit your recycling needs. The Yellow Pages listings under Landfills are also helpful in two ways: many haulers own landfills, and even if they don't offer hauling services, landfill owners or operators already know and refer you to the haulers bringing waste to them regularly.

In most cases, haulers handling recyclables are willing to design a collection plan to meet your needs. "You can reduce your costs by working with the haulers," explained David McDonough (Personal Communication, Phoenix Recycling of New Orleans). Phoenix collects recyclable materials from a variety of businesses; e.g., offshore oil and New Orleans French Quarter restaurants.

Port managers are familiar with the waste haulers contracting directly with large vessels such as ocean-going carriers and cruise liners. In fact, the crews on many of these vessels sort wastes right on board, so that the hauler may pick up presorted, containerized recyclable materials at dockside. The quantity of recyclable galley waste is especially heavy on large passenger vessels, making the process economical, and sometimes even profitable, for the vessel owner and the waste hauler. At present, vessel waste from ships and larger cruise boats are handled in this manner.

Two extremely large waste management companies, Browning Ferris Inc. (BFI) and Waste Management Inc. (WMI), operate in all five Gulf Coast states. Representatives of both of these companies will work with any vessel, port, terminal, or marina to arrange a recycling plan that meets the needs of the hauler and the reception facility. The greatest difference

between these two waste haulers and most smaller private entities is that these two have developed several options or programs for collecting your waste. These cover the degree to which the waste is separated — simply into recyclable and landfill waste, or extensively into separate containers for each type of recyclable — and the type of container(s) holding the waste for pickup. BFI and Waste Management offer several options or programs for waste collection.

Although most smaller, private entities sometimes limit the type of waste they can remove, they are often flexible about fee scales. All waste haulers are willing to work with the port, vessel, or marina to develop a program accommodating the location. One small waste hauler, Phoenix Recycling, accommodates each program to the particular situation. Says David McDonough, "You kind of go about it backwards — find the hauler then devise the program." Large or small, don't plan your recycling program without consulting your hauler or haulers. Find the hauler, then develop the plan. Use your Yellow Pages to find local haulers in your vicinity. WMI has an office in most major cities. BFI has a central telephone number in Houston (800) 950-2010 that will direct you to the BFI hauler closest to you.

Explore all of the possibilities of existing community recycling programs. They may already be collecting the types of recyclable materials in your waste stream and welcome those that you have for disposal. Besides contacting the local solid waste manager in city hall, you may learn about these existing programs from the local board of education (schools often have aluminum can, or paper programs) or the local ministerial association (churches also raise money by recycling). The chamber of commerce in your community can provide you with a list of major civic groups which might be recycling products. Chapters of the major environmental associations may also be involved. National contacts for some of these major groups are listed at the end of this chapter.

Fees

Recycling entrepreneurs must cope with a fluctuating market. Some use a standard fee based upon frequency of pick up. Because the market for recyclable materials fluctuates, haulers using this program will actually make more profit on some of the recycled products on one day than on another. "It's the economics of scale," explained John Shuler of BFI (Personal Communication). "They might make more on one type of recyclable than another. The market is small for plastics, and they have to be shipped great distances to be used. Aluminum cans and cardboard, however, are more desirable, easier to market, and, therefore, more readily accepted by many haulers."

This uncertainty in the profit margin leads other haulers to have a sliding fee that changes with the market, or with the weight or volume of a product that is picked up. Almost all haulers say that they prefer not to pick up small loads of recyclable materials, but none will specify what is meant by "small." Phoenix Recycling charges a set pickup fee, and, then, returns a certain percentage of the profit from selling the recyclable to the source when the profit exceeds the norm.

Across the Gulf Coast, some recyclable materials, particularly some vessel maintenance wastes, can be picked up without a fee. These particular haulers secure their profit completely from selling in the marketplace. Many of them contract with the particular industry using the recycled material in manufacturing. Since many of the industries using recycled raw materials have developed their own supply networks, you may locate them by contacting the product associations listed at the end of specific product chapters.

Scavengers

Visits to a few marinas revealed another resource for removing recyclable materials

from the waste stream of smaller docking facilities — scavengers — independent individuals who collect certain recyclable products to supplement a small income. (The security process at many ports excludes this group.) You will have to decide whether to do business with or exclude them. Some marinas find it convenient to make agreements with these individuals. Scavengers primarily seek aluminum cans because they can easily redeem them for quick cash. Terminal and marina operators who allow scavengers to haul away waste usually limit the activity to a few individuals who have shown responsibility and trustworthiness. An arrangement is usually made for the scavenger to rummage through and remove items from the trash at a certain time or on a day when the activity will not interfere with normal activities or offend the regular clientele. The scavenger is usually expected to clean up the work area, and leave the marina and the waste receptacle area as clean as it was found.

Look For Help From Recycling Laws and Associated Agencies

Recycling legislation can directly and indirectly help your project. The National Environmental Policy Act (NEPA) assigns responsibility to the federal government for maintaining harmony between the citizens and the environment. It specifically states that it is federal policy, in cooperation with state and local governments, "...to provide all practicable means including financial and technical assistance...to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans." [Section 4331(a) of NEPA] It further states that the federal government must also "...enhance the quality of renewable resources and approach maximum attainable recycling of depletable resources." [Section 4331(b)]

Congress set a goal for America to be recycling 50 percent of its waste by about the year 2004, and designated the EPA as a national clearinghouse to collect and disseminate information on waste reduction and recycling. EPA's budget includes funds to encourage recycling by direct grants, by drafting federal legislation, and by conducting a major public education effort. EPA has some information available about industry contacts. Their pamphlets and brochures, most of them free, can help you spread the recycling idea to the vessel operators using your port or terminal.

Within the last 10 years, each of the states along the Gulf Coast has also passed supportive recycling legislation. A port or marina recycling program can benefit from these laws and the programs the laws have established. Although a brief summary of each state's provisions follows, you'll get full advantage of these laws by seeking help directly from the state agency implementing the legislation.

Alabama

Alabamians' efforts are based on two state laws: (1) one that requires that all state departments, agencies and all public school systems implement a waste reduction and recycling program [Alabama Act No. 90-564], and (2) that establishes a statewide comprehensive solid waste disposal plan implemented by the Solid Waste Management Advisory Committee [Alabama Act No. 89-824]. The Alabama Legislature set a statewide goal to reduce or recycle 25 percent of the state's solid waste, required that each county and municipality devise a solid waste management plan in conjunction with the state plan, and defined stringent requirements for permitting new landfills or incinerators. Ports and marinas in Alabama may find recycling and recyclable materials hauling services available in their own counties or municipalities. Alabama's Department of Environmental Management provides information on recycling motor oil, newspapers, aluminum, glass, household hazardous waste, and organic waste. Complete

addresses are listed at the end of this chapter.

Florida

Between 1980 and 1991, Florida stopped using most of 500 open dumps in the state, limiting waste management to 143 permitted landfills (most of them lined), 14 waste-to-energy plants, or recycling. Florida's recycling program has a statewide goal of 30 percent in each county by 1994. These changes were made possible primarily by the 1989 Solid Waste Management Act (WMA) which established grants and awards to encourage the changes, training for landfill operators, and special waste management programs. Besides establishing packaging requirements, product disposal fees, litter control, and an intensive education program, the act authorized an inventory of local government solid waste services which is available in published form. This inventory is organized by county. You may wish to ecure a copy to learn about the waste disposal services available in your county.

Florida's counties are required to submit annual solid waste management reports to the Florida Department of Environmental Regulation. A Recycling Markets Advisory Committee was established to improve the markets for recycled materials. As a result, the state now publishes the *Directory of Florida Dealer/Processors and Industrial Users of Recyclable Materials in Alabama, Florida, Georgia, and Mississippi*. This recycling directory is cross-referenced to list the Florida dealers in alphabetical order by company, county, and by recyclable material. The users of ferrous and nonferrous metals, paper, glass, plastic, and rubber are listed alphabetically by company, state, and material. Benefits from WMA should be explored with the Florida Department of Environmental Protection, Bureau of Solid and Hazardous Waste, as listed at the end of this chapter.

Louisiana

Louisiana's Solid Waste Reduction and Recycling Law, passed in 1989, established a state goal of reducing, by 25 percent, the amount of solid waste being disposed of in Louisiana's landfills. The law seeks to "...encourage the development of solid waste reduction and recycling as a management procedure in all solid waste facilities in the state," and to promote "...recovery of recyclable materials...." [Title 33, Chapter 103, section 10301]. This law established a 20-cent-per-ton (of waste entering a landfill) tipping fee dedicated to supporting local recycling programs. An annually updated list of recyclers and recycling markets within the state is provided by this law. Louisiana's *Directory of Recyclers* also lists sources for purchasing recycling equipment, recycling publications, and organizations. Port, terminal, and marina operators can use this free booklet to develop a recycling program.

Louisiana also provides some income tax and corporate franchise tax credits, which ports and marinas might be eligible to receive, for the purchase of recycling equipment. Complete details should be secured from the Louisiana Department of Environmental Quality, Recycling and Waste Minimization Section,1 as listed at the end of this chapter.

Mississippi

The Mississippi Comprehensive Multimedia Waste Minimization Act of 1990 encourages source reduction and recycling as primary methods to reduce waste generated within the state. The statewide goal is to achieve a 25 percent reduction by 1996. Besides the education programs and requirements for state departments and agencies to institute waste minimization through reduction, recycling, reuse and treatment in lieu of disposal, the law establishes a state program of planning, technical and financial assistance, promotes development of markets for recycled items, and funds the program through a waste minimization tax. The Department of Environmental Quality annually updates a

small booklet, *Mississippi's Recycling List*, of recycling businesses. Organized by city or town, the listings indicate which items that particular business accepts, collects, or purchases. It is available from the MISSTAP/ MISSWRAP address listed at the end of this chapter. Financial assistance is primarily dedicated to research and education programs, and to demonstration projects. Complete details should be secured from the Mississippi Department of Natural Resources, Bureau of Pollution Control, listed at the end of the chapter.

Texas

The Texas Omnibus Recycling Act of 1991 supports the state's goal of reducing by 40 percent the amount of garbage going into Texas landfills by 1994. In conjunction with a broad education campaign on source reduction, this act authorizes a comprehensive market development study for recycled products now being conducted by the Texas General Land Office. This office coordinates all types of recycling efforts through a computer database and recycling bulletin board, *E-Source*, of recycling markets and vendors of products made from recycled materials. Information on *E-Source* can be secured by calling 1-800-367-8272.

Recycling is encouraged in Texas. The state gives a rate break to vehicles transporting recycled materials or products made from them. The Texas Railroad Commission was authorized by the Texas Legislature to set a rate ceiling for trucking recyclable materials at 40 percent below the general rate scale, and shippers are permitted to negotiate for even lower rates. Volume-based waste collection fees on local levels are encouraged, and the state has provided financial encouragement for training on composting, and encouraged state departments to recycle and to use products made from recycled materials.

The Texas Natural Resources Conservation Commission (TNRCC) publishes *Recycle Texas*, a directory that lists persons and businesses which seek or accept recyclable materials, recycling handlers and haulers, and companies marketing products made from Texas' recycled materials. Each listing includes the method or containers they can accept, other services they may offer, and a complete list of the materials they will accept or seek. The volume is periodically updated, most recently in the fall of 1994. A copy can be secured from the TNRCC, listed at the end of the chapter.

The Texas Corporate Recycling Council, created in conjunction with the act, provides help for large corporations and coordinates their recycling efforts. The council maintains the database mentioned above of market information on post-consumer waste, lists vendors of environmentally conscious products, and coordinates local councils located in most of the major metropolitan areas of Texas. Complete details are available from the Director of Plans and Programs in the Division of Solid Waste Management and the Texas Corporate Recycling Council in the Texas General Land Office, listed at the end of the chapter.

Texas Recycles, Marketing Our Neglected Resources, describes the possibilities or problems involved in recycling or disposal, and the steps being taken in the state to encourage recycling. Published by the Texas General Land Office and organized by recyclable product, it is a good primer for Texans to read before establishing a recycling program. This book is available from the Land Office, as listed at the end of this chapter.

Explore Resources Through A Waste Exchange

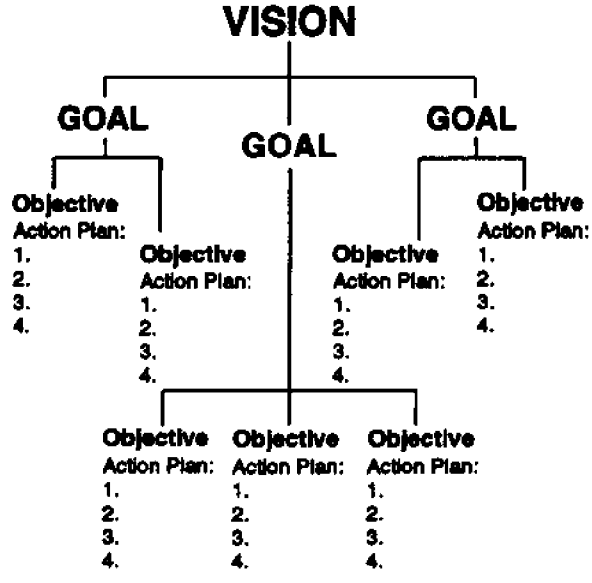
In Mississippi and Florida, clearinghouses have developed to help match needs for recycled materials with those collecting them. This clearinghouse, called a waste exchange, developed in Mississippi by seeking markets or users for industrial by-products or residues, off-spec. materials, or surplus materials that would otherwise go to a landfill. Called

Mississippi Technical Assistance Program (MISSTAP), this group also distributes Mississippi's recycling booklet mentioned earlier in this chapter. The Southern Waste Information Exchange (SWIX) in Florida is an outgrowth of that state's recycling and waste management effort. This group is trying to facilitate interaction between the generators and users of solid and hazardous waste, those who offer waste management services and products, and the regulations that might affect waste management programs. The clearinghouse's catalog, available for $15, may stimulate your thinking on waste management. This biannual publication is very informal, including listings of many kinds of waste management services, as well as requests for various recyclable materials. The address for both of these exchanges is included under their respective states at the end of this chapter.

Set Waste Management Goals

Now that you have a fairly detailed picture of the waste that you must manage or dispose of, the waste removal (hauling) services that are available in your area, and the support you might have from existing federal or state laws, you can set your waste management goal. Be realistic. Devise this goal on the basis of the above factors. Establish a recycling program where it is an appropriate factor in achieving the goal.

For example, a port that has a fishing vessel terminal within it may have a large amount of nonrecyclable material in the waste stream that comes off the bottom (old tires, plastic bags of garbage, rusted 55-gallon drums). This volume is part of the waste stream that might be balanced with a recycling system. Some terminals are operated exclusively by one industry. The company can set recycling goals for all of the vessels using the terminal. Some terminals and marinas are used by offshore service vessels carrying bags or boxes of waste from offshore oil and gas platforms. A recycling program for this waste will require a cooperative effort with those generating the waste on the platforms. Although port or marina personnel do not generate this waste, they must facilitate its disposal. A recycling program may be an appropriate part of the waste management system, but the ultimate goal is to dispose of debris and pollutants so that the sea will be conserved.



A goal is a broad description of a desired end result. Some typical waste management goals for a Gulf of Mexico port or marina might be to more efficiently continue to send all waste to the landfill, or to reduce, by a certain percentage, the amount of waste being sent to the landfill. This may not be possible. Since our surveys showed that most vessel waste management costs are absorbed by the marinas and terminals on the Gulf Coast, another goal might be to at least stabilize the amount you're spending on waste management. A port might select the goal of increasing business in the port by expanding waste management.

Once you have set a goal, you can achieve it by breaking it down into objectives; i.e., doable tasks , and then devising a plan of action to accomplish each one. The goal is the end result, and the objectives are the paths taken to get there.

As an example, to reduce the amount of waste sent to the landfill from a private terminal, you can try to encourage the reduction of the amount coming off the ships and boats (source reduction) or find another way — like recycling — to dispose of some portion of the waste from them. Source reduction can be accomplished by the ship's crew in a variety of ways: incineration, use of less throw-away items in the galley, and changes in procedures to eliminate the use of items that must be taken to the landfill. You may decide to encourage any or all of these solutions, as well as institute recycling in the port or terminal.

Note that these same two objectives can be used to reduce your waste management expenditure to a landfill or waste hauler. For a goal of offering a new service which could stimulate added port business, you would actually increase the amount of waste coming into port from ships or change the method of vessel waste disposal in port. Recycling is one action that will complete any of these objectives. The next chapter will help you plan a recycling program.

Contacts for State-Specific Information on Recycling Laws, Programs, and Opportunities

US

American Association of Port Authorities
1010 Duke St.
Alexandria, VA 22314
(703) 684-5700

Environmental Law Institute
1616 P St. NW
Washington, D.C. 20036
(202) 328-5150

Environmental Protection Agency
Office of Solid Waste
401 M St. SW
Washington, D.C. 20460
(800) 424-9346

EPA Region 4
(Includes MS, AL, FL)
U.S. EPA Region 4
345 Courtland St. NE
Atlanta, GA 30365
(404) 347-4727

EPA Region 6 (Includes LA, TX)
U.S. EPA Region 6
First Interstate Bank Tower
1445 Ross Ave. Suite 1200
Dallas, TX 75202-2733
(214) 665-6444

International Marina Institute
35 Steamboat Ave.
Wickford, RI 02852
(401) 294-9558

ALABAMA

Recycling
AlabamaDepartment of Environmental Management
1751 Cong. W. L. Dickinson Dr.
Montgomery, AL 36130
(205) 270-5651

Alabama Dept. of Economic & Community Affairs
Science, Technology, & Energy Div.
3465 Norman Bridge Rd.
P.O. Box 205347
Montgomery, AL 36125-0347
(205) 284-8952

FLORIDA

Recycling
Florida Department of Environmental Protection
Bureau of Solid & Hazardous Waste
Waste Reduction Section,
Mail Station 4570
2600 Blair Stone Rd.
Tallahassee, FL 32399-2400
(904) 488-0300

Clean Florida Commission
605 Suwannee St. MS-2
Tallahassee, FL 32399-0450
(904) 488-9939

Keep Florida Beautiful Inc.
401 W. College Ave.
Tallahassee, FL 32301
(904) 561-0700

The Southern Waste Information Exchange
P.O. Box 960
Tallahassee, FL 32302
(800) 441-SWIX
(904) 574-6704

LOUISIANA

Recycling Section
Louisiana Department of Environmental Quality
Office of Solid & Hazardous Waste
P.O. Box 82178
Baton Rouge, LA 70884-2178
(504) 765-0249

MISSISSIPPI

Recycling
Mississippi Dept. of Natural Resources
Bureau of Pollution Control
2380 Hwy. 80 West
Jackson, MS 39289
(601) 961-5171

MISSTAP/MISSWRAP (a waste exchange)
(Miss. Technical Assistance Prog.)
P.O. Drawer CN
Mississippi State, MS 39762
(601) 325-2171; 325-8485

TEXAS

Commissioner of Marine Environmental Affairs
Texas General Land Office
1700 N. Congress Ave.
Austin, TX 78701-1495
(512) 463-5344

Recycling & Waste Minimization Unit
Texas Natural Resources Conservation Commission
P.O. Box 13087
Austin, TX 78711-3087
(512) 239-6750

CLEAN TEXAS 2000 Information Center
(From TX telephones only)
(800) 648-3927

Recycling Coordinator
Texas General Services Commission
P.O. Box 13047
Austin, TX 78711-3047
(512) 475-2528

Major Environmental Associations

Center for Marine Conservation
1725 DeSalles St. NW
Washington, D.C. 20036
(202) 429-5609

Clean Water Action
3400 Montrose, Suite 909
Houston, TX 77006
(713) 528-0381

Concern Inc.
1794 Columbia Rd.
Washington, D.C. 20009

Environmental Defense Fund
257 Park Ave. S.
New York, NY 10010
(800) CALL EDF
(212) 505-2100

Keep America Beautiful
9 West Broad St.
Stamford, CT 06902
(203) 323-8987

National Wildlife Federation
1412 16th St. NW
Washington, D.C. 20036
(202) 797-6800

National Resource Defense Council
1350 New York Ave. NW, Suite 300
Washington, D.C. 20005
(202) 783-7800

Sierra Club
P.O. Box 7959
San Francisco, CA 94120-9943
(415) 776-2211

Worldwatch Institute
1776 Massachusetts Ave. NW
Washington, D.C. 20036
(202) 452-1999

SORTING THE WASTE STREAM

ITEM	PERCENTAGE BY VOLUME	PERCENTAGE BY WEIGHT
Used Oil		
Used Oil Filters		
Used Batteries		
Glass		
Aluminum Cans		
Steel Cans		
Plastics		
Recyclable Paper (newsprint, white paper, uncoated letterhead or computer paper)		
Cardboard		
Other Dunnage		
Fishing Nets		
Monofilament Fishing Line		
Waste Paper (wrappers, coated papers, plastic wraps, food contaminated paper)		
Food Waste		
Other items:		

ASSESSING WASTE STREAM GENERATORS

(To Determine Major Waste Sources and Estimate Waste Types)

TYPE OF VESSEL	APPROXIMATE SIZE (estimate number of vessels for each)						FREQUENCY OF VISIT (by number for each)					
	Under 20 feet	21-30 feet	31-40 feet	41-50 feet	51-100 feet	Over 100 feet	Daily	Weekly-weekday	Weekly-weekend	Monthly	Annually	Occasionally
Recreational Fishing Boat												
Recreational Power Boat												
Recreational Sailboat												
Offshore Service Vessel												
Tour Boat - about 6 passenger												
Dinner Boat/Tour Boat-30-100 passengers												
Gambling Boat												
Towboat/Pushboat												
Commercial Fishing Boat												
Military/CG Enforcement Boat												
Corps/CG Utility Boat												
Ocean Cargo Carrier												
Ocean Cruise Ship												

Chapter 2
DEVISING A RECYCLING PROGRAM

Recycling is a waste management method that can benefit your port, terminal, or marina while benefitting the marine environment and the vessels using the docking facility. As you select the products and methods you will use to recycle, keep in mind the current and projected costs in dollars and convenience of handling vessel waste. *By recycling those products which most effectively reduce the weight or volume of waste being sent to the landfill, you can reduce the current or future amount of money you pay in trash hauling or landfill fees. At the same time, selecting products that are easy to recycle or that are already being recycled locally can reduce the amount of effort you and your staff will put into waste removal.* Recycling products that are difficult or expensive for your customers to dispose of can be profitable if the process increases a port's business beyond the costs in time and money of recycling.

DEVISING A RECYCLING PROGRAM

- **Appoint a Recycling Leader**
- **Establish the Physical Process**
- **Consider the Psychological Process**
- **Contract with Haulers**
- **Purchase Equipment**
- **Evaluate Frequently**

Review the results of all of the data gathered using the suggestions in Chapter 1. You should have a general estimate of waste volume, a relatively accurate list of the dominant items in your waste stream, and knowledge about recycling programs in your area. Some type of public or private recycling infrastructure in a nearby municipality or county should be available. (This can range from a trucking network set up by an association to a single item drop-off station or multiproduct recycling center.) You should have a fairly detailed picture of your clients' current waste management programs. A working relationship with at least one waste hauler, recycling program, or landfill operator should be established. These are all needed to develop your recycling program.

Project or Program Leadership

In every program, someone has to be designated as the leader. The audit from Chapter 1, plus your waste management goals, should tell you whether you can personally establish and administer a recycling program in addition to your regular port or terminal responsibilities, or whether you need to assign this project to another. Depending upon your level of expertise, you may choose to attend a workshop or secure some training for yourself, if you are considering serving as project leader. A recycling program takes a lot of time initially to learn about recycling programs, plan the details, buy equipment, launch the program, train employees, and iron out the "bugs." Once operating, the program will primarily require regular oversight and coordination.

Some of the major ports along the Gulf Coast appoint one of the upper level management officers to oversee environmental matters, and waste management falls into this category. Corporate terminals usually have an environmental specialist, as well. In many marinas or small terminals, the operator or manager assume program leadership. We have

PROFILE OF
RECYCLING PROGRAM LEADER

LEADER SHOULD HAVE:

- **An interest in a recycling program.**
- **Willingness to expend the added effort to learn about recycling.**
- **Ability to lead staff to establish the program.**
- **Ability to oversee its continued operation.**

LEADER MAY BE:

- **A port or marina employee willing to accept extra responsibility.**
- **A consultant hired to set up a recycling program.**
- **A new employee with recycling or waste handling experience, hired specifically to establish and coordinate the recycling program.**

seen terminals in which an environmentally-conscious employee or one whose duties already include some contact with the waste stream — office personnel, a grounds keeper, a security guard, or a maintenance person — served as coordinator of the recycling program. In all cases, these employees have an interest in a recycling program and are willing to expend the added effort at the beginning to establish it.

In some states, consultants are available to set up these programs. Some port managers prefer to hire a new employee with recycling or waste handling experience to coordinate the recycling program. Some will hire a consultant or expert to set up the program, then, later, appoint a recycling manager to monitor and maintain it. Although an established recycling program takes little of a manager's time, it does require regular checks and adjustments similar to any other port or marina service.

Whether you decide to wear the recycling coordinator's hat or pass it on, be certain to include your entire staff in the project from the beginning. Some may have some recycling experience already. People are more willing to participate in projects that they have helped to launch.

Consult your waste hauler and the recyclable material handlers or haulers you have already contacted during planning. They can save you many hours of trial and error, at little or no cost. A recycled products hauler will often help you set up your program in order to get your business by coordinating it with his existing process.

The Physical Plant

To reach your objective, your recycling program needs proper receptacles and a process that minimizes handling. Your waste stream audit, especially the sorting worksheet, tells you which products you can recycle. Your knowledge of existing local recycling processes will reinforce or affect your decision.

RECEPTACLE FEATURES

Size - large enough to hold volume between collections

Color - attractive and easy to identify

Material - depends upon needs of the product it will hold

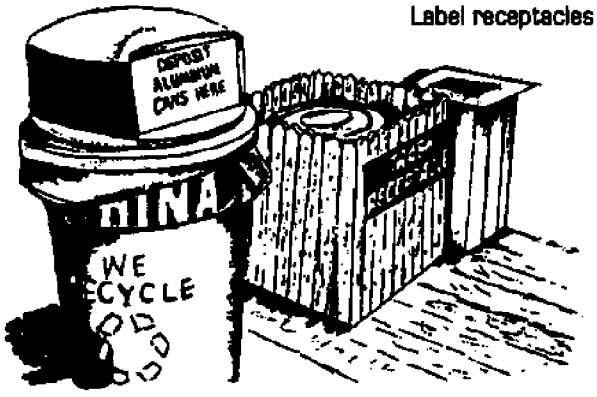
Mobile - with wheels or able to be carried by hand or mechanical means

Covered - attached lids or lids with specific openings

Carefully labeled - what it holds, how to open or use it.

Convenient location - for client, port or marina staff, and waste hauler

Attractive - clean, protected from elements



Label receptacles

Don't attempt to recycle a product that does not dominate your waste stream unless local recycling programs are so developed that it will actually reduce work in your marina or port. If possible, recycle the product that dominates your waste stream — it is already costing you or your clients money in landfill fees.

As you select receptacles and locations to place them, mentally assess the effort your staff, your clients, and your hauler will have to make to use them. No one wants to carry waste great distances, nor do they want to drive or walk on unsafe yards or walkways. Minimize the number of times a person has to handle waste; it can be heavy and bulky, smell strong or feel sticky. No one wants to be emptying containers frequently because they are overflowing, or repeatedly handling or resorting the same recyclable product once it has been deposited in a receptacle.

A Note for Ports and Terminals

At present, most of the recycling that occurs in Gulf Coast terminals and ports involves operations, offices and warehouses. Although paper, aluminum cans, and used oil are recycled in these internal waste management programs, used oil and oil filters are recycled in more ports than aluminum cans or paper. Office/computer paper is collected primarily from offices in a special bin for recycling; aluminum cans from the volumes of soft drinks consumed by employees are gathered in a recycling receptacle.

If port or terminal management initiates a recycling program for waste from vessels, collection receptacles may vary in size, and possibly, type or location. For example, a towing terminal may initiate a program to recycle some galley waste from all of the company's towboats. Each boat may use small receptacles onboard to sort or deposit recyclable materials. These will be emptied into a larger receptacle dockside. Perhaps these can be compacted or combined with the port's internal recycling program. Longshoremen may have

The Port of Corpus Christi Facilitates Recycling

This Texas container port has pre-stationed dumpsters at each port-owned dock, but no established recycling program for all vessel waste entering the port. Most of the ships using the port carry break-bulk palletized cargo or petroleum. "A port can promote recycling," according to Paul Carangelo of the port staff, "but the ship's crew has to perform. Experience has shown that there has to be an economic incentive to the ship's master or agent to require crew recycling. The crew just wants to disembark."

Some recycling programs do exist on individual ships or within specific shipping lines, but are not associated with the port. Ship's agents have arranged for the waste hauler, and the ship's crew sorts and prepares waste for disposal while at sea. "Most ports are pro-clean water, but our business is not waste management," Carangelo observed. "We're facilitators." By keeping a current list of ship's agents and making it available to their clients, the Port of Corpus Christi facilitates small recycling programs.

to move these receptacles with forklifts, or even move recyclable material from a vessel to a receptacle.

You must, therefore, consider business matters and physical plant matters. The business considerations fall into the category of labor (who moves the waste), expenses (who pays for receptacles, wages, other tools), and safety (best procedure to protect employees, insurance requirements). By considering the steps for moving a recycled product; i.e., physical plant matters like handling, lifting, space for maneuvering, you can choose the receptacles for a program of any size, and find a location that accommodates those dumping the waste as well as those hauling it away. Consult persons on your staff to tackle the business matters. The general information provided below about recycling receptacles will start your thinking process on the physical matters. Cconsult the subsequent chapters on the products you plan to recycle for more specific details.

A Note for Marinas

Marinas have a great deal of potential for recycling, although implementing a program might represent a major change in operations. Unfortunately, change usually involves expense. In addition, the impersonal "big business" atmosphere that might help a port smoothly institute recycling and bill clients for the service is not possible in many marinas where operations are smaller, and often, more personal. Since marinas are charged, like ports, with waste disposal, the Coast Guard has acknowledged that absorbing the waste removal costs for all of the boats using marinas could result in a budget burden. Marinas are thus permitted to recover the costs.

A direct charge for trash disposal may discourage boaters from participating in waste management programs. Fees are never popular but you may consider recovering the costs by adding them into moorage, docking, or launching fees.

Equipment

Recycling requires holding bins to accumulate the product from vessels until it can be hauled away. Not all waste receptacles are alike, or equally suited to a port, terminal, or marina. **Two basic receptacles must be considered: the receptacles into which your clients will deposit recyclable materials, and the receptacles from which your hauler will remove recyclable materials. When these are different, the staff must transfer the recyclable material from one to the other.** Your recycling coordinator will choose the receptacle or combination of receptacles meeting your needs and your budget.

An EPA study of 30 communities across the U.S. concluded that the size and type of receptacle directly affects the success of a recycling program because each receptacle (1) publicizes the program, reminding individuals to source-separate and to recycle; (2) assists haulers in identifying the receptacles to be emptied; and (3) may increase the amount people recycle by making the process convenient. (*Waste Prevention, Recycling, and Composting Options: Lessons from 30 Communities*, p. 57.)

The market is full of receptacles — and more are being designed and developed every day. You don't have to design or make them, in most cases, someone is already marketing a receptacle to fit your facility's program. The importance of using the right receptacles has been authenticated by many community recycling programs. In Berlin Township, New Jersey, replacing five-gallon buckets for recyclable materials with 20-gallon buckets resulted in an increase of 49 percent by weight of commingled recyclable materials. People participate in a program that appears to have some substance. Collection frequency can be reduced to an efficient pattern with a receptacle that can hold the correct volume of material.

Receptacles should be tailored to the product, encouraging port, terminal, or marina

Clearly Mark Receptacles

Bay Point Marina in Panama City, Florida, uses the well-known logo for the "Pitch In" campaign receptacles in the marina. The logo reminds people to properly dispose of trash while showing them how to use the receptacle. A stick figure pulls the inside container straight out. The unmovable plastic cover automatically keeps the lid on the trash. A plastic bag, inserted into the container, can be easily removed when full.

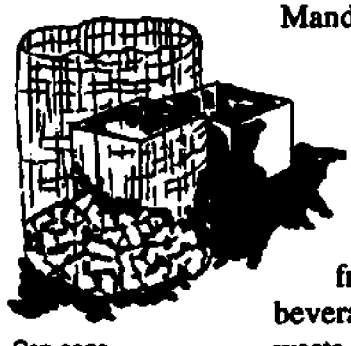
Color works as a recycling reminder at Bay Point. This recreational facility uses red receptacles for aluminum can recycling to easily distinguish them from regular garbage cans. Bay Point chose a receptacle with a flap lid for the cans to keep insects, (particularly bees) from getting to the soda residue on the cans. One limitation to an enclosed receptacle is that other trash may be thrown in. Because boaters cannot see the cans inside, they may not pay attention to a color code. Reduce this possibility by attaching a clear label.

clients and staff to throw only the proper product into them. For example, a receptacle for aluminum cans should have a lid on the top with a circular opening sized to allow deposit of only that type can. Because aluminum cans are light weight, this receptacle can be comparatively large, but it should be made of water- and sun-resistant material like plastic to remain solid after long periods of exposure to the elements. When selecting a location for your receptacle, choose a site that is accessible to both your clients and the waste hauler. Also consider how the receptacle will be emptied. **Limit the size to the load.** Machines are needed to lift and/or empty big receptacles. Make recycling easy for everyone; **be certain that each receptacle is labeled clearly**, i.e., "Aluminum Cans Only."

Size also depends upon the volume of product you accumulate. In an efficient system, the receptacles do not have to be emptied until they are full, and when they are emptied, they produce a cost-effective load for the hauler. A receptacle that is very large might take weeks to accumulate some products — be certain that lengthy storage fits your plan.

The rectangular recycling bin, common in municipal recycling programs, is a good example of tailoring the receptacle to the product and process. It was researched and designed for curbside recycling, in which residents gather several types of recyclable materials together; that is, they commingle them. Collection truck personnel sort the items into separate compartments at curbside. These bins were selected after testing because they can hold an exceptional amount of different recyclable materials (newspaper, aluminum cans, plastics, glass bottles), in a manner that allows all products to be easily seen and quickly sorted at curbside. The rectangular shape was found to be the easiest for both the depositors and the collectors to handle. It fits into the kitchen or trash handling area conveniently, stacks, if the process calls for it, and when full, is not excessively heavy or bulky. Follow a similar thought process when selecting your receptacles to consider all of the people who will handle the receptacle, and the process in which the recyclable materials will be collected and hauled away.

Sometimes a particular concern will dominate your choice or stimulate an innovative design. Mariner's Village in Mandeville, Louisiana, needed an easy-to-keep-clean aluminum can receptacle because soft drink cans, sticky from the sugar in the beverage, dominate the waste stream. Because he



Can cage

could find no receptacles that fit his need, the marina manager, David Keyser, decided to stake a cylinder of pig wire (similar to chicken wire, but with a larger and stronger mesh) to the ground as a receptacle. It allowed him to hose down the cans occasionally to remove the sticky residue. Sun and rain actually helped to clean the cans without damaging the receptacle. The open wire mesh made the cans visible, so that Keyser needed no label or sign. People automatically "pitched in."

Keyser's original concept didn't consider the process, however. The waste hauler could not pick up this receptacle and dump it until a bottom had been designed to make the receptacle portable. The original permanent nature of Keyser's pig wire aluminum can collector was labor intensive. Keyser's staff would have had to empty all of those cans by hand into some type of carrier and take them to the dumpster or receptacle provided by his waste hauler. By putting a bottom on his receptacle and reinforcing the sides so that it could be lifted, Keyser reduced the labor needed to recycle aluminum cans in his marina. The collection receptacle had only to be carried, when full, to the waste hauler's dumpster.

Strong plastic bags to carry recyclable materials from receptacle to receptacle or from receptacle to market have been developed. Consider the possibilities of lining receptacles with these bags when you plan the recycling process.

Always consult your waste hauler before selecting your receptacles. Some waste haulers will resist a receptacle like Keyser's because it cannot be lifted mechanically. Haulers often have receptacle requirements or prefer to provide their own receptacles for the recyclable materials. If the hauler does not provide a receptacle, select those that a hauler is willing to empty directly or that your staff can empty into the hauler's dumpster infrequently and with little effort. Haulers prefer light weight, sturdy containers that can be picked up and dumped easily by human or mechanical means.

In some cases, investment in a **compactor** can actually augment or improve the efficiency of the recycling process. A compactor crushes or breaks up recyclable products so that they occupy less space. It can also reduce your expenses in two ways: (1) reduce the number of pickups your hauler has to make, thus reducing your pickup fees, or (2) increase the amount of recyclable materials he secures from you on a pickup, making his trip to your terminal more profitable. In most cases, the hauler adjusts your bill according to the profit from your recyclable materials, i.e., a smaller fee for a more profitable load.

Compactors are also helpful when you are recycling several items. They provide a method for storing those recyclable materials that take up a lot of space while you are accumulating those that take less. Texaco uses compactors on certain offshore platforms in order to make transporting waste to shore as efficient as possible. The compactor condenses the waste from many small collection receptacles on a platform or on a couple of platforms, so that the waste transported to shore will be worth the effort. At the same time, they can accumulate a larger quantity of aluminum or plastic in a smaller amount of space. A compactor could, similarly, work in a port to condense the large items accumulating in dockside receptacles so a larger load would result for the hauler in the small space usually available at a terminal.

Moving recyclable materials from receptacle to receptacle can be made easier by **using carts** that can be hauled by tractors or golf-cart like vehicles, similar to the methods used by airlines to carry luggage from the terminal to the plane. Some marinas use large wheel barrows with bicycle tires to haul cans to larger hauler-provided dumpsters. These reduce the waste handling effort your staff must make.

The state recycling directories mentioned in Chapter 1, ads in recycling magazines, the product associations listed at the end of each chapter, and a brief general list of receptacle and compactor vendors and manufacturers at the end of this chapter, will help you find receptacle vendors in your area. Always use your Yellow Pages and your recycling waste haulers to find additional local sources for these products.

The Process

Before purchasing receptacles, consider their location in the recycling process from the moment a recyclable is deposited until a hauler takes it away. You have to consider the already established movement of people and equipment within the port, terminal and marina, and fit your recycling program into it.

Most docking facilities will have one of two programs: (1) recycling receptacles on the grounds close to the docking area that can be reached directly by the recyclable hauler, or (2) recycling receptacles near the boat docking area that can easily be carried and emptied into larger receptacles near the access road or general trucking dock or road for the hauler to pick up. Your program should be planned after carefully considering the product to be recycled and the type of receptacle best suited for it (size, shape, space required), all of the places where receptacles would be most convenient for your clients and your staff, and the roadway available for the waste hauler. **Convenience encourages recycling.**

Consider spillage or ease of deposit. Used engine oil and used oil or fuel filters have potential to contaminate the ground around a receptacle. They may chemically react with some products. Choose a recycling receptacle that will make depositing these recyclable materials easy and convenient to both the client and the port or marina maintenance crew. **Consider the method your waste hauler will have to use to empty these products from a receptacle.** Loose lids for receptacles will create extra work for your waste hauler and possibly your maintenance crew. Choose receptacles with attached lids to avoid this problem.

Wind can be a significant factor at any facility adjacent to water. Be certain that receptacles are large enough to prevent wind scattering of waste. In a National Marine Fisheries Service demonstration project at the Port of Newport (Oregon), when dockside garbage cans were replaced by 1.5 cubic yard dumpsters with a windscreen, port labor was no longer required to pick up debris.

In terminals and ports, a vessel crew member will be assigned to transfer the recycled product from the vessel to the receptacle. In most cases, this assignment will be an additional task attached to an existing job description. The recycling receptacle should be placed close to the same area in which the crew member works when he comes into port.

A marina client must be motivated to transfer the recycled product from the vessel to the receptacle. In many cases, he will already have an environmentally conscious attitude, but his enthusiasm will diminish quickly if receptacles are inconveniently placed or difficult to use. Study the path your clients take from their boats to the parking lot and select a place along it for the recycling receptacle(s). Place one as close to dockside as possible if the recyclable materials are difficult to carry. Some yacht clubs and marinas provide dock carts for clients to carry gear from boat to car. You might designate a cart for carrying waste to recycling bins that are a distance from the dock. Group receptacles together or near the waste dumpster, so that all waste can be dumped at once.

Figure 2.1 shows the process adopted by the Port of Everett (Washington). Although most marinas are much smaller and will probably have fewer receptacles or groups of them, the distribution for the convenience of both the client and the hauler are demonstrated.

The hauler needs a wide, paved or hard surfaced area upon which to drive a truck and operate his equipment. He must be able to turn around, or to travel in one direction throughout the terminal on a roadway sufficient for his truck to stop and empty all receptacles, and then continue to the exit.

Compartmentalized dumpsters of several types are available for recycling several products. Some are even provided by the larger recyclable waste haulers. Consider these in terms of the total port or marina recycling program.

Sanitary Considerations

David Keyser's concern about **cleaning up the cans** in Mariners Village's aluminum recycling bin extended beyond the sugar on the cans. Keyser was concerned about the odor emanating from beer cans. Recycling bins can develop odors from the decay of container's original contents. Marinas' landfill trash bin, which often contains food scraps, may also begin to smell; especially if someone throws a fish carcass into it. When you reduce the **frequency of landfill pickups** by diverting part of the waste stream to recycling, you may hold waste for a longer period which allows more decay, and thus, possibly more odor. Consider these odors and the sanitary condition they indicate when you plan your recycling program and arrange for both recycling and general waste pickups.

Continuing the same landfill pickups, even at extra cost, is not the only solution. Our surveys show that ports and terminals along the Gulf Coast are paying waste disposal fees that are based on volume of waste and frequency of pick up, although marinas are generally paying a set fee for a regular pickup, with no difference built in for volume. If the general waste pickup fee is determined by the size of the dumpster, as well as frequency of landfill pickups, you might save a little money by contracting for a smaller waste dumpster while retaining your regular landfill pickup schedule. Your expense can thus be contained or reduced without the addition of a sanitary problem. If the fee is predicated only on pickup frequency, you might install some type of compactor or arrange to add some chemical to the waste that would allow you to store decaying food waste without developing a sanitation problem. Many wet garbage compactors encase the matter during compacting, thus reducing the smell. You might also look for a compost hauler. Some communities have a composting program in which food wastes are commingled with soil and plant waste to produce fertilizer.

The bottom line is that **the recycling process must be attractive — clean, organized, and welcoming the recycler.** To be successful, everyone from the harbormaster to the day sailor must take some responsibility for keeping the marine environment clean. No one is going to willingly participate in a program that cleans up the marine environment by making their own environment less attractive or uncomfortable. A clean recycling plant rewards those efforts, and stimulates people to continue to participate.

Appearance Is Important

"We knew, when we started, that we needed an attractive recycling area if we wanted it to be used," observed Karen Bukis who oversees the recycling program at the Port of Everett (Washington). "People don't use 'ugly.'" The port placed groups of recycling receptacles together under a roof adjacent to each regular garbage dumpster, close to restrooms and access to a water faucet. Clients have the convenience of carrying all refuse to one place and access to water to wash out containers or wash their hands during or after sorting.

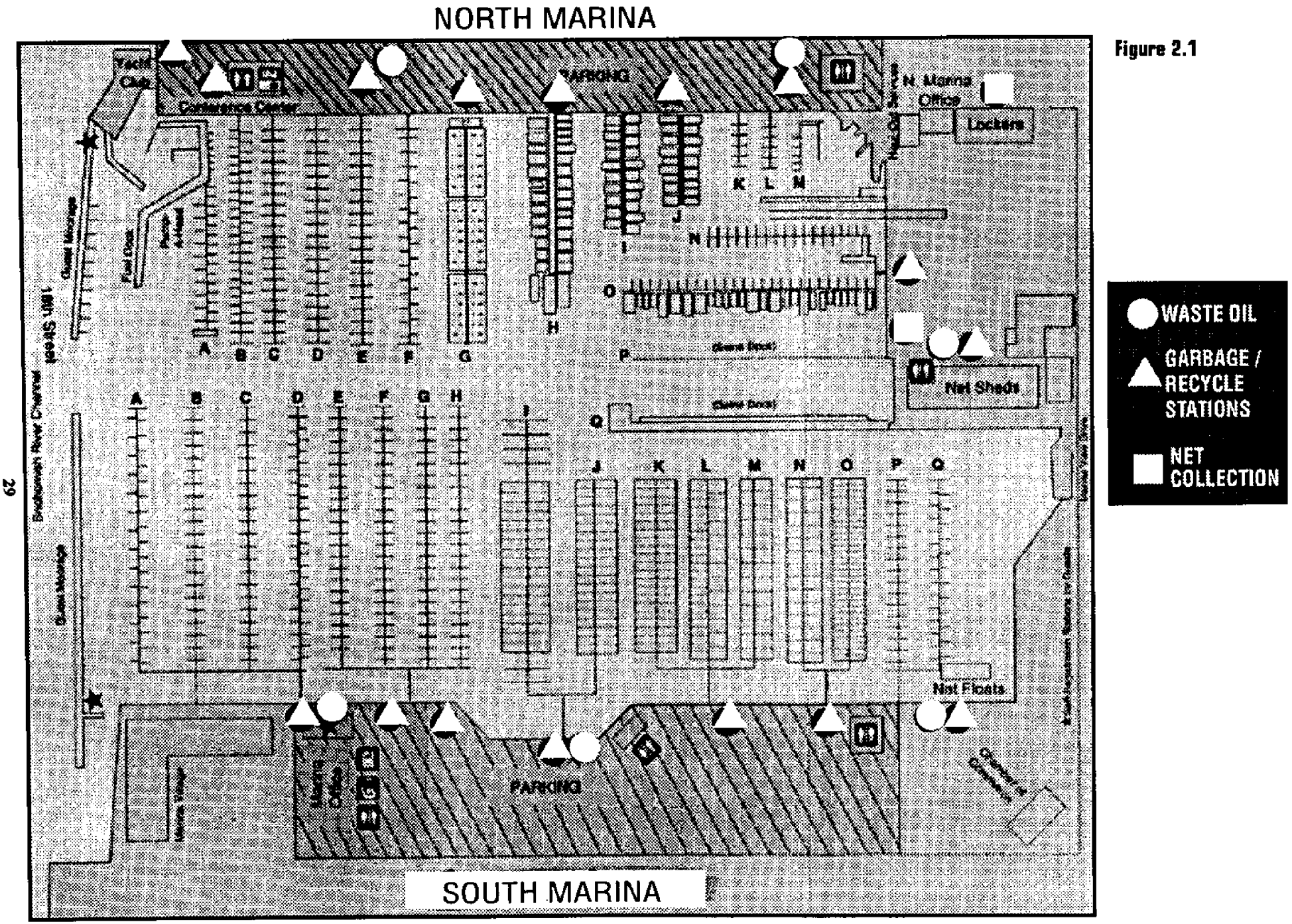


Figure 2.1

Diagram courtesy of Port of Everett in Everett, Washington.

The Psychological Plant

Your recycling program should **make subtle rather than radical changes** in your current waste management program. When change creates discomfort, people resist it. By minimizing the effort needed to change waste removal habits already formed by your clients and your staff, you will be able to secure recycling cooperation and they will adapt easily. Comfort, for the most part, will be maintained.

Adapt To The Existing Pattern

Set up a program that fits into the existing waste disposal pattern, the work pattern of those in the terminal, or the work and play patterns of those in the marina. For example, when Texaco started a recycling program for the employees on all of their offshore petroleum platforms, they placed recycling wastebaskets in exactly the same spots where regular wastebaskets had always been. But, these new wastebaskets were divided into two parts: one part for recyclable beverage cans, plastic bottles, and glass containers, and one part for recyclable paper. What appeared, from the outside, to be a slightly larger wastebasket was actually a small square wastebasket attached to one side of a larger rectangular one. A second wastebasket was placed right next to the recycling wastebasket to take all other waste. Because each receptacle was clearly labeled, it took little extra effort for the people on the platform to sort their waste while throwing it away. Then, the maintenance people who were already emptying wastebaskets changed their process slightly to separate the aluminum, plastic, and glass while emptying them into several bins centrally located together on the same spot where they used to have one trash receptacle. Each bin is lined with a recycling plastic bag. When full, it is readied for transport to the Texaco terminal and on to market or to the landfill.

Because Texaco's waste coordinator knew the habits of his waste generators, adapting to an existing pattern was easy. The company developed a secondary sorting and recycling program at their Morgan City, Louisiana, terminal to handle waste from all of their offshore rigs and platforms. Because of the success with this unusually large recycling program, Texaco has produced a booklet and a video about their program which is available from the address at the end of this chapter. You might be able to adapt some of their ideas to your program.

Marinas and terminals that deal with many clients from different types of vessels may not know how their clients currently dispose of waste after docking, or in what condition that waste is brought off the vessels. You can't establish a program that follows people's existing habits if you don't know them. Formally or informally **survey your regular clients.** Either visit with them individually or devise a one-page questionnaire survey to **find out what they do with their trash onboard, and where they take it when they dock.** Ask your employees to informally observe and record clients' waste removal behaviors. Use all of this information as you establish your program.

Since most municipalities and counties collect commingled recyclable materials from a separate container right next to one full of general waste, marina clients will already be comfortable with that program. It will take little effort for them to separate designated recyclable materials from other waste onboard, and deposit these in separate, adjacent receptacles in a marina. Marinas within municipalities may be able to take advantage of the existing program and arrange for municipal collection. Ports may benefit from a particular community recycling project because the volume generated in the large facility might increase the marketability of the community's recycled waste.

In areas not collecting commingled recyclable materials, you will have to find a recyclable hauler who will take the commingled

recyclable materials and sort them, or your staff will have to sort the materials for haulers who take separate products. Neither ports nor marinas are in the waste handling business, so this type of process should be kept to a minimum. Most employees are willing to add the task when it takes little added effort or fits into their existing job process. Marinas might be able to introduce a little sorting of galley waste. Commingled galley waste recyclable materials from power boats or day sailboats for an example, are dominated by beverage containers. If you limit the staff's responsibility to sorting out primarily plastic or aluminum cans — a quick and comparatively easy job — they will adapt easily. However, if the commingled recyclable materials include plastic, aluminum, glass, newspaper, and vessel operations and maintenance waste, and activities waste, the additional time and effort may be too much for a simple adaptation. You may have to revise job descriptions, hire some part-time help, or offer additional compensation.

Be subtle in the choice of receptacle, too. Our surveys indicated that large dumpsters are currently twice as prevalent in Gulf Coast ports, terminals, and marinas as smaller plastic or metal receptacles and 55 gallon drums. Individual recycling **bins for different products should be attractive and comfortable.** Those resembling existing receptacles will already be associated with waste removal in the user's mind . Recycling dumpsters, which look similar to the general dumpsters now in use, are available. People can dock and walk to the same place where you now have a dumpster for all waste and put sorted recyclable materials and waste into separate, labeled bins within a recycling dumpster.

The existing waste hauling schedule can be subtly changed, too. Almost five times as many marinas, ports, and terminals have weekly rather than daily waste pickup service now. Employees and budgets are both accustomed to this schedule. You might revise it so that you alternate weekly between a pickup for recyclable materials and a general landfill pickup, or you might even be able to reduce your monthly pickups to three: once a month for recyclable materials and twice a month for general landfill. The change should reduce your landfill pickup costs to balance the new recycling pickup expenses.

Change Pattern Carefully

Sometimes change cannot be avoided, especially if you have decided to recycle many products or if you have concluded that changes on board the vessels must occur in order for you to be able to accept vessel waste. In multiproduct recycling, someone has to sort the products. Labor is reduced for all if most of the sorting is done at the source: onboard the vessel.

Company-owned terminals can effect this change most efficiently. **Sorting at the source can be made a company policy.** Texaco used this technique, and instituted it with a general meeting in each department to explain the process, the reasons for recycling, and to stimulate employee interest in the program. The booklet and video they produced are now used to orient new employees to the program.

Ports and marinas have two groups to work with, employees and client/customers. In some cases, the latter will be regular, frequent callers at dockside; in others, only occasional or one-time callers. Although the employees can be incorporated into the program by involving them at the planning stages or adding the responsibilities to their existing ones, **clients and customers must be educated to the process. In all cases, people must be motivated to recycle.** We are, after all, asking them to make a little effort. However preserving the marine environment benefits all.

In most ports, the public relations department can help. Marinas will have to educate employees and clients independently.

ESTABLISHING THE RECYCLING PROGRAM

- **Leader Is Appointed**
- **Leader Uses Waste Stream Audit To Select Products To Be Recycled**
- **Leader Finds Hauler(s) for the Product(s)**
- **Hauler + Leader Select Equipment**
  - **Receptacles, compactors, other amenities**
- **Hauler + Leader Design Process To:**
  - **Collect recyclables from vessels**
  - **Move recyclables out of port or marina to market**
- **Leader and Staff Review Equipment Selections and Process Design**
  - **Evaluate for client comfort**
  - **Evaluate for sanitation**
- **Leader Purchases Equipment; Adjusts Infrastructure**
- **Leader and Staff Publicize Project**
- **Leader, Hauler, and Staff Evaluate Project**
  - **Consult clients**

Start with a little publicity. Post a notice on a bulletin board promoting the idea of recycling. The Port of Everett (Washington) erected a bulletin board adjacent to the recycling area. "Communication is important," said Karen Bukis, recycling leader for the Port of Everett (Personal Communication). "People take recycling seriously because we address current concerns by changing the board's content regularly." Your bulletin board can have information about the value of recycling to the marine environment, and the laws with which vessels, ports, and marinas must comply. Specific cautions about those items that should not be recycled are popular. People want to do the right thing, and your bulletin board will assure them that they are.

Put a flyer in the clients monthly statements, or include a short article in the port or marina newsletter or the company publication describing the planned recycling program. Talk about these topics at every opportunity and ask for your client's ideas and help.

An effective education program is really a sales program. You tell it one way, you tell it another, you keep it in conversations, you compliment people who become involved. Ports and terminals that have launched successful safety programs to change sloppy work habits can use the same procedure to sell recycling to employees . You have influence over employees, but not over clients. Use a mini-campaign to develop interest and participation — appeal to their desire for a clean marina, an efficient port, uncluttered waterways. Remember that many people are already recycling at home. This campaign will encourage both clients and employees to transfer already established habits to work and recreational spaces. Keep clients posted on recycling progress. Be certain to single out and compliment those in compliance. You might feature a photo of the person on the bulletin board emptying recyclable materials into the proper dockside bin.

Giveaways are good reminders. You can give out reminders like floating key chains or foam sleeves for aluminum cans upon which is printed a reminder to sort recyclable materials on board before coming to port. You might decide to provide each boat with a tool to help clients sort recyclable materials on board: two complimentary plastic bags — one for recyclable materials and one for other trash — or a complimentary wastebasket divided into two sections. But be careful. A giveaway tool will work only if 1) it is the correct size to accommodate the recyclable material generated offshore, and 2) it is not the correct size to meet other needs like carrying a sportfisherman's catch that day.

Education can include involvement on the planning level. Port officials might develop a program with some of the regular cruise or cargo lines using port facilities. You might

purchase receptacles together or the port might offer to provide the plastic bags to line recycling receptacles. **Cooperative efforts often increase enthusiasm.**

Generously hang posters in the port or marina to remind clients to sort their waste before throwing it away. Some examples of posters may be found at the end of this chapter. Be certain that every recycling bin is clearly marked and easy to use. Some marinas give prizes for superior compliance — coupons to redeem in the store, for example.

Your state environmental agency, the EPA, and the various product associations all offer free or inexpensive posters and flyers about recycling the environment, or preserving resources. Flyers and brochures,on reducing the amount of waste that is generated, are available from product associations, environmental groups, and local environmental agencies. Most of these are free so that you can use the tips in them or give them out at your ship's store. Resources for these are found at the end of Chapter 1 and the various topic chapters 3-8.

Because of the close contact between clients and staff in marinas, **waste management trends or practices can be initiated.** For example, encourage source reduction by suggesting the use of finger foods to eliminate the need for paper plates and plastic utensils on board. Old terry towels can absorb many times more spills and wipe more sticky fingers than a paper towel — and they can be taken home to be used again. Emptied 2- and 3-liter beverage bottles can be filled with water and frozen to cool ice chests — eliminating plastic bags and the accompanying mess of melted ice. because these can be re-used, the bottles are kept out of the waste stream. You will find that your clients have their own tips for reusing some vessel waste. Using conversation as well as the bulletin board and news letter, encourage clients to share these ideas. Pass them on and be sure to give credit to the originator!

No program happens without some problems or roadblocks. Ports may find some vessel operators quite cooperative, and others, distinctly uncooperative. Marina operators may experience individual mishaps; e.g., client may accidentally spill used engine oil at dockside and contaminate the water. Another may put rotting fish carcasses in the dumpster, thus contaminating the area around the landfill receptacle until the next landfill pickup. Someone is sure to put glass in the plastics bin, or potato chip bags and sandwich wrappers in with recyclable paper. These types of problems will happen. Don't let them stop you from continuing with your waste management process.

Your waste management effort may falter initially because of poor receptacle function or placement, uninformed participants, or the wrong hauler. Give your process a few months trial before you make any changes. Efforts to improve the environment take time because you have to reverse polluting practices before you can begin to see an improvement in the environment. The result will be worth the effort.

Evaluate Frequently

Mishaps and bad experiences present an opportunity to evaluate your program. Informally ask all of the clients what changes might be instituted to prevent another mishap. Use employees' suggestions as well. Formal questionnaires provide written response and give you information from several sources to compare and consider. Always seek ideas to streamline the process or increase the amount of material which you are diverting from the landfill or the sea. Every little bit helps.

Don't use smooth sailing as an excuse to skip evaluation either. After the first six months, you and your staff should take a hard look at the program and be certain that it is working as intended. Review your waste stream audit and roughly calculate the changes. Are more, less, or the same number of tons moving through your waste stream? If it is the

EVALUATING THE PROGRAM

I. Review Waste Stream Audit
Make new audit if changes are apparent

II. Note Changes in Volume or Weight of Waste
A. How much is still going to landfill?
B. How much is being recycled?

III. Compute Waste Change - Difference Between A and B

Congratulations if this is a positive number

If this is a negative number, audit to discover

How Much New Trash is Entering Port?

Congratulations, you are responsible for keeping this volume out of the aquatic environment.

IV. Seek Staff Observations on New Program
By informal interview/conversation
By formal questionnaire

V. Seek Client Observations On New Program
By informal interview/conversation
By formal questionnaire

VI. Compute Change in Operating Expenses to Send Waste to Landfill
A. Multiply volume or weight by fees to get cost
B. Look up record of this cost before program was initiated

VII. Compute Expense Change - Difference Between A and B

Congratulations if this is a positive number. You are saving money.

If this is a negative number, additional trash may be entering the port or marina. You have succeeded in encouraged people to clean up the aquatic environment.

VIII. Revise Process to Accommodate Changes or Observations

IX. Purchase New Equipment to Accommodate Changes or Observations

same, determine how much have you reduced the amount going to the landfill and if that difference is going to a recyclable material hauler. Look for signs of source reduction among your clients and staff.

Look at the financial picture, too. Multiply the volume or weight of materials going to the landfill by the fees per cubic yard or ton. Has this total risen, remained the same, or gone down? The best, hopefully, is a reduction in the amount you are paying for waste to go to the landfill. Often, the first two or three financial audits after instituting recycling will show little financial change in the landfill fee because the volume of waste coming from vessels is increasing as vessel operators learn about the new program and begin to bring their waste to port. Because the number of landfills is declining and the costs to comply with environmental laws increasing, landfill fees are increasing rapidly. After a year or two, you should see some reduction in landfill volume, and hopefully landfill fees. By then your port waste stream will be smaller because of a combination of source reduction and recycling.

Look at your waste savings. Add up the tons or cubic yards of material you have recycled per month instead of dumping them into the landfill. This material has been put to some use — recycled — rather than wasted. Don't keep the news about this accomplishment a secret; share it with employees and clients on your bulletin board or newsletter. Marinas with ongoing recycling campaigns might regularly update a posted graph to show the progress that is being made in recycling and waste management. After all, everyone in the marina is partially responsible for the success.

After a year, take a new waste stream audit. If the waste stream has changed significantly, you must consider changing your recycling plan or adding to it.

The Rest of the Manual

Chapters 1 and 2 have given you the basics to establish a recycling program as part of your waste management plan. Most of the examples, however, were general and do not necessarily apply to the type of waste you want to recycle. Your next step will be to tailor your recycling program to specific products.

The first chapter helped you set boundaries by determining which products can most practically be removed from your port or marina waste stream for recycling; Chapter 2 provided the general guidelines for establishing a recycling program. The balance of this manual, organized into separate chapters by recyclable product, will help you tailor your program. Use those chapters which help you recycle the major products in your waste stream. Refer to the other chapters to meet future needs.

RECYCLING OFFICE AND GALLEY WASTE

Guidelines below apply to marinas, ports, and terminals handling vessel and internal office waste primarily to protect the aquatic environment. A recycling program for residences or offices may include additional products.

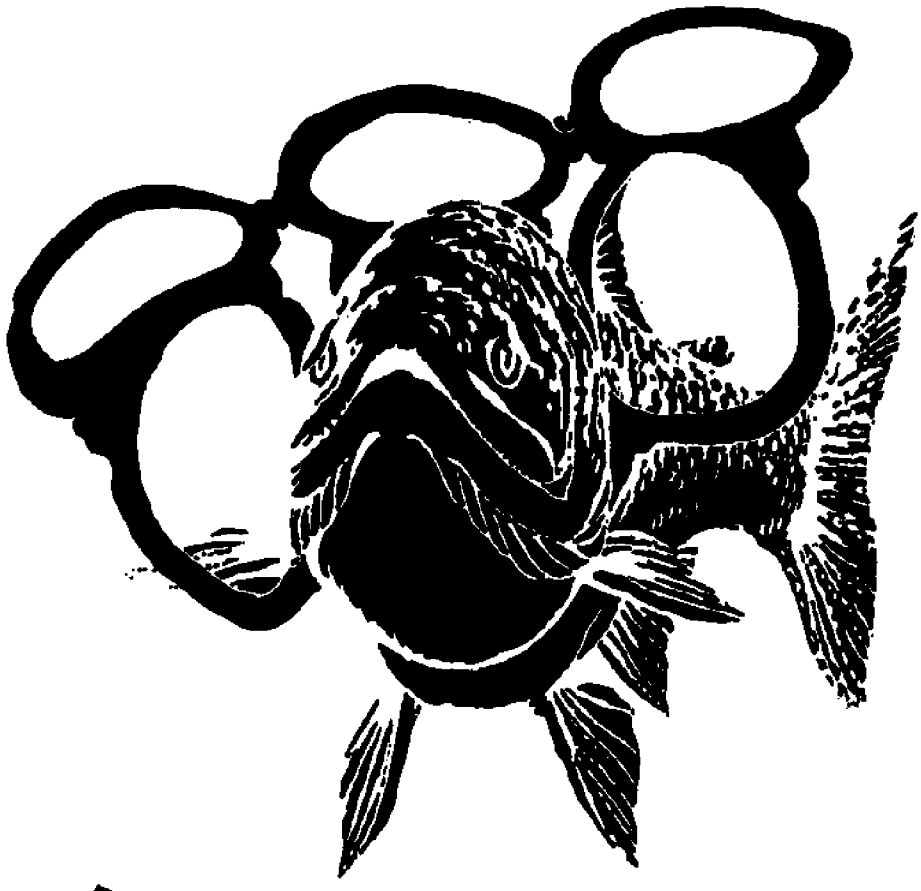
	PAPER	PLASTIC	CANS	GLASS
YES	•newspaper •corrugated cardboard •computer paper •file stock •white ledger paper •copy paper	•plastic soft drink bottles •milk jugs •plastic containers with plastic code on bottom	•aluminum soft drink cans •aluminum foil	•Green, brown, or clear glass food or beverage containers
NO	•shiny page magazines •phone books •inter-office brown envelopes •preprinted paper or forms •plastic attachments •coated, waxed, or treated papers •carbon paper or carbonless paper •paper with rubber-based glue on it •food wrappings & boxes •soft drink or beer cartons	•plastic wrap •uncoded plastic bottles and containers •plastic cups •plastic items other than containers	•other metals •steel cans •bottle caps •aerosol cans •scrap metal	•ceramics •drinking glasses •light bulbs •plate glass •mirrors •non-food or beverage containers •lids or tops

SOME WASTE RECEPTACLE MANUFACTURERS & VENDORS

(Many firms manufacture a variety of waste receptacles. The complete address/phone number for a vendor is printed under the firm's first listing in the upper areas of the table. Subsequent listings provide only the manufacturer's name.)

Garbage Cans	Compactors	Larger receptacles Drop-off use / dumpsters	Boxes	Moveable carts
With wheels **ZARN** P.O. Box 1350 Reidsville, NC 27320 (919) 349-3323 (800) 367-7687	7.5 to 39 sq. ft ; optional dividers to crush up to 6 products in one unit. **Enviro-Pak Compactors** 4308 W. Doyle Dr. New Iberia, LA 70560 (800) 737-5533 (318) 367-6165	3.4 to 4.3 cubic yard dome shape; face on front; lockable; colorful; bag-lined **KOSMOS Recycling, Inc.** 37 Skyline Dr Suite 4304 Lake Mary, FL 32746 (407) 333-0607	Hangs on garbage can **Safco Products Co.** 9300 W. Research Rd. New Hope, MN 55428	Tilt & dump wagons, carts **Chem-Tainer Industries Inc.** 361 Neptune Ave. N.Babylon, NY 11704 (516) 661-8300 (800) ASK-CHEM
32 to 95 gallon opt. dividers; 4-dividing bins; fork-liftable, colorful **Otto Industries Inc.** 12700 General Dr. P.O. Box 410251 Charlotte, NC 28241 (800) 227-5885	Glass crusher **Ertel Engineering Co.** P.O. Box 3358 Kingston, NY 12401 (914) 331-4552 (800) 553-7835 FAX (914) 339-1063	360 to 500 gallon holds oil & anti-freeze; face on front; stainless steel, fiberglass **KOSMOS Recycling, Inc.**	Paper & cans; flat lid **Safco Products Co.** address above plus vendor: **Recycling Sys Inc** 4060 Hwy 59 Mandeville, LA 70448 (504) 898-0880	Utility, sorting and transport trucks **Chem-Tainer Industries Inc.**
Dome or flat top/15 to 140 gallon, replaceable liner; handles & key lock; cylindrical & rectangular **Windsor Barrel Works** P.O. Box 47 Kempton, PA 19529 (800) 527-7848	Stores 400 crushed cans with crusher embedded in lid **CSL & Associates** 202 Buck Dr. Ft. Walton, FL 32548 (904) 864-6801 (800) 822-6069	200 to 400 gallon holds oil **Vital Visions Corp.** 9863 Hwy 20 West Freeport, FL 32439 (904) 835-3131	Stackable paper bin **Safco Products Co.**	2-3 container, aluminum frame to move cans **Safeco Products Inc.**
20 to 52 gallon; divided; Paneled dome top **Vital Visions Corp.**	Crushes oil filters **Enviro-Pak Compactors**	Circular bin **Vital Visions Corp.**		
49 gallon; polyethylene; bag-lined **KOSMOS Recycling Inc.**	Compacts hazardous waste **Enviro-Pak Compactors**	450 gallon; colorful holds cans & paper **Vital Visions Corp.**		
Fork-liftable **Chem-Tainer Industries Inc.**	Oil-filter crusher **J.V. Mfg., Inc.,** 701 Hwy. 265 Spur Springdale, AR 72765 (501) 751-7320	98 gallons, holds up to 250 pounds, covered, with wheels. **Safeco Products Co.**		
Labeled; optional dome top **Safco Products Co.**		325-450 gallon; fiberglass over steel; optional w/ filter receptacle. **Fibrex Inc.** 3724 Cook Blvd. Chesapeake, VA 23323 (800) 346-4458		
Drum Cover for 55-gal. drum; round opening for cans or oil filters. **Fibrex Inc.**				

This list represents only a few of the manufacturers and vendors of waste receptacles for recycling, provided for illustration and as a start in your search for receptacles. No endorsement is implied. Use your Yellow Pages to find manufacturers and vendors in your area; and your state recycling contacts to find those doing business in your state.



DON'T TEACH YOUR TRASH

TO SWIM!

PACKAGING • LINE • NETS
THROWN OVERBOARD
HURT YOU AND OTHER MARINE LIFE

PLEASE KEEP REFUSE ON BOARD
UNTIL YOU LAND

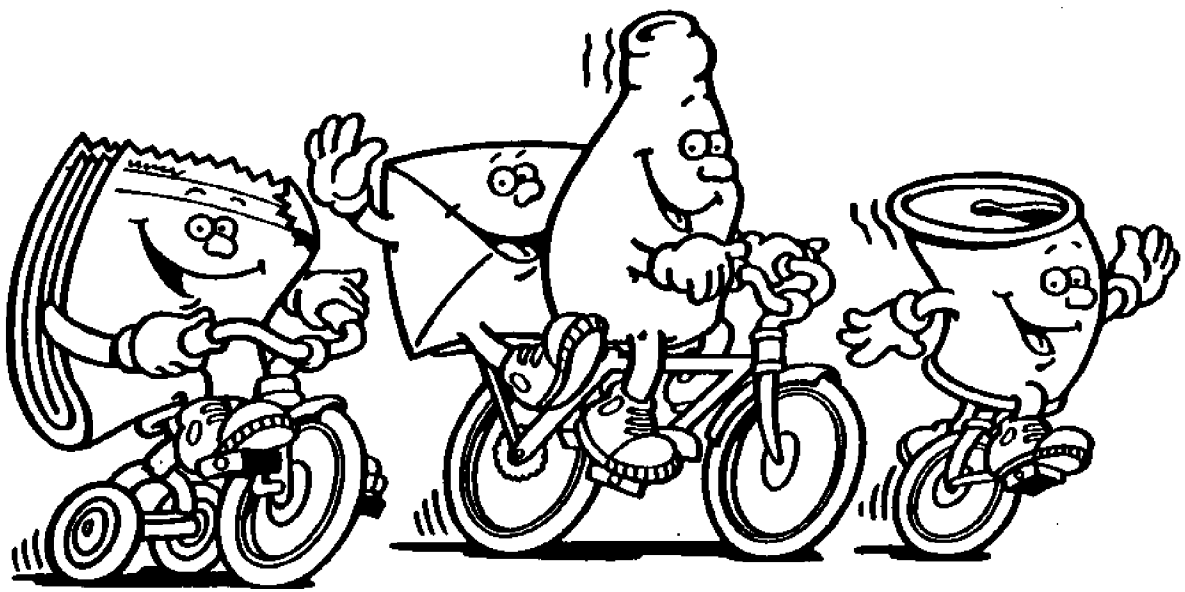
POSTER COURTESY OF NOAA MARINE DEBRIS INFORMATION OFFICE
CENTER FOR MARINE CONSERVATION

HELP STAMP OUT THE GARBAGE GREMLIN

RECYCLE TODAY!

POSTER COURTESY OF THE U.S. ENVIRONMENTAL PROTECTION AGENCY

RECYCLE HERE



POSTER COURTESY OF THE SNOHOMISH COUNTY (WASHINGTON) PUBLIC WORKS DEPARTMENT, SOLID WASTE MANAGEMENT

Chapter 3
ALUMINUM

The success of all recycling depends upon the market for the recycled product, and this market depends upon the nature of the product and the amount of work that must be done to reuse it. Aluminum beverage cans, found in most waste streams, are the largest source of scrap aluminum used by the industry. Uses for recycled aluminum are increasing almost fast enough to accommodate the recycled product because the metal alloy is versatile and economical to reuse.

Aluminum is soft, light weight, strong, durable, and it does not rust. It conducts electricity, heat and cold, and it is not magnetic. It can be rolled into sheets, drawn into bars and rods, shaped by dies, made into tubes, pulled into wire or cast into molds. Manufacturers have only to remove impurities from the aluminum scrap before they melt it down and reuse it. According to the EPA, practically all of the aluminum that is recovered during recycling is reused because the process can save 95 percent of the electrical power needed to convert bauxite into virgin aluminum, while each ton of remelted aluminum saves four tons of bauxite ore, a non-renewable resource. Air and water pollution are reduced significantly in this process, too. For all of these reasons, the aluminum industry actively seeks recycled aluminum; they have even developed methods to produce more cans per pound of aluminum to get more from the resource.

RECYCLING ALUMINUM

RECYCLING POSSIBILITIES

- **Many civic groups and municipal waste management services recycle aluminum cans**
- **Industry reuses almost all recycled aluminum**
- **Recycling aluminum saves energy and bauxite while reducing air and water pollution**

WHAT DOES THIS MEAN TO PORTS & MARINAS?

- **A ready market exists**
- **Other recycling programs may be available for "piggybacking"**
- **Haulers may be available and economical**

WHAT DOES A PROGRAM NEED?

- **Receptacles**
- **Pickup process**
- **Contacts for help**

What Does This Mean To Ports & Marinas?

Most ports and marinas may include aluminum recycling in the waste reduction program because aluminum cans most likely will be one of the dominant products in the waste stream. Aluminum is easy for any docking facility to accept, store, and transport from vessel to receptacle to hauler, and comparatively profitable to recycle.

Most port and terminal clients and employees will adapt easily to aluminum can recycling since many are already recycling these at home. Encourage on board and on site sorting by providing a gimmick — a reusable small waste basket, a net bag — for boat deck or galley which can be emptied as the crew unloads the vessel and comes ashore.

To locate haulers or markets for the cans, consult the list of associations at the end of Chapter 1, your state recycling directory or recycling office listed in Chapter 1, and the Yellow Pages. Because the market for aluminum cans is better than that for some of the other recyclable products found in a vessel's waste stream, you may be able to use a contract for recycled aluminum cans to secure an agreement with a reluctant hauler to take a less

profitable waste at the same time.

Although other aluminum items such as TV dinner plates and aluminum foil can also be recycled, these are not always accepted by those recycling aluminum cans. Consult your hauler.

Receptacles

Choose a receptacle that is large enough to hold at least one day's cans so that it accumulates aluminum can waste from clients without requiring frequent servicing. The receptacle's size should also be limited by weight, especially if your program requires that the full receptacle be emptied into a waste handler's receptacle. The EPA provides a helpful weight to volume guideline: one cubic yard of aluminum cans weighs 50-74 pounds (uncrushed to crushed). To put that into perspective, a full grocery bag of cans weighs about 1.5 pounds, and a 55-gallon plastic bag of them weighs 13-20 pounds. These cans are bulky, and they may be sticky.

Can Cages

Pat's Landing Inc. and Speckled Trout Marina, adjacent mom-and-pop marinas in Palm Harbor, Florida, designed for the coastal sportfishermen, are using a rudimentary recycling receptacle, a/k/a wire basket, to collect recycled aluminum cans. Both are faced with small budgets and a lot of indiscriminate dumping in the general vicinity by, as Pat Dreyer of Pat's Landing says, "People that can't afford a garbage service."

These can cages, as Tom Carr of Speckled Trout dubs them, are inexpensive receptacles made of chicken wire. They weigh next to nothing, can be reproduced easily and economically, and provide their own sign to "Recycle Aluminum Cans Here." The proceeds from sale of the cans in Carr's "can cage" goes to the Dunedin High School Band.

Covered cylindrical receptacles with a round hole cut in the hinged top or a hinged flap attached to the side work best for aluminum cans. Be sure a sign — Aluminum Cans Only — is clearly visible. Some marinas and ports with a multiproduct recycling program use color codes for cylindrical receptacles to collect aluminum, glass, and plastic. When purchasing colored receptacles for this type of program, select bright colors — yellow, red, blue — because they will fade in the sunshine.

At marinas, a receptacle can be placed near the docking area to encourage vessel operators and passengers to bring this waste ashore. If you are encouraging vessel crews to sort their waste on board or as soon as they come ashore, choose a tall, deep receptacle with limited access — it should have a round opening only slightly larger than the diameter of a beverage can to discourage the placement of other waste into the aluminum can receptacle. This type of receptacle can be placed in lunchrooms or break areas of ports and terminals. Similar receptacles placed near coin-operated soft drink machines, refreshment bars, and restrooms will easily accumulate cans.

Ports or terminals that accept presorted aluminum cans from vessels will need a

receptacle to accommodate a large volume of cans that may be encased in a plastic bag. Your process should include a step for someone — either a vessel or port employee — to empty the cans from the bag or for the hauler to accept that responsibility. Be certain to consult the hauler before designating a person to do this.

If you are accepting commingled waste, consider a shallow rectangular receptacle in which the cans are visible for later sorting by your staff or the recycling handler.

Keep the area around this receptacle clean and apply insect repellent regularly to reduce the possibilities of ant, cockroach, or bee infestation. Rinse or hose out receptacles each time you empty them to avoid the accumulation of beverage residue. If your hauler requires that the cans be rinsed out, you will need an education program to motivate clients and staff to do so.

Some port operators have placed can crushers near the receptacles so that the volume of aluminum cans is continuously condensed. Receptacles that come with can crushers on them or with a slit to accept only a crushed can are also available. Do not expect these to be universally used because boaters and commercial boat crews are often weary when they come ashore. Crushers and compactors can assist staff members to condense a volume of accumulated vessel waste, however. A short list of receptacle and compactor vendors may be found at the end of Chapter 2. Consult your Yellow Pages and seek the advice of your recyclable hauler as well.

Volume Demands on Pick Up

Because aluminum cans take up a lot of space, marina staffs will have to empty the dockside receptacle into a larger container or compactor frequently —or management will have to arrange for frequent pickup by a recyclable handler. Although most ports and terminals will accumulate aluminum cans more rapidly than some other recyclable materials, many operators prefer to develop storage in their recycling program that permits an economic and less frequent aluminum can pickup schedule.

Contacts for Aluminum Recycling

Alabama Waste Exchange
The University of Alabama
P.O. Box 870203
Tuscaloosa, AL 35487-0203
(205) 348-8401

Alcan Rolled Products Co.
Lake Rd. N
Oswego, NY 13126
(315) 349-0121

Alcoa Recycling Co.
100 Clover Place
Edison, NJ 08818
(201) 225-9550

The Aluminum Association
900 19th St. NW, Suite 300
Washington, D.C. 20006
(202) 862-5100

Aluminum Recycling Association
1000 16th St. NW, Suite 603
Washington, D.C. 20036
(202) 785-0550

Anheuser-Busch Companies
One Busch Place
St. Louis, MO 63118
(314) 577-2000

The Beer Institute
1225 Eye St. NW, Suite 825
Washington, D.C. 20005
(202) 737-2337

Can Manufacturers Institute
1625 Massachusetts Ave. NW
Washington, D.C. 20036
(202) 232-4677

Center for Marine Conservation (CMC)
1725 DeSalles St. NW
Washington, D.C. 20036
(202) 429-5609

Container Recovery Corp.
10733 Sunset Office Dr., Suite 400
Sunset Hills, MO 63127
(314) 957-9350

Environmental Protection Agency
Office of Solid Waste
401 M St. SW
Washington, D.C. 20460
(800) 424-9346

EPA Region 4 (includes MS, AL, FL)
U.S. EPA Region 4
345 Courtland St. NE
Atlanta, GA 30365
(404) 347-4727

EPA Region 6 (Includes LA, TX)
U.S. EPA Region 6
First Interstate Bank Tower
1445 Ross Ave. Suite 1200
Dallas, TX 75202-2733
(214) 665-6444

Institute of Scrap Recycling Industries
1627 K St. NW, Suite 700
Washington, D.C. 20006
(202) 466-4050

Keep America Beautiful Inc.
9 W. Broad St.
Stamford, CT 06902
(203) 323-8987

MISSTAP/MISSWRAP
(a waste exchange)
(Miss. Technical Assistance Prgm.)
P.O. Drawer CN
Mississippi State, MS 39762
(601) 325-2171; 325-8485

National Association of Aluminum Distributors
1900 Arch St.
Philadelphia, PA 19103
(215) 564-3484

National Association of Recycling Industries, Inc.
330 Madison Ave.
New York, NY 10017
(212) 867-7330

National Association of Solid Waste Management
1730 Rhode Island Ave. NW,
Suite 1000
Washington, D.C. 20036
(202) 659-4613

National Recycling Coalition
1101 30th St. NW, Suite 305
Washington, D.C. 20007
(202) 625-6406

National Soft Drink Association
Solid Waste Management Dept.
1101 Sixteenth St. NW
Washington, D.C. 20036
(202) 463-6732

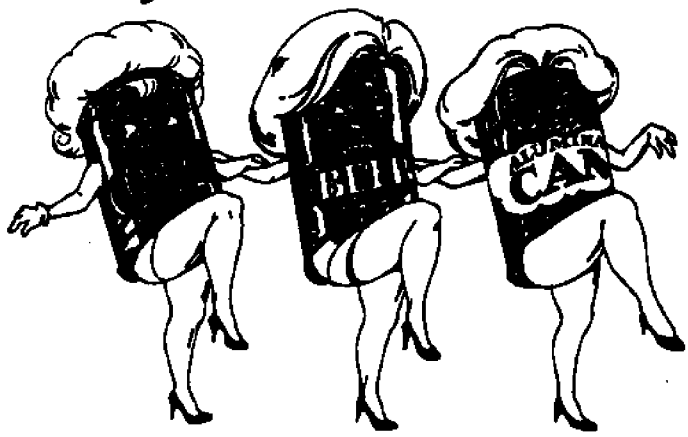
RENEW (a waste exchange)
Texas Natural Resources Conservation Commission
P.O. Box 13087
Austin, TX 78711-3087
(512) 239-3171

Reynolds Aluminum Recycling Co.
P.O. Box 27003
Richmond, VA 23261
(800) 228-2525

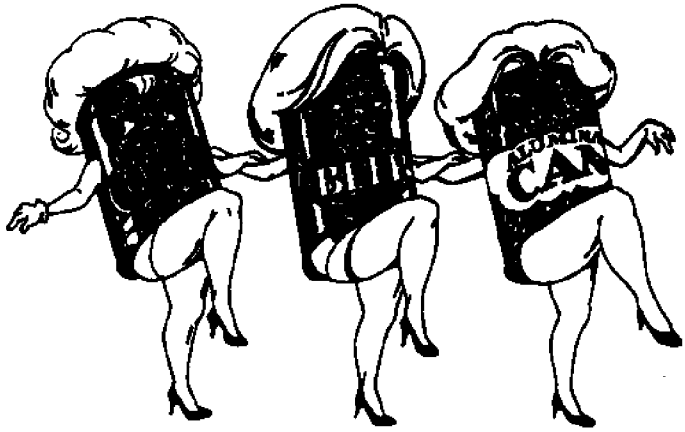
Solid Waste Association of North America
P.O. Box 7219
Silver Springs, MD 20910
(800) 456-4723

Southern Waste Information Exchange Svc.
P.O. Box 960
Tallahassee, FL 32302
(800) 441-7949

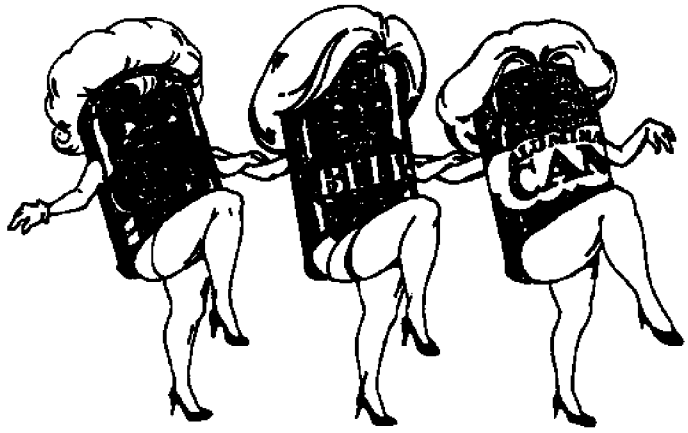
YES, We CAN CAN It!



YOU CAN...



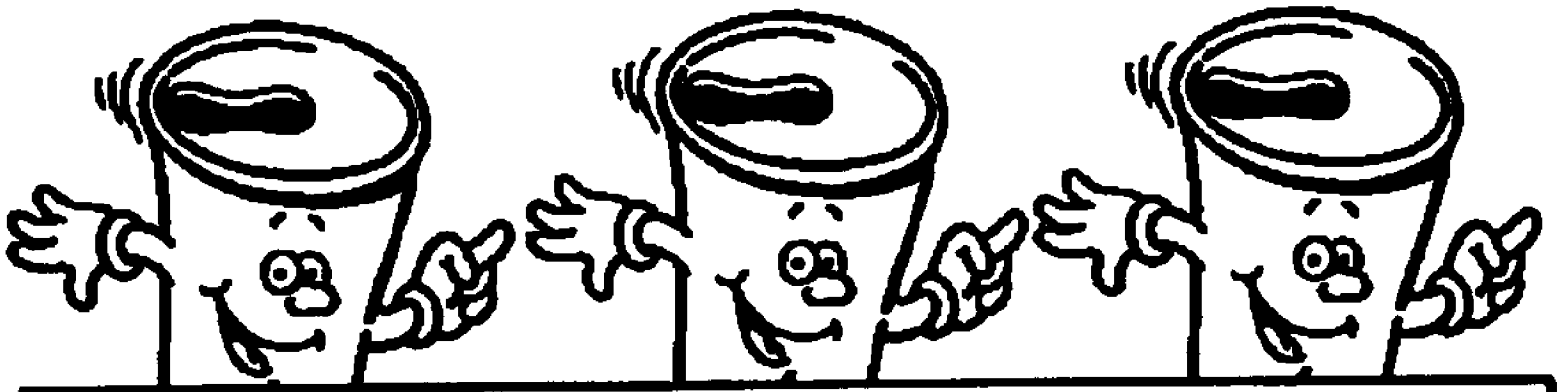
I CAN...



HELP KEEP OUR WATERS CAN-FREE!

LOUISIANA
SEA GRANT
College Program

REDUCE,
REUSE,
RECYCLE



RECYCLE ALUMINUM CANS HERE

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RECYCLE ALUMINUM CANS

TO PRESERVE:

• **Resources** — Remelting aluminum scrap to produce new aluminum products saves about 95 percent of the energy required to convert bauxite into virgin aluminum. Each ton of remelted scrap replaces four tons of bauxite.

• **Energy** — It takes 7,000 BTUs to make a single new aluminum can from bauxite, but only about 2,250 BTUs to make one from recycled aluminum.

• **Balance of Payments** — The U.S. has been a net exporter of aluminum scrap for over 10 years. More than half of those exports go to Japan, helping the U.S. balance of payments.

Chapter 4
PLASTICS

The Coast Guard regulations to implement MPPRCA were a direct result of the visibility of plastics in the marine environment. No one along the U.S. Gulf Coast can go through an entire day without handling or using plastic. Because it has so many uses, plastic dominates our lives, and, therefore, is a dominant item in the waste stream. The combined characteristics of light weight, flexibility, durability, and strength have made it the material of choice for all kinds of manufacturing. According to the American Plastics Council, U.S. production of plastics has averaged an annual growth rate of 10 percent over the past 30 years, and the largest sector of plastics sales in the U.S. is packaging. It is no surprise then, that discarded plastic is in the sea.

RECYCLING PLASTICS

RECYCLING POSSIBILITIES

- **Plastic is made from a variety of hydrocarbon compounds called resins**
- **Industry reuses recycled plastic in pure resin form**
- **Resins are indicated by code only on plastic containers**
- **Plastic represents 14-21 percent of the waste stream**
- **Plastics are visible litter along coast and in streams**
- **Recycled plastic useful: 36 two-liter beverage bottles will make one square yard of carpeting.**

WHAT DOES THIS MEAN TO PORTS & MARINAS?

- **Recycling market is limited to pure resins**
- **Process must include sorting by code**
- **Haulers may be available through plastic industry**

WHAT DOES A PROGRAM NEED?

- **Receptacles**
- **Client education about codes and resins**
- **Pickup process**
- **Contacts for help**

Two other characteristics — it is seldom biodegradable and it floats — called added attention to plastic waste. This attention, coupled with documented physical damage to marine animals by some plastic products (monofilament fishing line, beverage container ring-carrier devices, and plastic bags) led to worldwide concern and the signing of Annex V of the MARPOL Treaty. As a result of this portion of the treaty, plastics must be brought back to shore instead of being included in other at-sea waste disposal.

Although the volume of the plastic in waste and probably in your terminal waste stream is significant enough to consider recycling it, the chemical characteristics make it a little more involved than recycling some other products. All plastics are not the same — products are made from different resins. To recycle plastic, the average person must be able to identify the resin in a product, and only the same resin as that in the product being manufactured may be used.

The Plastic Bottle Institute helped the public in identifying these resins by developing a number code which can easily be found on the bottom or the label of each piece. It consists of a number (1, 2, or 3...7) inside a triangle or a modification of the recycling symbol. Because plastic containers can now be sorted by this Plastic Container Code System, those plastic items can be recycled effectively. As a result, the market for recycled plastics is improving. For example, Rubbermaid Commercial Products Inc. makes office note pad holders, trays, and trash receptacles from recycled polystyrene (the plastic in fast food

restaurant packaging); and Quantum Chemical Corp. turns recycled plastic milk jugs into portable toolboxes.

Most of the plastics found in marina waste stream audits have a number 1 or 2 on the bottom. One- and-two liter soft drink bottles, with a number 1 on the bottom, are made from the polyethylene terephthalate (PET or PETE) resin. The empty number 2 bottles, made from High Density Polyethylene (HDPE), usually contain water, milk, juice, and most detergents. According to the Urban Waste and Management Research Center at the University of New Orleans, the most popular plastics, HDPE and LDPE (codes 2 and 4), together are the basis of more than two-thirds of all plastics produced.

Although recycling programs exist for all seven resins, programs to recycle PETE and HDPE are the most common. The recycled plastic from beverage bottles is used to make carpet, paint containers, fiberfill and insulation, auto parts, and engineering plastics; plastic from milk jugs is used to make drainage pipes, toys, drums, traffic cones, plastic lumber, and combs. Florida, Louisiana, Mississippi, and Texas require the use of this code on all plastic containers marketed in those states. A copy of the complete code is at the end of this chapter.

A small market has also been established for recycling mixed plastics into low-cost building materials that compete with wood and concrete in the marketplace. Some have been recycled into waterfront piers, recreational furniture such as picnic tables and benches, and others into storage containers and animal pen floors. In fact, Dunedin Municipal Marina in Florida uses this plastic wood product in the parking lot in lieu of concrete parking curb stoppers. The market for recycled mixed plastic does not exist in all of the Gulf Coast states, however. Be certain that this market is available before you decide to recycle mixed plastics.

The code is not imprinted on plastic fishing nets and monofilament lines, plastic bags and sheeting, beverage container ring-carrier devices, and plastic eating utensils, making them difficult to recycle although some of these are made of one of the pure resins. All of these are considered major offenders in the marine environment. A couple of fishing line companies take back used monofilament line or have arranged to accept recycled product at one of their manufacturers, and some playground equipment has been enhanced with used commercial fishing nets. These plastics are recycled primarily as mixed plastic or in individualistic programs.

Catch That Fishing Line

Monofilament fishing line represents a form of trash that requires special effort to collect. One manufacturer, Berkley, has developed a program to collect entangled monofilament line from marinas. Those marketing the Berkley product receive a cardboard display and collection container which can be mailed back to Berkley when it is full of used line. Others can simply box up collected used line. The recycling effort is too small to be profitable but large enough to stimulate a good public image for the participating marinas and the fishing line company by demonstrating a concern for the marine environment — valuable to all, not just to recreational fishermen.

The plastic industry's recycling plan, Blueprint for Plastics Recycling, emphasizes recycling plastic containers in its three goals: (1) to enable a majority of consumers to participate in plastics recycling programs, (2) to recycle nearly 18 billion plastic bottles and containers by 1995, and (3) to double the number of curbside plastics recycling programs each year and reach 4,000 programs by 1994.

The industry assessed itself $10 million per corporation to build five plastics recycling facilities in the U.S., and many of the major plastics corporations use recycled plastic resins and set an additional goal to recycle 25 percent of all common consumer plastic bottles by 1995. Like the aluminum industry, the plastics industry has reduced the amount of raw material used in container manufacture so that the volume of plastic in the waste stream is also being reduced at the source.

What Does This Mean To Ports & Marinas?

Recycling the plastics in your waste stream will be more labor intensive than recycling some of the other products, but a program can be developed and a market exists to recycle plastic containers. Ships and towboats entering ports and terminals will most likely be carrying plastics for disposal onshore. This waste will sometimes be sorted, sometimes compacted, although no consistent method seems to have been adopted. Because ocean-going vessels (cruise ships and cargo vessels) separate Animal, Plant, and Health Inspection Service (APHIS) waste from non-APHIS waste, those plastics that can be contaminated by food or living matter from other countries (APHIS waste) will never be eligible for the port or terminal waste stream. APHIS waste disposal is strictly regulated by the Department of Agriculture. Many shipping lines contract directly with haulers to dispose of non-APHIS plastic waste, however. This waste might be enough to combine with port-generated plastic or a local plastic recycling program.

Since the public is most aware of the dangers to marine animals from plastic products like monofilament fishing line, beverage container ring-carrier devices, and plastic bags that are not easily recycled, you can improve your terminal's public image by encouraging vessel owners to bring these plastics ashore, and by absorbing the cost of disposal, even to the landfill. Two monofilament fishing line manufacturers, Berkley and Shakespeare, will accept used line, and all of the major monofilament manufacturers endorse the landside disposal of the line to protect the marine environment. The shipping costs will probably be comparable or less than landfill fees since monofilament line weighs very little. Addresses for disposing of this product are listed at the end of the chapter.

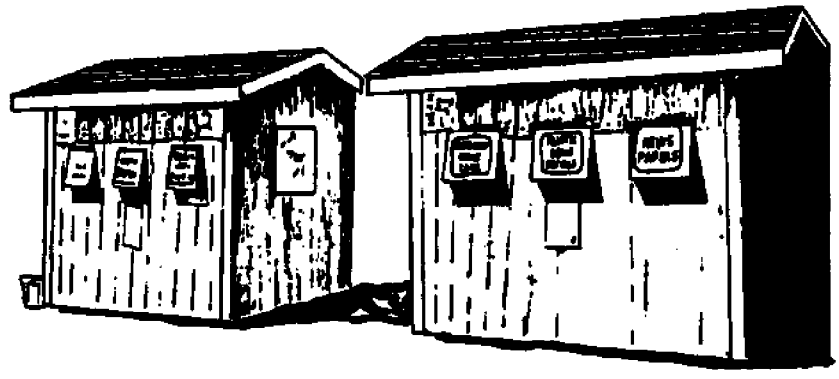
Recyclable plastics will come primarily from galley wastes and cleaning products. Some can be secured from non-APHIS waste streams entering ports and terminals although the handling process to sort by resins may be too labor- and therefore cost-intensive. Marinas may choose to recycle these products when they are being recycled in the local community's program.

If you are considering a recycling program for plastics, consult your hauler for restrictions before you devise your program. Because the plastic in containers is susceptible to change or contamination by the product it holds, plastic containers for toxic products like insecticides or motor oil cannot be recycled. Many recycling centers will not accept plastics that contained products like peanut butter or cooking oil that are almost impossible to remove from the plastic.

Just as you have to learn about plastic resins and the limitations of plastic recycling, you will have to help your clients understand and sort their waste. A plastics recycling program must have a good education component.

A well-labeled, carefully organized center for sorting and depositing plastics by resin number will be required. But don't make it complicated — establish separate bins for the major code types (most often 1, 2, and 3) in your waste stream, a place (like a Berkley carton) for monofilament line if you are recycling it, and then designate a bin "All Other Plastics." This group of bins in your plastics recycling center should be labeled according

to the Plastic Container Code System. A simple poster or bulletin board with "cau-tions or don'ts" will help reduce the introduction of contaminated plastics that could prevent a hauler from marketing your recyclable plastic. See the sample at the end of this chapter.



Group recycling receptacles in an attractive manner.

Most haulers will require that recycled plastic containers be rinsed out because of the variety of products which might be left in them. Posters and a bulletin board can be used to encourage clients to rinse out containers on board when possible. A water faucet adjacent to the plastic recycling bin(s) will make this process easy for your clients or staff. Dairy product containers will produce an especially offensive odor if dairy residue left in them is exposed to heat from the sun.

Source reduction may provide plastic waste control. In marinas with a regular clientele, posters and bulletin boards can be used to reduce the number of resins coming through your waste stream. An item in your newsletter or on the bulletin board can suggest reusable alternatives like large thermos jugs that will reduce the number of plastic beverage bottles while reducing the number of offending beverage container ring-carrier devices. Reusable cups and plates are also a method of reducing debris thrown overboard — in reality it also reduces the debris in the waste stream. A free EPA booklet, *The Consumer's Handbook for Reducing Solid Waste*, is full of ideas you can suggest. The EPA's address is listed at the end of this chapter.

Ports may be able to encourage plastic source reduction by working with the general management of their regular shipper/clients. A general management decision among the terminals might also be implemented. For example, Keystone Shipping Co. in Seattle reduced the volume of plastic entering port from their vessels by exchanging paper for plastic bags and polystyrene hot drink cups. If all of the vessels using a particular terminal did the same, they would significantly reduce the amount of plastic entering the port waste stream.

You can indirectly help your efforts by purchasing and encouraging your clients to purchase products made from recycled plastics. The American Plastics Council publishes a free booklet, *Shop Recycled*, and a larger free book, *Recycled Plastic Products Source Book*, that describe the many products from clothing to home furnishing made from or contained in recycled plastics. Share these with your clients. By seeing the end result of their efforts, your clients will be encouraged to participate in your recycling program. The address for the council is found at the end of this chapter.

Receptacles

A manageable receptacle for recycling plastic containers presents a challenge. These light, bulky items are likely to appear in the waste stream in all shapes and sizes. Choose a receptacle that is large enough to hold at least one day's containers so that the plastic waste accumulates without requiring frequent servicing. The receptacle's size should also be limited by weight, especially if your program requires that the full receptacle be emptied into a waste handler's dumpster or truck. The EPA provides some helpful weight guidelines: one

cubic yard of PET (PETE) soft drink bottles weighs 30-40 pounds; one cubic yard of HDPE dairy jugs weighs 24 pounds. A mixed cubic yard of PET and HDPE containers weighs 32-38 pounds. (Some haulers will take PET and HDPE mixed, and sort them later.) A cubic yard of completely mixed plastics, including plastic bags, weighs about 60 pounds.

Plastic containers take up significantly less space after crushing, but take care that the items are sorted properly if you are recycling by pure resins. A compactor might help you reduce the number of times per month your hauler picks up plastic. Choose your receptacle to fit the type and volume of plastics you are accepting. If you plan to accept commingled plastics and have your staff or hauler sort them at regular intervals, choose a shallow, rectangular receptacle that allows the sorter to see similar types more efficiently. If you expect your clients to sort plastics, tall, deep cylindrical, or rectangular receptacles can be used. In either case, be certain that each bin is clearly labeled. Choose covered receptacles with swinging doors or a rectangular opening. The cover should be latched to the receptacle in some manner. Marinas and terminals already recycling plastic have found that loose covers are a nuisance, and clients will not put them back on the can. Some type of cover is desirable, however, because wide open receptacles might become unsightly or give off offensive odors if clients forget to rinse out the containers before depositing the recyclable materials. A short list of receptacle and compactor vendors may be found at the end of Chapter 2. Consult your Yellow Pages and seek the advice of your recyclable hauler as well.

Placement of receptacles depends upon the program you have chosen. If you are accepting commingled recyclable waste or commingled plastic which requires the minimum of effort from boat crews and your staff, locate the receptacle close to the docking area to encourage vessel operators and passengers to bring their waste ashore. Be sure it can be emptied into a truck or dumpster by one person or by equipment at your disposal unless you have arranged for your hauler to empty it. If you are encouraging vessel crews to rinse and/or sort plastic containers, or if your staff will have to do so, centrally group your plastic recycling receptacles in one area, adjacent to regular waste disposal. Water should be available for the sorter to rinse out containers or wash his hands after sorting. You might want to select a segmented dumpster or compactor into which clients can put plastic containers by resin number. A staff member can crush the lot periodically.

Volume Demands on Pickup

Depending upon volume and type of plastics you are recycling, you may have to empty receptacles into a larger container or compactor frequently — or arrange for frequent pickup by a recyclable handler. You may accumulate one type of plastic much more quickly than another. Discuss these variables with your hauler to devise an economic and efficient pickup schedule. To locate haulers or markets for recycled plastic, consult the list at the end of this chapter, your state recycling directory or recycling office listed at the end of Chapter 1, and the Yellow Pages.

Contacts for Plastics Recycling

Alabama Waste Exchange
The University of Alabama
P.O. Box 870203
Tuscaloosa, AL 35487-0203
(205) 348-8401

American Plastics Council
1275 K St. NW, Suite 400
Washington, D.C. 20005
(800) 2-HELP-90

Association of Foam Packaging Recyclers
1025 Connecticut Ave. NW, Ste. 515
Washington, D.C. 20036
(800) 944-8448

Ctr. for Marine Conservation (CMC)
Gulf Coast Regional Office
1201 W. 24th St.
Austin, TX 78705
(512) 477-6424

Ctr. for Plastics Recycling Research
Rutgers University
Busch Campus, Bldg. 3529
Piscataway, NJ 08855

Container Recovery Corp.
10733 Sunset Office Dr., Suite 400
Sunset Hills, MO 63127
(314) 957-9350

Council for Solid Waste Solutions
a/k/a Partnership for Plastics Progress
1275 K St. NW, Suite 400
Washington, D.C. 20005
(202) 371-5319; (800) 243-5790

Council on Plastics and Packaging & The Environment
1001 Connecticut Ave. NW, Ste. 401
Washington, D. C. 20036
(202) 331-0099

Environmental Protection Agency
Office of Solid Waste
401 M St. SW
Washington, D.C. 20460
(800) 424-9346

EPA Region 4 (serves MS, AL, FL)
U.S. EPA Region 4
345 Courtland St. NE
Atlanta, GA 30365
(404) 347-2091

EPA Region 6 (serves) LA, TX)
U.S. EPA Region 6
First Interstate Bank Tower
1445 Ross Ave. Suite 1200
Dallas, TX 70202-2733
(214) 665-6444

Foodservice & Packaging Institute
1025 Connecticut Ave. NW Ste. 513
Washington, D.C. 20036
(202) 822-6420

Keep America Beautiful
Mill River Plaza
9 West Broad St.
Stamford, CT 06902
(203) 323-8987

MISSTAP/MISSWRAP (a waste exchange)
(Miss. Technical Assistance Prgm.)
P.O. Drawer CN
Mississippi State, MS 39762
(601) 325-2171; 325-8485

National Association for Plastic Container Recovery
4828 Parkway Plaza Blvd.
Charlotte, NC 28217
(704) 357-3250; (800) 7NAPCOR

National Polystyrene Recycling Co.
P.O. Box 66495
Washington, D.C. 20035
(202) 296-1954

National Assoc. of Solid Waste Mgt.
1730 Rhode Island Ave. NW, Ste. 1000
Washington, D.C. 20036
(202) 659-4613

National Recycling Coalition
1101 30th St. NW, Suite 305
Washington, D.C. 20007
(202) 625-6406

National Solid Waste Institute
10928 N. 56th St.
Tampa, FL 33617
(813) 985-3208

The Plastic Bottle Information Bureau
1275 K St. NW
Washington, D.C. 20005
(202) 371-5244

Plastic Institute of America
277 Fairfield Rd., Suite 100
Fairfield, NJ 07004-1932
(201) 808-5950

Plastics Recycling Foundation
1275 K St. NW
Washington, D.C. 20005
(202) 371-5337

Polystyrene Packaging Council Inc.
1025 Connecticut Ave. NW
Washington, D.C. 20036
(202) 822-6424

RENEW (a waste exchange)
Texas Natural Resources Conservation Commission
P.O. Box 13087
Austin, TX 78711-3087
(512) 239-3171

Society of the Plastics Industry, Inc.
1275 K St. NW, Suite 400
Washington, D.C. 20005
(202) 371-5200

Solid Waste Assoc. of North America
P.O. Box 7219
Silver Springs, MD 20910
(800) 456-4723
(301) 585-2898

Southern Waste Information Exchange Svc.
P. O. Box 960
Tallahassee, FL 32302
(800) 441-7949

Textile Fibers & By-Products Assoc.
4108 Park Rd. Suite 202
P.O. Box 11065
Charlotte, NC 28220
(704) 527-5593

Vinyl Environmental Resource Center
1 Cascade Plaza
Akron, OH 44308
(800) 969-VINYL

To send used monofilament fishing line:

Berkley Outdoor Technologies Group
One Berkley Dr.
Spirit Lake, IA 51360

Saluda River Textiles Recycling
1 Main St.
Piedmont, SC 29673

THE PLASTIC CONTAINER CODE SYSTEM

CODE

Polyethylene Terephthalate (PET) is primarily used to make soft drink containers. Twenty to thirty percent of all plastic containers are made from PET.

High Density Polyethylene (HDPE), used to make milk and detergent bottles and the base cups on soft drink bottles, is the base resin for 50-60 percent of all plastic containers.

Vinyl/Polyvinyl Chloride (PVC) is used for cooking oil bottles and food wrappers. Only 5-10 percent of all containers are made from PVC resin.

Five to 10 percent of all containers are made from Low Density Polyethylene (LDP), including garbage bags and bread wrappers.

Polypropylene (PP) is used primarily to make lids and heavy wrappers. Only 5-10 percent of all plastic containers are made of polypropylene.

The basic resin in fast food and dairy product containers, polystyrene (PS), is used to make only 5-10 percent of all plastic containers.

Plastic containers made from all other resins or some combination of resins may be labeled with a code number 7. Only five to ten percent of plastic containers fall into this category.

Plastic containers are coded by the resins from which they are made. Look for the code symbol below on the bottom of all plastic containers. Those without a code are difficult to recycle. This code, devised by the Plastic Bottle Institute in cooperation with its members, is a nationally recognized, voluntary, material identification system.

PUT PLASTICS IN PROPER BINS

Code 1: Soft Drink Bottles

Code 2: Milk Jugs, Detergent Bottles, Base Cups on Soft Drink Bottles

All Other Plastics: Bottles, Bags, Lids, Fast Food Cups & Containers with Codes 3,4,5,6,7.

RINSE

PLASTIC CONTAINERS WITH WATER

BEFORE RECYCLING

Chapter 5
RECYCLING GLASS

It is doubtful that any port, terminal, or marina will choose to recycle only glass because this material is less prevalent in the marine environment than any of the other recyclable materials. Most recreational boats carry little or no glass because of the hazard broken glass fragments can present to unsuspecting passengers and crew who might be dressed for swimming or sunbathing rather than sailing. But ships calling at ports and boats bringing waste from offshore oil platforms do have a substantial amount of glass in the galley waste. A vessel's or terminal's waste stream volume can be reduced by 15-25 percent by recycling glass.

RECYCLING GLASS

RECYCLING POSSIBILITIES

- **Glass is 15-25 percent of the waste stream on commercial boats; but under 5 percent on recreational boats**
- **Industry reuses glass from containers according to color**
- **Glass industry has several cullet and manufacturing plants along the gulf coast**
- **Glass industry encourages recycling**

WHAT DOES THIS MEAN TO PORTS & MARINAS?

- **Recycling market is available**
- **Program could enhance plastic or aluminum can recycling**
- **Haulers may be available through glass industry**

WHAT DOES A PROGRAM NEED?

- **Receptacles**
- **Client education about recycling only containers**
- **Pickup process**
- **Contacts for help**

Recycling diverts glass from the marine environment or the landfill, where it will become a permanent fixture. Eventually glass in the marine environment can be broken down to dirt-like particles, but that process takes much impact or many years of wave action.

The cost of many food products contained in recycled glass may be reduced since the recycling process reduces the cost of making glass containers. The glass industry substitutes recycled glass (called cullet) for the sand, soda ash, and limestone needed to make this product. Since cullet melts at a lower temperature than the 2,800°F needed to melt those raw materials, energy as well as raw materials are conserved and furnace life prolonged by this process.

According to the Glass Packaging Institute, glass has been recycled since colonial times, when the glass blowers of Jamestown used old glass containers to make new ones. Today, 70 glass plants in 27 states use cullet to produce about 41 billion glass containers per year. Along the Gulf Coast, there are glass container manufacturers in Houston, and Waco, Texas; Ruston, Louisiana; and Jacksonville, Lakeland, and Bradenton, Florida. Cullet processors are located at Waxahachie, Texas; Brandon, Mississippi; and Jacksonville, Florida.

Only about 30 percent of all glass containers are acceptable for recycling — soda bottles, beer bottles, juice containers, ketchup bottles, wine and liquor bottles, and food jars and bottles. Most of the glass used in other ways — mirrors, light bulbs, drinking glasses, windows — is not usable because the materials to make these produces melt and form at different temperatures than container glass. If unusable glass is mixed into the cullet, a defective container can result.

Cullet must match the intended color of the finished product because that color reflects

some of the chemicals in the glass. Production of glass products in all three colors — green, brown, and clear — is not universal. In general, brown glass is used to produce some beer and wine bottles; green glass to produce some soda, wine and liquor bottles; and clear glass to produce most food containers. All cullet must be free of food residue and metal or rubber rings and caps. Labels may be left on the containers.

The glass industry has begun to seek secondary markets for mixed cullet or glass that cannot be reused in container production. Some mixed cullet has now been introduced for storm drainage and to replace gravel and crushed stone in roadbase construction. The asphalt industry sometimes uses a product called glasphalt to replace sand in making asphalt. Mixed cullet has also been used to produce fiberglass insulation, reflective beads, and paint. It works as an abrasive in sand-blasting.

What Does This Mean To Ports & Marinas?

A decision to recycle the glass in your waste stream depends upon the quantity and type of glass found in your audit, the proximity of glass recycling in your community or area, and the other types of recycling in your program. Neither the quantity of glass in vessel waste streams nor the market for cullet are large enough for glass to be the only element in a dockside recycling program.

Although the waste streams in most ports and terminals will probably have a substantial quantity of glass in them, only part of this waste can be recycled. Because ocean-going vessels from foreign ports must separate Animal, Plant, and Health Inspection Service (APHIS) waste from non-APHIS waste, glass containers contaminated by food or living matter from other countries will not enter the port or terminal waste stream unless they are first "steamed" in a commercial autoclave. APHIS waste disposal is strictly regulated by the Department of Agriculture.

Some shipping lines contract directly with haulers to dispose of non-APHIS glass container waste, however. Combined glass container waste from all terminals in a port might yield enough to warrant a port glass recycling program. Alternately, the positive public relations resulting from adding the port's glass waste to a community glass recycling program is excellent insurance toward continued local goodwill and government cooperation.

Marinas will have little glass waste in the waste stream because most recreational boaters avoid using glass onboard. However, if you are encouraging boaters and sportfishermen to recycle aluminum cans and/or plastic containers, you will increase client participation in those programs by including glass. It is easier and habit-forming to sort all recyclable containers into one receptacle onboard, and non-recyclable materials into another. Within the marina, you will then have the option of asking the clients to sort these into separate bins or pitch it all together for your staff to sort later.

Piggyback Glass

Mexico Beach, Florida's municipal recycling collection facility is located near the center of Mexico Beach, only a few blocks from Marquardt's Marina. Although the marina's recycling program was designed to accommodate used oil, oil filters, aluminum cans, and monofilament fishing line in its waste stream, the marina added paper and glass recycling to help the city's effort. As a result, the marina enjoys an excellent relationship with the citizens of Mexico Beach while easily eliminating glass and paper from the marina's waste stream. And the volume of recycled glass and paper flowing into the city's recycling program has increased.

Glass adds markedly to the weight or volume of materials carried to the landfill. Thus, recycling glass containers will contribute to the reduction of the materials — and therefore cost — in landfill disposal.

Receptacles

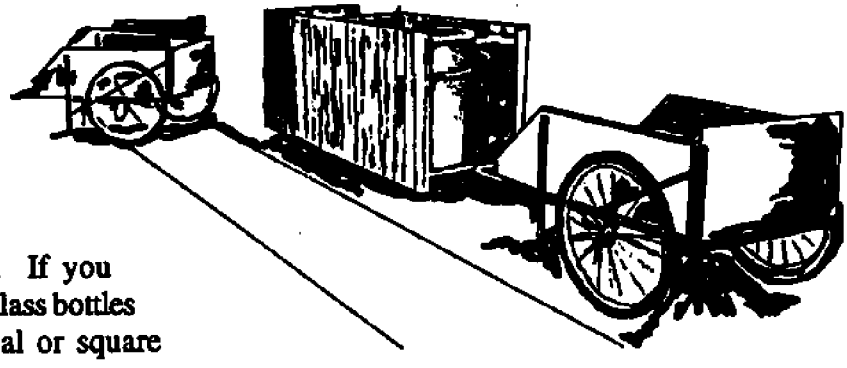
A manageable receptacle for recycling glass containers presents a challenge. Although the daily quantity of glass containers might be small, these vary in weight, size, and shape. Choose a receptacle that is large enough to hold about a week's accumulation of glass waste without requiring frequent servicing. The receptacle's size should also be limited by weight, especially if your program requires that the full receptacle be emptied into a waste handler's receptacle. The Glass Packaging Institute provides some helpful weight guidelines: one full grocery bag of whole glass containers weighs approximately 16 pounds. A 55-gallon drum of whole glass bottles weighs about 100 pounds.

Glass containers take up significantly less space after crushing. A compactor might help you reduce the number of times per month your hauler picks up recycled glass. Note that the weight of a receptacle of crushed glass will be significantly higher than the weight of that same receptacle filled with crushed aluminum or plastic. Do not try to fill the same size receptacle with crushed glass unless you or your hauler are equipped with mechanical means to empty it.

Choose your receptacle to fit the type and volume of glass you are accepting. If you plan to accept commingled glass and have your staff or hauler sort them at regular intervals, choose one shallow, rectangular receptacle that allows the sorter to see similar types efficiently. If you expect your clients to sort out glass bottles and jars, three tall, cylindrical or square receptacles can be used. Since glass must also be sorted by color, be certain that each bin is clearly labeled: clear, green, or brown glass only.

A latched cover is preferred on glass recycling receptacles. The cover should have a swinging door or a rectangular opening for ease of deposit. Marinas and terminals already recycling glass have found that uncovered receptacles become unsightly or give off offensive odors when clients forget to rinse out the containers before depositing the recyclable materials. Loose covers are a nuisance, and clients will not replace them. A short list of receptacle and compactor vendors may be found at the end of Chapter 2. Consult your Yellow Pages and seek the advice of your recyclable hauler for vendors and products available in your area.

Placement of receptacles depends upon the program you have chosen. If you are accepting commingled recyclable waste or commingled glass which requires the minimum of effort from boat crews and your staff, locate the receptacle close to the docking area to encourage vessel operators and passengers to bring their waste ashore. Be sure it can be emptied into a truck or dumpster by one person or by equipment available to you or your hauler. If your are encouraging vessel crews to rinse and/or sort glass containers, or requiring that your staff do it, centrally group your glass recycling receptacles in an area close to other recycling bins, or install a segmented dumpster



Use carts to haul receptacles around the marina.

or compactor into which clients can sort glass by color. Place these adjacent to regular waste disposal to accommodate the rubber, plastic, or aluminum lids and rings on these products.

Water should be available to rinse out containers or wash hands after sorting. Be sure that the receptacles or segments of a receptacle are carefully labeled for green, brown, or clear glass. For safety reasons, do not encourage your clients to crush glass. Assign crushing or compactor duty to a specific employee, equipped with gloves and safety lenses on his eyes. The crushing process should be planned for a period when clients do not normally use the recycling center.

Remind clients or crew members of the types of glass which can be recycled and the importance of separating recyclable glass from other glass products. Industry sources like the Glass Packaging Institute produce free brochures and posters about the glass recycling process, pictures of damage to glass containers produced by putting non-recyclable glass into the cullet, and posters about the types of containers that are made of recyclable glass. Addresses are listed at the end of the chapter.

Volume Demands Infrequent Pickup

Because marinas will have a small volume of glass in the waste stream, a contract with a handler or hauler for this product will schedule infrequent pickups. You might arrange for glass pickup once for every three times other recycled products are picked up. Your hauler can provide advice on an economic and efficient pickup schedule. If you store recycled glass until a substantial amount has accumulated, your hauling fee will be more reasonable.

Since the volume of glass accumulating on ships and on towboats that remain offshore for several days can be substantial, ports or terminals can offer glass recycling more profitably. Together, a large volume of product can be regularly accumulated and marketed, reducing the waste stream to the landfill for all clients. If a separate program is not desirable, ports or terminals therein can, like marinas, join a municipal or community glass recycling program.

Combining your program with a municipal or community glass recycling program has two advantages: (1) storage will not be as necessary because your recycled glass will be combined with many others' during a regular pickup cycle, and (2) client participation will be high and easy to encourage because many will already be familiar with glass recycling within the community. If possible, take advantage of this situation by selecting receptacles that fit into the community's program and adapting to the existing pickup schedule.

Contacts For Glass Recycling

Alabama Waste Exchange
The University of Alabama
P.O. Box 870203
Tuscaloosa, AL 35487-0203
(205) 348-8401

Anheuser-Busch Companies
One Busch Place
St. Louis, MO 63118
(314) 577-2000

The Beer Institute
1225 Eye St. NW, Suite 825
Washington, D.C. 20005
(202) 737-2337

Center for Marine Conservation (CMC)
Gulf Coast Regional Office
1201 W. 24th St.
Austin, TX 78705
(512) 477-6424

Container Recovery Corp.
10733 Sunset Office Dr., Ste. 400
Sunset Hills, MO 63127
(314) 957-9350

Environmental Protection Agency
Office of Solid Waste
401 M St. SW
Washington, D.C. 20460
(800) 424-9346

EPA Region 4
(includes MS, AL, FL)
U.S. EPA Region 4
345 Courtland St. NE
Atlanta, GA 30365
(404) 347-4727

EPA Region 6 (includes LA, TX)
U.S. EPA Region 6
First Interstate Bank Tower
1445 Ross Ave. Suite 1200
Dallas, TX 75202-2733
(214) 665-6444

Glass Packaging Institute
Southern Office
4825 S. Peoria, Suite 4
Tulsa, OK 74105
(918) 742-8343

Keep America Beautiful Inc.
9 W. Broad St.
Stamford, CT 06902
(203) 323-8987

Mid America Glass Recycling Program (LA, TX)
824 N. Mission
Sapulpa, OK 74066
(918) 227-3889

MISSTAP/MISSWRAP
(a waste exchange)
(Miss. Technical Assistance Prgm.)
P.O. Drawer CN
Mississippi State, MS 39762
(601) 325-2171; 325-8485

National Association of Recycling Industries, Inc.
330 Madison Ave.
New York, NY 10017
(212) 867-7330

National Assoc. of Solid Waste Mgmt.
1730 Rhode Island Ave. NW, Ste. 1000
Washington, D.C. 20036
(202) 659-4613

National Recycling Coalition
1101 30th St. NW, Suite 305
Washington, D.C. 20007
(202) 625-6406

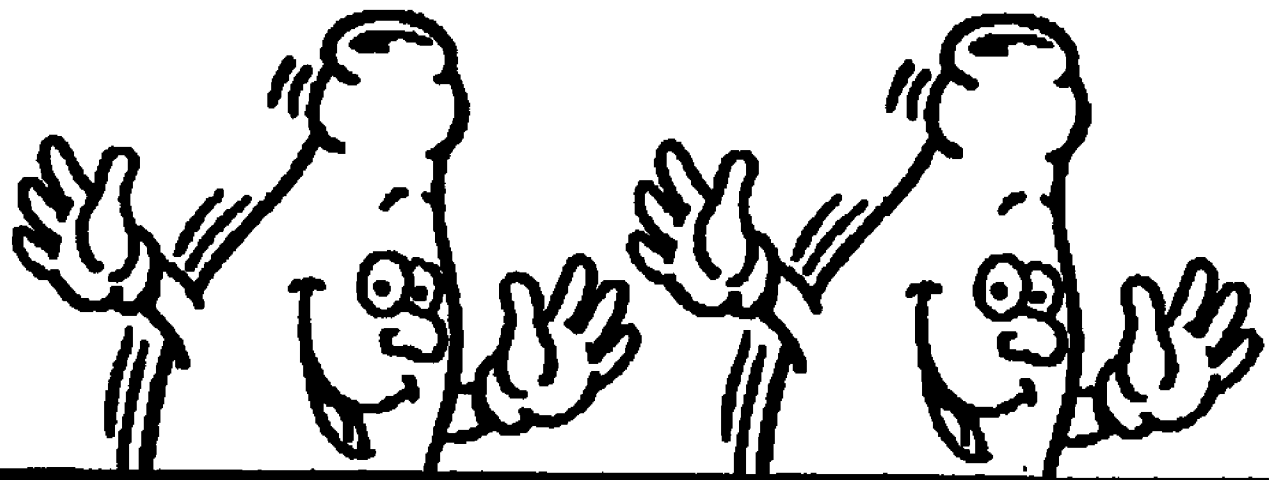
National Soft Drink Association
Solid Waste Management Dept.
1101 Sixteenth St. NW
Washington, D.C. 20036
(202) 463-6732

RENEW (a waste exchange)
Texas Natural Resources Conservation Commission
P.O. Box 13087
Austin, TX 78711-3087
(512) 239-3171

Solid Waste Association of North America
P.O. Box 7219
Silver Springs, MD 20910
(800) 456-4723

Southeast Glass Recycling Program (AL, FL, GA, MS)
P.O. Box 5951
Clearwater, FL 34618
(813) 799-4917

Southern Waste Information Exchange Svc.
P.O. Box 960
Tallahassee, FL 32302
(800) 441-7949



GLASS BOTTLES HERE

POSTER COURTESY OF THE SNOHOMISH COUNTY (WASHINGTON) PUBLIC WORKS DEPARTMENT, SOLID WASTE MANAGEMENT

RECYCLE GLASS CAREFULLY

Sort By Color

RECYCLE		DON'T RECYCLE
	SODA BOTTLES	CERAMIC BEER, WINE CAPS
	BEER BOTTLES	LEAD COLLARS FROM WINE, CHAMPAGNE BOTTLES
	JUICE BOTTLES	CERAMIC CUPS, PLATES, POTTERY
	KETCHUP BOTTLES	FLOWER POTS
	WINE, LIQUOR BOTTLES	LABORATORY GLASS
	FOOD JARS	CRYSTAL
		MIRRORS
		WINDOW GLASS
		OVENWARE
		LIGHT BULBS
		OPAQUE/MILK GLASS
		DRINKING GLASSES

Chapter 6
PAPER

Paper makes up about 40 percent of most municipal waste streams, and is found in some form in most vessel waste streams. However, only a portion of that paper is recyclable. In fact, two-thirds of the paper and paper products manufactured in the U.S. are made from wood pulp (trees), and only one-third is made from recycled paper. But paper has been recycled in the U.S. at least since World War II, and the paper industry plans to continue to improve the rate of recovery.

RECYCLING PAPER

RECYCLING POSSIBILITIES

- **Paper makes up about 40 percent of most municipal waste streams**
- **Industry reuses paper according to strength and brightness of the used fiber**
- **Paper that can be recovered economically is reused**
- **Paper mills in Louisiana, Alabama, and Georgia use some recycled paper**

WHAT DOES THIS MEAN TO PORTS & MARINAS?

- **Recycling market is available**
- **Program could be added to port office recycling programs**
- **Newspaper, office paper, and corrugated boxes are greatest possibilities**
- **Haulers may be available through paper industry**

WHAT DOES A PROGRAM NEED?

- **Receptacles**
- **Pickup process**
- **Contacts for help**

Paper in the waste stream can be in the form of office paper, newspaper, tissues and galley papers, packing papers, and/or cardboard. All but the galley papers can theoretically be recycled, but they must be separated. Usually, a paper mill mixes new wood pulp with recycled slurry (a ground up mush of recycled paper that looks like oatmeal) in a proportion to ensure product quality. Because recycling reduces the fiber strength or brightness, only a limited number of paper products that can be made from recycled paper.

The paper industry classifies recycled waste paper into 50 different grades of secondary fiber to determine the new paper products that can be manufactured from it. For example, waste newspaper can be used to make new news pages, but recycled computer paper cannot be used to make new computer paper because these secondary fibers do not have the required characteristics of strength and brightness. Instead, recycled computer paper may be used to make tissue products or paper towels. Corrugated boxes may be used to make new boxes, but office papers will seldom be used to make new office paper. Fiber from a mixture of waste papers will seldom be used to make any new paper. Instead, it can be used in making roofing shingles, tar paper, or the facing on gypsum board. The papermaking process changes the original strength and brightness of the wood fiber, thus limiting the products that can be made from secondary fibers.

The secondary fiber industry seeks recycled waste paper that is (1) usable and (2) economically recoverable. Usable waste paper must meet the quality and quantity standards that have been defined for the new pulp in a particular type of paper. For example, the weak and brittle fiber in wet or sun-exposed newsprint is not considered usable because it would produce news pages that break during the printing process.

Economic recoverability depends upon weight, distance, and transportation mode. Paper is heavy but a paper mill will spend the

money to transport usable fiber when the volume or weight, the distance to the mill, and the mode of transportation together fit the budget. For this reason, many successful paper recycling programs have a market nearby.

PAPER RECYCLING SAVES

- **Landfill: Each ton of recycled paper saves 3.3 cubic yards of landfill space.**
- **Resources: Substituting one ton of recycled paper for new wood fiber saves 7,000 gallons of water, 380 gallons of oil, 4,100 kw-hours of energy, and 60 pounds of air pollutants.**
- **Habitat: It takes the wood pulp from about 75,000 trees to produce the paper for one press run of the Sunday edition of the *New York Times*.**
- **People: The deinking process is cleaner and less toxic than the process of making paper from virgin pulp.**

Recyclable waste paper is classified as low-grade and high-grade. Low grade paper — newspaper, corrugated boxes, and mixed waste paper — is marketed to manufacturers of boxboard (cereal boxes) or corrugated boxes. High-grade waste paper can be marketed in two ways: as pulp-substitute grade and deinking grade. Pulp-substitute grade is used instead of new wood pulp in making white products such as envelopes. Paper that has been printed or dyed has to be deinked or bleached, processes that produce a duller and sometimes weaker product. This deinking grade pulp is marketed to tissue products and writing paper manufacturers.

What Does This Mean To Ports & Marinas?

The presence of paper in almost every dockside waste stream would appear to make possible a paper recycling program, but few ports or marinas have one. The vast majority of paper in a marina waste stream is galley waste, which cannot be recycled. But office paper and cardboard dunnage, usually found in significant portions in the port, are recyclable.

Some of the Gulf Coast ports already have an office paper recycling program. These entities may expand their office program to include a separate collection of corrugated paper to reduce the volume of dunnage accumulating for landfill disposal. The same hauler might be able to handle both types. A port could also combine the corrugated boxes with the high-grade papers from office activities into a mixed batch for low-grade recycling.

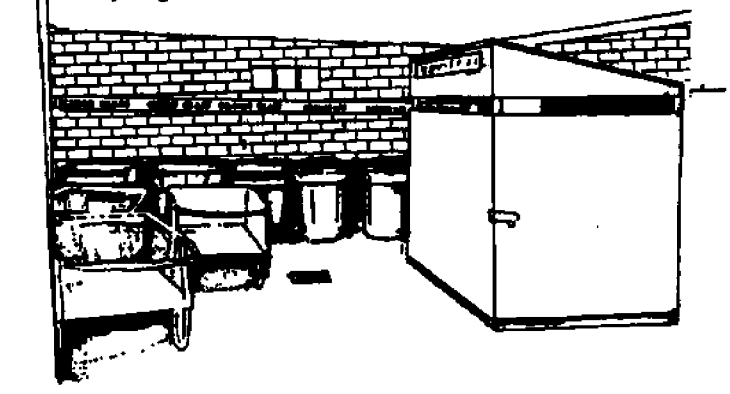
The decision to recycle waste paper of any type depends upon the secondary fiber market and/or already established paper recycling programs in the area. Most recycled paper is not transported long distances because of the cost. (Along the Gulf Coast, there are paper mills in Louisiana, Alabama, and adjacent Georgia.) The key to a program is the availability of a hauler. Try first to contract with a private paper recycler who is already accepting paper from schools, industries, or municipal waste collection programs. Since the paper industry also actively encourages recycling, a hauler may also be identified through a local paper mill or one of the paper associations listed at the end of this chapter.

Receptacles

Recycled waste paper must be kept in good condition for marketing — clean, dry and away from sunlight — and it must be sorted by type. Although receptacles will differ according to the type or volume of paper in your recycling program, the need for a cover is universal.

Office papers can most easily be collected in rectangular bins or baskets adjacent to desks or computers in port or marina offices. All white paper such as index cards, tabulating cards, computer printout paper, typing, writing, and photocopy paper can be recycled. When these are collected by the regular maintenance

A dumpster with a slit-type opening will encourage recycling flattened cardboard boxes.



crew during office cleaning, they must be bundled together neatly for transport. Be careful that no dyed or colored paper and envelopes, blueprint paper, newspapers or magazines, sensitized paper (from a fax, or from carbon), file folders, film and photos, tape, glue and adhesives, binders, metal fasteners, or galley wastes are mixed with these. In ports or terminals where the recycling program mixes this high-grade recyclable paper with low-grade paper or corrugated dunnage, the maintenance crew can add the office paper to covered dumpsters or bins containing the other recyclable paper products.

Because paper is heavy, the size of these receptacles will be limited by how they are handled in your program. Large dumpsters are appropriate when the paper will be picked up mechanically. According to the EPA, one cubic yard of newsprint weighs 360-800 pounds; and if it is compacted, 720-1,000 pounds. A 12-foot high stack of newspaper weighs 35 pounds. Loose corrugated cardboard is also heavy. One cubic yard of loose corrugated boxes weighs about 300 pounds; that same cubic yard baled weighs 1,000 to 1,200 pounds.

A large dumpster will best accommodate large volumes of corrugated cardboard boxes until they can be flattened for transport. A roof or attached lid will protect the boxes from rain, sun, and spillage. When these are flattened and bundled, remove plastic packaging, metal objects, and plastic packing slip jackets to make the product more valuable.

A marina can conveniently recycle newspapers when the local waste recycling program includes this product. These can be kept dry and away from sunlight in a covered dumpster or a large, covered rectangular bin. Be sure the receptacle is labeled. Do not gather old newspapers in plastic bags because the weight of the papers can break the bundle. Brokers handling recycled newspapers cannot accept telephone books, paperback books, junk mail and magazines or any type of glossy or coated paper. Be careful that recycled news-papers are not contaminated with them. Some of the larger waste haulers can provide newspaper recycling dumpsters that are already labeled and ready to use.

Demands on Pickup

In some ports or terminals, recycling corrugated boxes will reduce the size of the waste stream destined for the landfill because the volume of box-type dunnage accumulating in ports is significant. A comparatively frequent pickup schedule should be developed.

Since most of the paper recycling programs in ports or marinas will be developed because of an existing community or local paper recycling program, the pickup schedule can be coordinated with this group. Although your port or marina may not accumulate enough paper to provide an economical load for an independent paper recycling program, you could add volume to a municipal or civic group's program or help them to develop one. The public relations value of participating in such a program, especially with a school or other civic group, can be worth the effort. Marinas in residential areas may also secure positive public images by encouraging paper recycling among the live-aboard population. In this instance, the municipal paper recycling and waste collection service may agree to include the marina on their collection route.

Contacts for Paper Recycling

Alabama Waste Exchange
The University of Alabama
P.O. Box 870203
Tuscaloosa, AL 35487-0203
(205) 348-8401

American Forest Council
1250 Connecticut Ave. NW, Ste. 320
Washington, D.C. 20036
(202) 463-2455

American Forest & Paper Assoc.
1111 19th St. NW, Suite 700
Washington, D.C. 20036
(800) 878-8878

American Newspaper Publishers Assoc.
The Newspaper Center
P.O. Box 17407
Washington, D.C. 20041
(703) 648-1000

American Paper Institute
260 Madison Ave.
New York, NY 10016
(212) 340-0600; (800) 878-8878

American Pulpwood Association Inc.
1025 Vermont Ave. NW, Ste. 1020
Washington, D.C. 20005
(202) 347-2900

Ctr. for Marine Conservation (CMC)
Gulf Coast Regional Office
1201 W. 24th St.
Austin, TX 78705
(512) 477-6424

Container Recovery Corp.
10733 Sunset Office Dr., Suite 400
Sunset Hills, MO 63127
(314) 957-9350

Environmental Protection Agency
Office of Solid Waste
401 M St. SW
Washington, D.C. 20460
(800) 424-9346

EPA Region 4 (includes MS, AL, FL)
U.S. EPA Region 4
345 Courtland St. NE
Atlanta, GA 30365
(404) 347-4727

EPA Region 6 (includes LA, TX)
U.S. EPA Region 6
First Interstate Bank Tower
1445 Ross Ave. Suite 1200
Dallas, TX 75202-2733
(214) 665-6444

Fibre Box Association
10 Gould Center 412
Rolling Meadows, IL 60008
(312) 364-9600

Institute of Scrap Recycling Industries Inc.
1325 G St. NW, Suite 1000
Washington, D.C. 20005
(202) 466-4050

Keep America Beautiful Inc.
9 W. Broad St.
Stamford, CT 06902
(203) 323-8987

MISSTAP/MISSWRAP (a waste exchange)
(Miss. Technical Assistance Program)
P.O. Drawer CN
Mississippi State, MS 39762
(601) 325-2171; 325-8485

Midwest Paper Association
2510 Dempster, Suite 109
Des Plaines, IL 60016
(312) 296-7788

National Association of Recycling Industries, Inc.
330 Madison Ave.
New York, NY 10017
(212) 867-7330

National Association. of Solid Waste Management.
1730 Rhode Island Ave. NW, Ste. 1000
Washington, D.C. 20036
(202) 659-4613

National Business Forms Assoc.
433 E. Monroe Ave.
Alexandria, VA 22301
(703) 836-6225

National Paper Trade Association
111 Great Neck Rd.
Great Neck, NY 11021
(516) 829-3070

National Recycling Coalition
1101 30th St. NW, Suite 305
Washington, D.C. 20007
(202) 625-6406

New York Association of Dealers In Paper Mills Supplies Inc.
35 W. 45th St.
New York, NY 10036
(212) 966-9710

The Paper Bag Institute Inc.
505 White Plains Rd.
Tarrytown, NY 10594
(914) 631-0696

Paperboard Packaging Council
1101 Vermont Ave. NY, Suite 411
Washington, D.C. 20005
(202) 289-4100

RENEW (a waste exchange)
Texas Natural Resources Conservation Commission
P.O. Box 13087
Austin, TX 78711-3087
(512) 463-3171

Solid Waste Association of North America
P.O. Box 7219
Silver Springs, MD 20910
(800) 456-4723

Southern Forest Products Assoc.
2900 Indiana Ave.
Kenner, LA 70065
(504) 443-4464

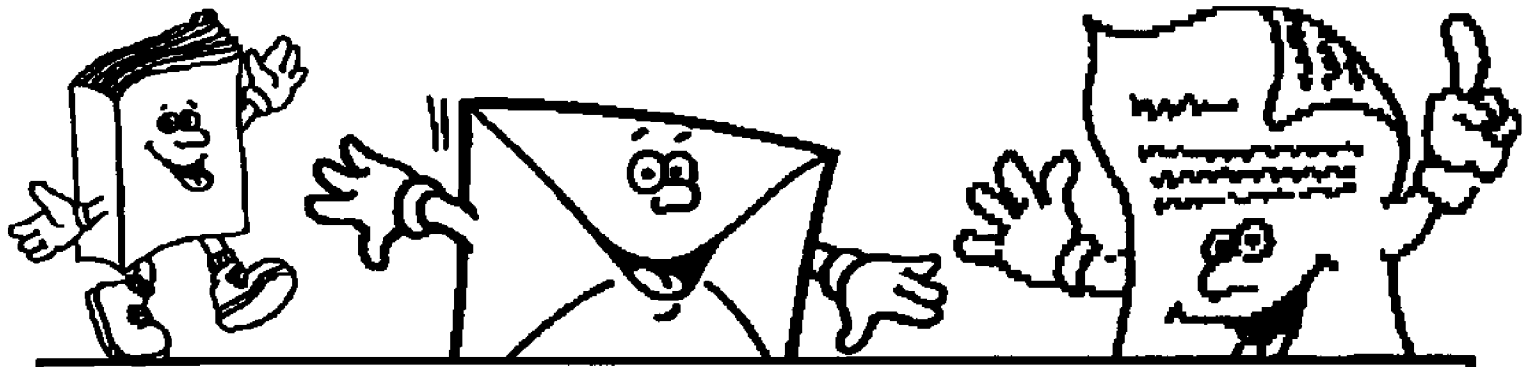
Southern Waste Information Exchange Svc.
P. o. Box 960
Tallahassee, FL 32302
(800) 441-7949

Technical Association of the Pulp & Paper Industry
15 Technology Parkway S.
Norcross, GA 30092
(800) 332-8686

RECYCLE PAPER CAREFULLY

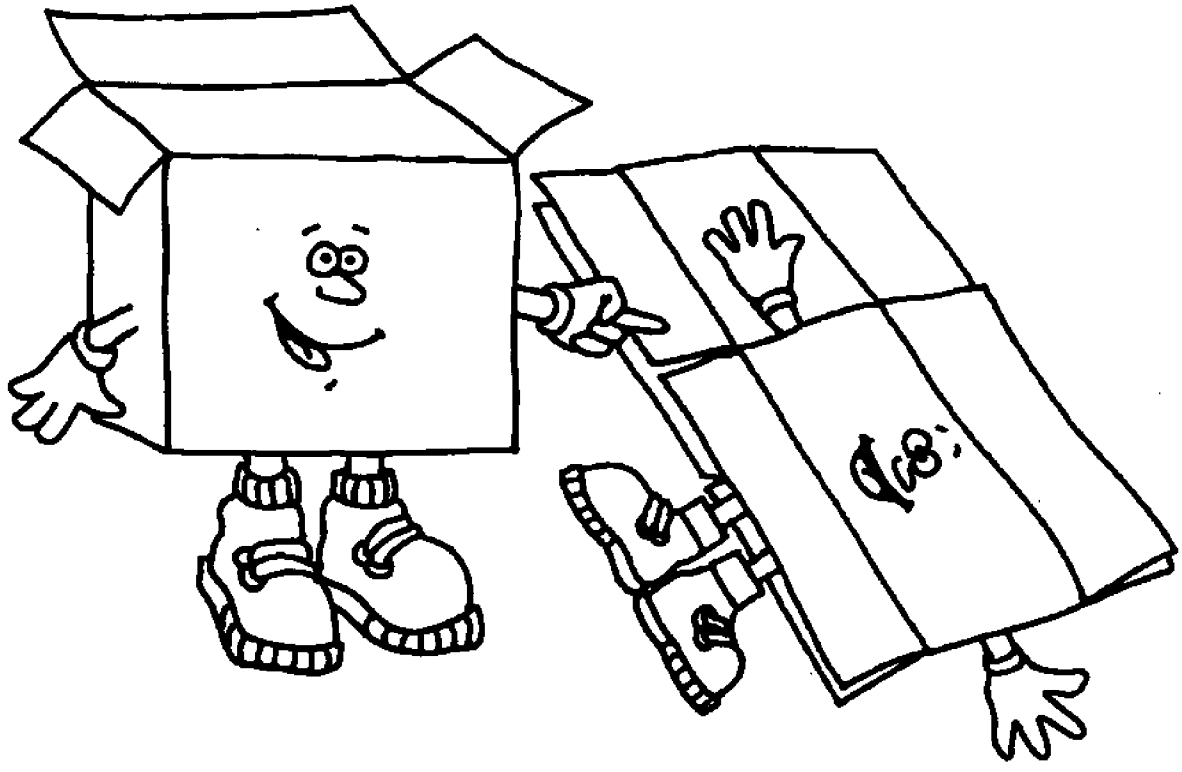
RECYCLE	DON'T RECYCLE
NEWSPAPER	SHINY PAGE MAGAZINES
CORRUGATED CARDBOARD	PHONE BOOKS
COMPUTER	INTEROFFICE BROWN ENVELOPES
FILE STOCK	PREPRINTED PAPER OR FORMS
WHITE LEDGER PAPER	PLASTIC ATTACHMENTS
COPY PAPER	COATED, WAXED, OR TREATED PAPERS
	CARBON PAPER OR CARBONLESS PAPER
	PAPER WITH RUBBERBASED GLUE ON IT
	FOOD WRAPPINGS & BOXES
	SOFT DRINK OR BEER CARTONS

Guidelines above apply to marinas, ports, and terminals handling vessel and internal office waste primarily to protect the aquatic environment. It suggests recycling the types of recyclable paper that are most common in those facilities. A recycling program for other facilities may include additional products.



RECYCLE MIXED PAPER

RECEPTACLE LABEL COURTESY OF SNOHOMISH COUNTY (WASHINGTON) PUBLIC WORKS DEPARTMENT, SOLID WASTE MANAGEMENT



FLATTENED CORRUGATED CARDBOARD

RECEPTACLE LABEL COURTESY OF SNOHOMISH COUNTY (WASHINGTON)
PUBLIC WORKS DEPARTMENT, SOLID WASTE MANAGEMENT

Chapter 7
ENGINE OIL & FILTERS

Everyone is aware of Americans' dependence upon the non-renewable resource, oil, for fuel and as a raw material in manufacturing processes. Much of it lubricates the engines essential to our way of life, yet only about 14 percent of the product handled by the public is recycled, according to the American Petroleum Institute (API). The American public has known, since at least 1981, that spilled or leaking oil can harm the environment, but the traditions of dumping used engine oil still prevail. Used oil continues to be dumped overboard, into a sewer, or poured on the ground to kill weeds or control dust, especially in the residential, recreational boating, and commercial fishing sectors where changing engine oil is often a do-it-yourself project.

Although public shock over the marine damage after the 1989 *Exxon Valdez* incident resulted in strict oil spill prevention and cleanup legislation and a genuine public concern about pollution from oil spills, far less concern is directed at the small quantities of oil entering the marine environment from vessels, runoff, and ground water. Treatment plants can be disrupted, groundwater can be contaminated, and marine life can be harmed. An oil sheen on the water's surface prevents dissolved oxygen replenishment in the water, impairs photosynthesis, and blocks sunlight. Oil is toxic to some aquatic life.

Dumping is not the only way that engine oil enters the marine environment. Oil sometimes gets into the bilge (deliberately or accidentally) and enters a river, lake, or coastal waters when the bilge is discharged. The operators of small pleasure boats powered by two-cycle outboard engines may spill a little oil when adding it to fuel. Each year, about 15 million gallons of oil are discharged into coastal waters after passing through sewage treatment plants — twice as much as is discharged from marine accidents.

Recycling can help reduce this pollution while extending the benefits of this non-renewable resource. Used oil can be re-refined by using only one third of the energy needed to refine crude oil to lubricant quality. It can also be reprocessed and burned as fuel. One gallon of used oil burned as fuel results in 140,000 BTUs of energy. In fact, if we recycled all the used oil currently being discharged improperly, we could reprocess it to produce enough energy to power 360,000 homes annually, or re-refine it and manufacture 96 million quarts of high quality motor oil.

RECYCLING ENGINE OIL & FILTERS

RECYCLING POSSIBILITIES

- Oil is a non-renewable resource that is used as a fuel and as a raw material in manufacturing
- Used engine oil can be reprocessed into heating oil or re-refined into engine lubricating oil
- Many federal and state laws regulate oil transport and disposal
- The petroleum industry actively seeks used oil to reprocess and re-refine

WHAT DOES THIS MEAN TO PORTS & MARINAS?

- Recycling market is available
- Program could be added to port and marina recycling programs
- Some used oil can be hauled away at little cost
- Haulers may be available through petroleum industry

WHAT DOES A PROGRAM NEED?

- Special receptacles
- Acceptance of oil handling responsibility
- Special provisions for spills and contamination
- Licensed haulers and careful contracts
- Contacts for help

The Coast Guard enforces a law forbidding the discharge of any oil from a vessel or from the vessel's bilge. Violation is punishable by fines of up to $20,000. Many states have similar laws. Because of these laws, deliberately dumping used oil in lakes, rivers, and along the coast has diminished considerably. Other environmental laws now forbid pouring used oil down sewers, on roadways to reduce dust, and along fences and buildings to kill weeds. Enforcement of all of these laws has reduced deliberate dumping into the environment and increased the need for a safe way to dispose of used oil. A used oil recycling program is one way to meet this need.

Hundreds of companies throughout the U.S. collect used oil for reprocessing. These local businesses collect oil from quick-lube and automobile service stations, community recycling centers and marinas to sell the product to a reprocessor. Some reprocessors collect their own used oil. About 80 percent of all used oil is blended with virgin petroleum stock to make industrial heating fuel that can be sold cheaply.

Used oil can also be re-refined to make engine lubricants. This process, restoring the oil to its former state, can be profitable. Because only 10 firms in the U.S. re-refine waste oil today, far less used oil goes to this industry. Most of the used oil for re-refining is secured in the immediate vicinity of the refinery since the expense of transporting used oil long distances can eliminate profits after re-refining.

Recycled waste oil haulers take risks of oil spills and contaminated oil. Liability for spill damage to the environment is large, and contamination of this oil from other engine fluids and solvents can make it unusable for reprocessing or re-refining. The presence of contaminants can change the classification of the used oil to hazardous waste, making it subject to stringent and expensive handling and disposal regulations. A profitable venture can be changed into an expensive nightmare with only a small amount of contaminant.

Despite the risks, API actively encourages oil recycling to extend the life of this non-renewable resource. Both the API and the EPA have published booklets on establishing an oil recycling program in any community. Four of the five Gulf Coast states have a government office to assist in implementing this type of recycling program, and, in several states, local communities have already established programs. The Coast Guard has published a book on managing oily waste in the marine environment. Sources for securing these publications and contacting these offices are listed at the end of this chapter.

What Does This Mean To Ports & Marinas?

Although large quantities of used oil will not appear in all waste stream audits, engine oil is being changed on all vessels. Don't depend upon the waste stream audit to determine the volume of used oil that might pass through your dockside facility.

Because ships and larger pleasure boats, commercial fishing boats, and towboats operate most efficiently with frequent oil changes, ports and terminals do accumulate some used oil. Some commercial fleets with maintenance schedules that concentrate engine maintenance in one terminal or port may already participate in a used oil recycling program. Many Gulf Coast commercial fish processors dispose of used engine oil from commercial fishing boats as a courtesy to the fishermen supplying their businesses.

The oil from power, sportfishing, and sailboat engines, generally changed annually, is most noticeable in marina waste streams at the beginning and end of the recreational season. A recreational user tends to regard the "small" quantity of oil that is drained from his or her engine annually as negligible (usually a couple of quarts), and many claim that disposal is unimportant. Cumulatively this oil can do serious damage to the marine environment. Since these people live in communities

supporting or enforcing "proper" disposal of motor oil from automobiles, a large proportion of them may be receptive to recycling in the marina.

Used oil in the waste stream, whether it is recycled or disposed of at a landfill, presents some challenges because this technically biodegradable substance can harm people and the environment if it is improperly handled or dumped. Most ports and marinas are already complying with some petroleum-related regulations. Before you establish a used oil recycling program, you will have to learn about the circumstances under which used oil is harmful, the laws in your state or community governing used oil disposal, and be certain of the availability of a used oil waste hauler whose equipment and procedures comply with these laws.

Port Recycles Used Engine Oil Directly Off Vessels

Used engine oil is recycled from is the vessels in the Port of Pensacola by a commercial contractor, Pensacola Pollution Control. "It works well for us," said Jim Avery, assistant port director. The contractor has secured all of the proper permits, and the port simply designates this company as a port agent. Hauling is conducted by request. Through this process, the Port of Pensacola does not have to store used engine oil or filters at all.

Because the contractor is designated by the port, the ship's master or chief engineer can contact directly for service, or they can secure service through their own ship's agent. On occasion, when a chief engineer or ship's master asks the port for service, Avery simply puts in a call and Pensacola Pollution Control complies.

Oil Handling Responsibility

Whether oil is dumped or spilled, it can be toxic to animals and humans. Even a simple oil sheen on the water's surface can prevent the replenishment of oxygen in the water, impair photosynthesis among aquatic plants, and essentially block sunlight. According to API, one gallon of used oil can ruin a million gallons of fresh water — a year's supply for 50 people. One cup of oil can produce an oil sheen over an acre of calm water.

Persons handling the product — boat crews, vendors, marina attendants, truck drivers — are responsible for taking every precaution to prevent this harm to people and the environment. Whether you have a recycling program or not, spills can occur in port waters, on the marina dock, on the terminal grounds — and you have some responsibility for cleaning it up. Education can help you with this process. All dockside facilities can reduce the oil that enters the water through the bilge by promoting the use of absorbents and filters designed to take oil out of bilge water.

Because of the legislation resulting from the *Exxon Valdez* oil spill in 1989, most commercial vessels, ports, and terminals already have developed an oil spill cleanup plan in compliance with U.S. Coast Guard regulations. Marinas handling fuel have also developed a cleanup plan to keep damage from fuel spills at a minimum. Your used oil recycling program must include a BMP (best management practices) description of oil spill cleanup procedures in your marina or port. And, because the equipment you use to do this may become contaminated with petroleum, this BMP must include a plan for the proper disposal of the cleanup materials.

Equipment

Storage is an essential element in this recycling program. The type of receptacle used to hold the used oil must be designed so that the crewman, engineer, or boat operator can pour his used oil into it without spilling, and

An Ounce of Prevention . . .

Marinas are faced with a challenge to promote used engine oil recycling among do-it-yourself boat operators. At Elliott Bay Marina in Seattle, a program of prevention is working. When a new customer enters the marina, he or she is given a free oil absorption pad for the bilge, as well as lessons on how to use it and how to change engine oil without spilling it. The marina regularly picks up the used oil from vessels and dumps it into a storage tank for recycling. Education and service prevents used engine oil spills while encouraging recycling.

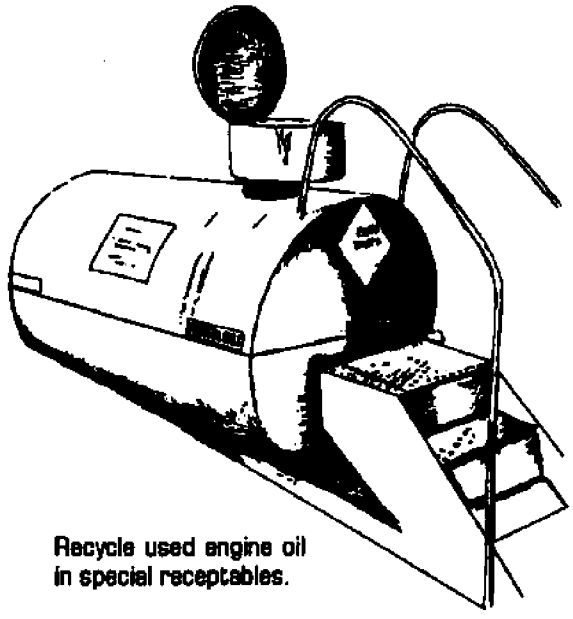
Elliott Bay's general manager, Marty Harder, won the National Marine Manufacturers Association Facilities Committee Marina Environmental Responsibility Award in 1994 because all of this marina's programs are designed to be environmentally friendly and easy for clients to comply with best management practices.

(This vignette is based on an article in *Dock Lines*, International Marina Institute, 6(20):1, Oct. 1994.)

the hauler can easily remove it. This tank or drum must have a capacity to accumulate and hold free from contamination the volume of oil agreed upon between you and your hauler, and it must be vented to comply with local fire code regulations. It should have a wide opening or a wide-mouthed funnel fastened to a small opening. The opening or the funnel should have an attached lid so that the contaminants from the environment don't enter the tank. The best tanks have designs that have been approved by Underwriter Laboratories, but small oil recycling programs, especially in small marinas, may use sturdy 55-gallon drums. Large rectangular and cylindrical fiberglass and steel tanks as well as steel drums are available for this type of recycling. Because many of these hold hundreds of gallons, the opening may be high above ground level. Many ports or terminals with oil recycling facilities have installed stairs to provide comfortable access. Stairs should be wide and sturdy so that a person can carry a large bucket or jug to the opening and pour into the receptacle without falling, losing his balance, or spilling oil. They should be high enough so that the average person pours from a waist high position rather than pouring at shoulder height. Stairs that terminate too soon will position the pourer awkwardly. Steep stairs will throw the person off balance and make carrying difficult.

Many marinas with existing used oil recycling programs share a common problem in used oil recycling. Boaters or crewmen, uncomfortable with dumping the oil into a large tank because of poor accessibility, oil-contamination on the outside of the tank, or just plain laziness, leave 2-, 5- or 10-gallon jugs on the ground next to the tank. Leakage is possible. This unsightly and unsafe situation can be avoided by taking the steps mentioned above to ensure the good quality of your receptacle, and by considering a program that leaves all the dumping to a member of your staff. Consider this problem as you design your program.

Recycled oil is often accompanied by used engine oil filters. A rectangular or cylindrical drum next to the used oil tank is the most convenient location for the crewman or boat operator to dispose of these at the same time. Many terminals and marinas along the Gulf Coast use 55-gallon drums for this purpose. Filters are sometimes crushed on site to squeeze out the oil. They can also be punctured and tipped on end to drain, a 24-hour process. Although many marinas currently dispose of the filters at a landfill, they can be recycled. The size and type of receptacle will depend upon how you choose to handle this element of your program.



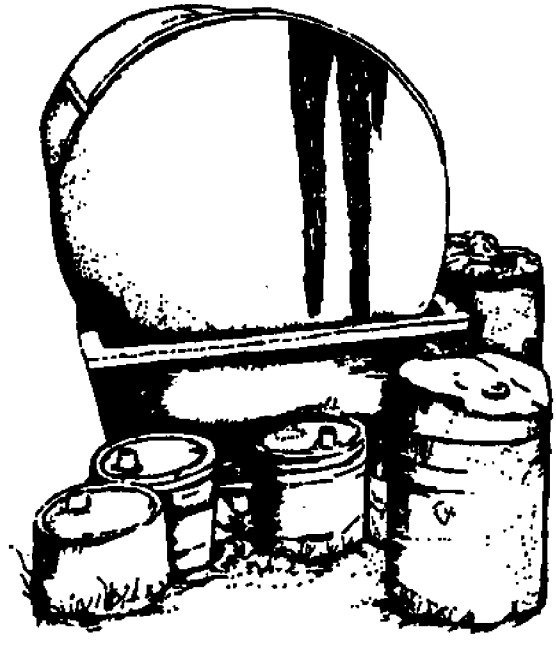
Recycle used engine oil in special receptables.

Several different oil filter crushers are available for on site programs. Consider the spill possibilities when selecting this equipment. Restrict draining or crushing these filters and subsequent used oil dumping to one of your properly trained staff members. For more information on receptacle and crusher vendors in your vicinity, consult the short list of vendors at the end of Chapter 2, the petroleum associations and contacts listed at the end of this chapter, and the Yellow Pages.

No matter how well designed your receptacle, spills will occur. The site of the reception receptacle should be designed to contain or isolate these. The tank should sit on an impenetrable — perhaps concrete — surface with a curb or lip around it to contain oil from spills and splash backs during disposal. Absorbent materials like sand, cedar chips, or cat litter can be placed around the receptacle. Absorbent pads are also available to clean up spills. Some programs try to reduce spillage by restricting the tank to an attendant who pours the oil into the receptacle for the client or crewman.

The receptacle's location is as important as the receptacle's amenities. Isolation must be balanced by convenience and accessibility for those disposing of the oil and those collecting it. If your terminal or marina has a shop area, locate the used oil recycling receptacle adjacent to it. Avoid locating these tanks at the shoreline or on a dock. Some small marinas place the used oil collection receptacle on shore near the fuel dock which is already equipped with spill cleanup materials. A few have placed 55-gallon drums right on a dock. This procedure, a convenient way to group all potential for petroleum spills in one place, might result in disaster. Isolation is impossible at the floating fuel docks, popular at inland marinas. Because the shore area of almost all marinas drains directly into the water, a close-to-shore reception facility is an invitation for a spill to get away before cleanup can be initiated.

Spillage must also be considered in small marinas where an attendant is not practical. Ask your used oil hauler and/or your landfill hauler to help you plan for spills because of the restrictions for disposal of the cleanup materials.



Clients may leave used engine oil for marina to recycle.

Isolation for safety from spills must be balanced by convenience for the recycler and the used oil waste hauler. In large ports or terminals, place receptacle away from the water's edge adjacent to a roadway accommodating a large truck to pump out the oil. Marinas may choose to locate the center at the fueling dock because it is already equipped with spill cleanup equipment. This choice should not be made if the used oil collector cannot pull his truck up to the fuel dock and empty it safely and conveniently. In terminals and marinas with boatyard facilities for engine work, a successful oil recycling program has a used oil tank adjacent to the work area.

One of the best resources in developing a used oil recycling program is a used oil hauler. Some are able to help you set up your program, including the design of your spill contingency plans and making your on-site waste audit.

Licensed Haulers & Careful Contracts

Most haulers who transport used engine oil have tank trucks equipped with pumps or have the capacity to transport 55-gallon drums of it. They have an EPA identification number and in most Gulf Coast states, a permit from their state to haul oil. Some carry with them a contamination test kit to be certain that the oil they are picking up is not contaminated. Those that pick up directly from vessels also have Coast Guard approval for their waterfront activities.

The fee schedule is normally customer specific — a large volume of uncontaminated oil will cost you very little. The contractual price is dependent upon quantity and quality. Because of the growth in the oil reprocessing industry, many of these haulers will collect large volumes of good quality used oil for free. The hauler makes a profit by selling the oil to a broker or producer. The pickup schedule usually fits the needs of the reprocessors. Consider this schedule when planning your program.

Some haulers field test the oil upon pick up; others will accept your certification that contaminants are not present. Generally, your hauler asks you to fill out a form or answer questions resulting in a generator's profile. This describes the types of vessels from which the oil comes and the quantities of oil that can be expected. From this profile, the hauler or his end-customer may ask to lab test your oil. Test results tell the customer or hauler the quality of the oil and, generally, the contaminants in it. (Some contaminants like water and dirt, can be cleaned out in reprocessing.)

Some used oil haulers will take oil filters as well as oil; others will not. Some drain them and sell the scrap steel; others accept drained filters. It is economical to collect filters at a central location and crush many at one time. Don't assume that taking the recyclable used oil guarantees that the filter will be carried away too. Discuss this question with your hauler.

Oil can sometimes be recovered from bilge water using specially designed absorbents that repel water while attracting oil molecules. Some reprocessing centers will squeeze the oil out of these absorbents just as they take it out of used oil filters. A few of the marinas already recycling used oil and used oil filters are selling these absorbents in their stores and regularly recommending that boat owners use them. They have contracted with their used oil hauler to collect the absorbents with the oil and filters. If you decide to add this element to your waste management program, you must be certain that your hauler will accept these oil-soaked absorbents.

Because spills are inevitable, disposal of oil-contaminated absorbents and containment booms must be considered. Try to secure a contingency agreement from your used oil waste hauler to dispose of these materials irregularly when spills occur. Find out whether he has a fee schedule for disposal or whether he will take these materials whenever he takes

oil. Some haulers consider this pickup as part of their contract.

Recycling used oil is one of the best services you can offer your clients while you comply with the law. But among the volumes of regulations associated with this product are many about handling oil and transporting it. Liability for spilling it, disposing of it improperly, or contaminating something (land, water, air) with it must be considered. Discuss your understanding of these laws with your hauler to be certain that you are both in agreement with the state and federal laws regulating used oil recycling in your state. Information is available from the state agencies listed at the end of this chapter. You may want to also consult your own legal advisor. Since most of the Gulf Coast states require them, be certain that you hauler has a permit to carry used oil.

Use your Yellow Pages, the state used oil recycling contacts listed at the end of this chapter to secure haulers' names and telephone numbers.

Preventing Contamination

The best receptacles, spill prevention plans, and cooperative haulers are not enough to guarantee a successful used oil recycling program. It is equally necessary to prevent contamination. Use education and an oil acceptance protocol to keep contamination at a minimum.

Education takes many forms. First, you must educate your staff. Alabama's Project ROSE (Recycled Oil Saves Energy) has materials to brief the staff member handling the used oil. Second, you must educate your clientele. API has developed generic brochures and posters to help clients understand why recycling oil is desirable, how to do it, and where to do it. Install signs to identify the used oil receptacle, and post clear instructions on it for disposing of oil. Safety precautions such as "No Smoking" should also be prominently displayed. Be certain that all staff understand the precautions of your recycling program.

Marinas can benefit from general public awareness about used oil recycling. Alabama's Project ROSE includes pamphlets, newspaper, radio, and television products, and all Gulf Coast environmental quality departments have developed programs for schools and communities. Many of these materials are free. Use them. Visit the local schools to find out which, if any, are already being used in your community.

An oil acceptance protocol gives the client some of the responsibility for recycling used oil. It is a log of all of the oil added to the receptacle. When a person disposing of used oil signs his name, the date, the vessel from which the oil came, and indicates the approximate volume of oil placed in the tank, he also indicates that the oil is free of contaminants. In this manner, you can place some of the responsibility for good recyclable product on your clients. This record can help you locate and remove the source of a contaminant, and provide a good reference for updating your generator profile.

Contacts for Used Oil Recycling

State Departments Specifically For Used Oil Recycling

FLORIDA

Department of Environmental Regulation
Twin Towers Office Bldg.
2600 Blair Stone Rd., Room 238
Tallahassee, FL 32399-2400
(904) 488-0300

LOUISIANA

Department of Environmental Quality
Hazardous Waste Division
P.O. Box 44307
Baton Rouge, LA 70804
(504) 342-4677

MISSISSIPPI

Bureau of Pollution Control
Department of Natural Resources
P.O. Box 10385
Jackson, MS 39289
(601) 961-5171

TEXAS

Recycling & Waste Minimization Unit
Texas Natural Resources Conservation Commission
P.O. Box 13087, Capitol Station
Austin, TX 78711-3087
(512) 239-6750

CLEAN TEXAS 2000 Information Ctr.
(From TX telephones only)
(800) 648-3927

Contacts for HOW-TO Manuals

"A Guidebook for Implementing Curbside and Drop-Off used Motor Oil Collection Programs"
American Petroleum Institute
1220 L St. NW
Washington, D.C. 20005
(202) 682-8229

Government Institutes
4 Research Place, Suite 200
Rockville, MD 20850
(301) 921-2300 (for publ. catalog)

"A Practical Guide to Establishing A Community Used Oil Collection Program"
Texas Natural Resource Conservation Commission
Clean TEXAS 2000 Program
P.O. Box 13087
Austin, TX 78711-3087
(512) 239-6945; (800) 648-3927 (from TX telephones only)

"How to Set Up A Local Program To Recycle Used Oil"
EPA publication 530-SW-89-039A
U.S. Environmental Protection Ag.
Solid Waste and Emergency Response
401 M St. SW (5-305)
Washington, D.C. 20460
(800) 424-9346

"Managing Oily Waste and Garbage From Ships"
U.S. Coast Guard
Marine Environmental Protection Div.
Washington, D.C. 20593

Associations & Other Contacts

Alabama Waste Exchange
The University of Alabama
P.O. Box 870203
Tuscaloosa, AL 35487-0203
(205) 348-8401

American Petroleum Institute
1220 L St., NW
Washington, D.C. 20005
(202) 682-8343

Assoc. of Petroleum Re-Refiners
P.O. Box 605
Buffalo, NY 14205
(716) 855-2757

Environmental Protection Agency
Office of Solid Waste
401 M St. SW
Washington, D.C. 20460
(800) 424-9346

EPA Region 4 (includes MS, AL, FL)
U.S. EPA Region 4
345 Courtland St. NE
Atlanta, GA 30365
(404) 347-4727

EPA Region 6 (includes LA, TX)
U.S. EPA Region 6
First Interstate Bank Tower
1445 Ross Ave. Suite 1200
Dallas, TX 75270-2733
(214) 665-6444

Florida Petroleum Council
First Florida Tower, Suite 800
215 South Monroe St.
Tallahassee, FL 32301
(904) 561-6300

Mid-Continent Oil & Gas Association
Louisiana Division
801 N. Blvd., Suite 201
Baton Rouge, LA 70802-5727
(504) 387-3205

Mid-Continent Oil & Gas Association
Mississippi-Alabama Division
188 E. Capitol St., Suite 805
Jackson, MS 39201
(601) 948-8903

Keep America Beautiful Inc.
9 W. Broad St.
Stamford, CT 06902
(203) 323-8987

National Association of Recycling Industries, Inc.
330 Madison Ave.
New York, NY 10017
(212) 867-7330

National Assoc. of Solid Wastes Mgmt.
1730 Rhode Island Ave. NW, Ste. 1000
Washington, D.C. 20036
(202) 659-4613

National Oil Recyclers Association
2266 Bellfield Ave.
Cleveland, OH 44106-3126
(216) 791-7316

National Petroleum Refiners Assoc.
1899 L St. NW
Washington, D.C. 20036
(202) 457-0480

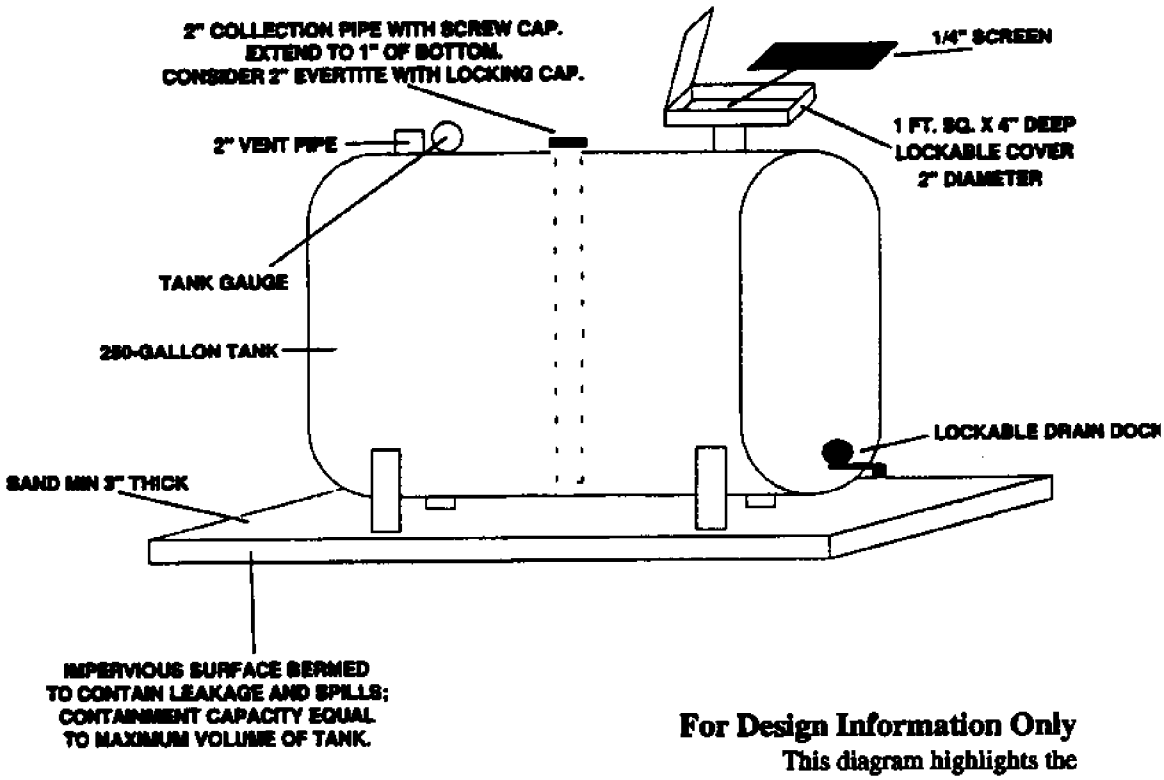
Pensacola Pollution Control Inc.
(hauler/reprocessor serving Alabama and Florida to Apalachicola)
Box 39
Ellyson Industrial Park
Pensacola, FL 32514
(800) 642-7445

RENEW (a waste exchange)
Texas Natural Resources Conservation Commission
P.O. Box 13087
Austin, TX 78711-3087
(512) 239-3171

Southern Waste Information Exchange Svc.
P. o. Box 960
Tallahassee, FL 32302
(800) 441-7949

Texas Mid-Continent Oil & Gas
1115 San Jacinto Blvd., Suite 275
Austin, TX 78701-1906
(512) 478-6631

SAMPLE OIL COLLECTION TANK DESIGN

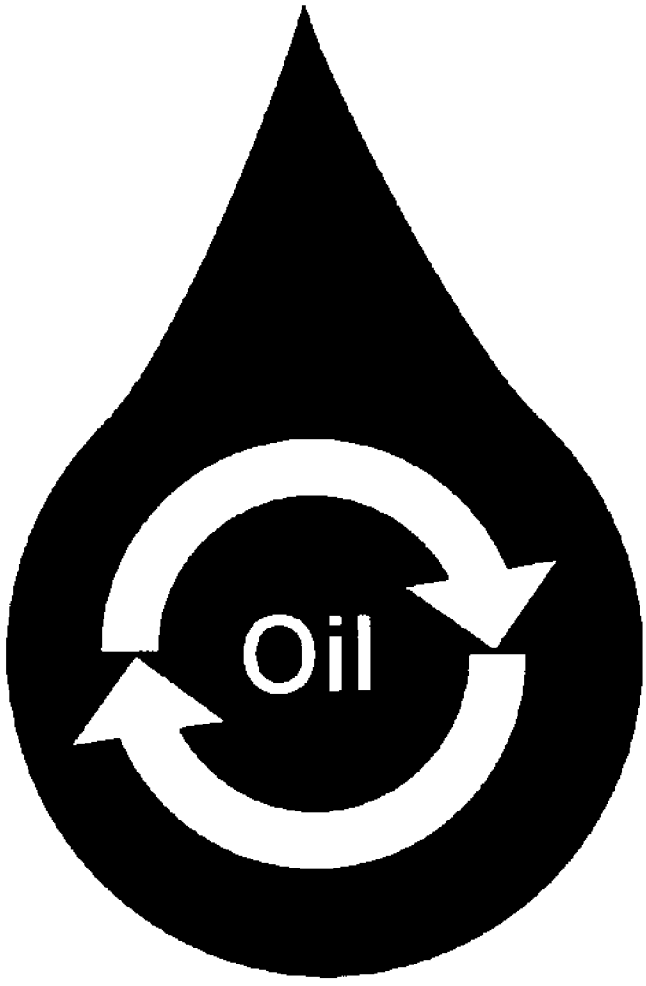


For Design Information Only

This diagram highlights the essentials of an environmentally-safe collection tank for recycling used oil. The amentities on the tank are described to provide a checklist for those establishing a used oil recycling program. The diagram does not represent an endorsement of any particular receptacle nor does it represent the only tank design that may be used for collecting used engine oil.

Design adapted from information provided by the U.S. Environmental Protection Agency Solid Waste and Emergency Response Divison.

RECYCLE USED OIL HERE



POSTER COURTESY OF THE U.S. ENVIRONMENTAL PROTECTION AGENCY
SOLID WASTE AND EMERGENCY RESPONSE DIVISION

Used Engine Oil

Privately owned vehicles annually generate over 300 million gallons of used crankcase oils. The majority — about 200 million gallons — is generated by do-it-yourselfers who change their own oil. A great deal of this oil eventually enters coastal waters through surface runoff, groundwater, and sewers. In fact, about 15 million gallons of oil are annually discharged into coastal waters after passing through sewage treatment plants — twice as much as is discharged from marine accidents.

To reverse this trend, recycle engine oil following the **Do-It-Yourself DOs** and **DON'Ts.**

Do-It-Yourself
DON'Ts

DON'T empty used oil into sewers. It disrupts treatment plants or damages marine life in waterways.

DON'T dump onto ground to kill weeds or suppress dust. It enters the groundwater and may end up damaging marine life in a waterway.

DON'T throw it into the trash. Once in a landfill, it enters the groundwater and may contaminate ground or surface water.

DON'T use dispersants (soap and surfactants) on small oil spills or in the bilge. This just moves the petroleum from surface to subsurface areas.

DON'T place anything except used engine oil in oil reception facilities in the marina. Even other petroleum products will contaminate this resource and make it difficult, possibly too difficult or expensive, to recycle.

Oil Can Harry Says...

Recycling Oil Saves

Do-It-Yourself
DOs

DO keep engines tuned and operating at peak efficiency.

DO add oil to most marine engines and to fuel tanks on two-stroke engines only at the marina's fueling dock — spill containment equipment is already present.

DO inspect lines and hoses for deterioration; secure lines and hoses to prevent them from chafing.

DO place used engine oil only in oil reception facilities in the marina. It will be recycled.

DO place an oil absorption pad into the bilge and below the engine to collect oil drips.

DO place used oil filters and oil absorption pads in proper leakproof collection receptacles at your marina.

When replacing an outboard motor, **DO** consider a four-stroke instead of a two-stroke engine because it does not require oil in the fuel tank.

It's the Law

- According to Coast Guard regulations: Boats over 25 feet must display an "Oil discharge is prohibited" sign in the engine compartment. If oil or oil waste is intentionally discharged from a vessel or into the bilge of a vessel so that it reaches the water, fines up to $20,000 are possible. In addition, the boater is responsible for the costs of environmental clean-up and damage claims.
- According to Coast Guard regulations: In U.S. waters, no liquid detergent or other dispersant may be used on an oily sheen resulting from an accidental discharge of any petroleum product. Fines up to $25,000 are possible.

Chapter 8
OTHER RECYCLABLE MATERIALS

Vessel and engine maintenance generate a couple of products which are recyclable: antifreeze and batteries. The former usually results from preventive maintenance on keel coolers of larger commercial and recreational boats; the latter, from the outboards on smaller recreational boats. Both are toxic to the marine environment. Since these products will appear in the waste stream, it is in both a terminal's and a marina's best interest to encourage their clients to dispose of these products on shore instead of overboard.

OTHER RECYCLABLES

ELIGIBLE PRODUCTS IN WASTE STREAM
- Vessel maintenance products like antifreeze and used batteries

RECYCLING POSSIBILITIES
- Many federal and state laws regulate battery disposal
- Antifreeze industry has developed a recycling program
- Batteries are recycled in most states
- Battery manufacturers take back used batteries

WHAT DOES THIS MEAN TO PORTS & MARINAS?
- Recycling market is available
- Program could be added to port and marina recycling programs

WHAT DOES A PROGRAM NEED?
- Receptacles
- Hazardous waste haulers
- Contacts within the two industries

Although antifreeze is classified as a toxic waste by the EPA, it is actually just ethylene glycol, a biodegradable product. The contaminants from the cooling system and the deterioration of an added rust inhibitor in this coolant are toxic, making periodic replacement of antifreeze necessary. This product must be taken to a hazardous waste disposal site.

Antifreeze is completely recyclable. In fact, Prestone Corporation Products of Danbury, Connecticut, markets a do-it-yourself kit that includes everything needed to drain, recondition, and refill an auto's cooling system using only a garden hose. This company also has a community antifreeze recycling program that includes plans for a mobile collection system, and a central service center to recondition the antifreeze using a larger version of the do-it-yourself kit. They even provide educational materials. BG Products of Wichita, Kansas, has a process in which the coolant can be cleaned and reconditioned in the engine at automobile repair facilities called the BG Cool'r Clean'r Purification System. Some contacts for these programs are listed at the end of this chapter.

Batteries contain lead and sulfuric acid, both toxic to the marine environment. Most states have lead/acid battery recycling laws; some prohibit dumping them in landfills or burning them in incinerators. As a result of these laws, most battery dealers ask for the old battery when you buy a new one. The old battery core is shipped to a central recycling facility where the battery is disassembled, the plastic case is recycled, the acid is neutralized, and the lead is reclaimed.

What Does This Mean To Ports & Marinas?

Those dockside facilities used by clients for maintenance will have both of these products in the waste stream. Although ports and marinas are not in the business of reconditioning antifreeze or collecting used batteries, both must consider them in devising a waste management program. No matter what provisions are made for antifreeze and batteries in that program, dockside facilities have a

responsibility for encouraging proper onshore disposal because both of these products are dangerous to the marine environment.

Ports will have little more than a facilitator's responsibility for disposal of these products. By providing chief engineers and ship's agents with the local mobile antifreeze recycling service center (if one is nearby), you should keep antifreeze out of your waste stream. Most large vessels will have generators to operate the electrical system as well as batteries for specific uses. Be certain that the ship's agent takes responsibility for trading in old batteries when he arranges for delivery of new ones.

Potential is high for both of these products to appear in a marina's waste stream, but the volume of antifreeze is not high enough to establish a recycling program on site. Those marinas selling new batteries in the ship's store may already be recycling because most manufacturers or distributors take the old batteries when delivering new ones.

Education would be the first element in either a port or marina battery or antifreeze recycling program. Let your clients know that these products kill marine life while providing information about proper disposal of them. Antifreeze should not be dumped into the marina's waters, down the drain, or into the dumpster. Locate an antifreeze service center in your area, or any dealers using similar programs, and post information about them on your marina bulletin board or in your newsletter. Provide information about do-it-yourself kits like Prestone's and, if possible, locate a local vendor.

Batteries sometimes frustrate recreational boaters — especially when they fail or give up on the water. Be prepared to find some in your dumpster or left at dockside. Contract with a local battery vendor to take these or encourage a reliable scavenger to pick them up periodically and take them to a battery vendor.

Receptacles

To keep batteries out of the marina's landfill dumpster, place a smaller, well marked metal receptacle next to it for dead batteries. Some marina operators prefer to post a sign at the dumpster, "No batteries," to avoid having to take them to a battery vendor for recycling. Education is at least as important as a receptacle.

Keep in mind, however, that sometimes a recreational boater is so frustrated when he comes ashore that he is going to dump that battery somewhere, and soon. You must decide whether you want to take a chance that he will see your "No Batteries" sign and take the battery along, or, in anger and frustration, drop it in your dumpster.

Haulers

Few independent haulers contract to take batteries and/or antifreeze for recycling. Sometimes those hauling oil and oil filters have a vendor for these products. More often, you will have to contract with your landfill hauler or a hazardous waste hauler to remove these products from a terminal or marina. Encouraging the boat operators to recycle these products is the easiest method.

Contacts for Disposing of or Recycling Antifreeze and/or Batteries

State agencies:

FLORIDA
Department of Environmental Regulation
Twin Towers Office Bldg.
2600 Blair Stone Rd., Room 238
Tallahassee, FL 32399-2400
(904) 488-0300

LOUISIANA
Dept. of Environmental Quality
Hazardous Waste Division
P.O. Box 44307
Baton Rouge, LA 70804
(504) 342-4677

MISSISSIPPI
Bureau of Pollution Control
Department of Natural Resources
P.O. Box 10385
Jackson, MS 39289
(601) 961-5171

TEXAS
Recycling and Waste Minimization Unit
Texas Natural Resources Conservation Commission
P.O. Box 13087, Capitol Station
Austin, TX 78711-3087
(512) 239-6750

CLEAN TEXAS 2000 Information Ctr.
(From TX telephones only)
(800) 648-3927

Contacts for Recycling Antifreeze:

Prestone Corp. Products
A division of First Brands Corp.
83 Wooster Rd.
Danbury, CT 06813
(203) 731-2300

BG Products
701 S. Wichita
Wichita, KS 67213
(316) 265-2686

BG Products Distributors by Territory:

[Coastal AL, MS, Lafourche, Iberia, Calcasieu, Cameron, St. Mary, Tangipahoa, Terrebonne, Vermilion Parishes, LA]

Martins Distributing Co.
72367 Live Oak Loop
Abita Springs, LA 70420
(504) 893-4668

[St. Tammany, Orleans, Plaquemines, St. Bernard, Jefferson, St. John the Baptist Parishes, LA]

Martin's Specialty Supply
39049 Doll Factory Rd.
Pearl River, LA 70452
(504) 586-8599

[Bay, Gulf, Franklin, Wakulla, Taylor, Leon, Dixie, Levy, Walton, Jefferson, Escambia, Santa Rosa, Okaloosa Counties, FL]

Dealer Services Inc.
1161 Walden Dr.
Tallahassee, FL 32311
(904) 942-7355

[Citrus, Hernando, Pasco, Pinellas, Hillsborough Counties, FL]

Bar G. Enterprises Inc.
P.O. Box 2006
Palm Harbor, Fl 34682-2006
(813) 784-0986

[Charlotte, Collier, Lee, Manatee, Monroe, Sarasota Counties, Fl]

Fox Distributing Co.
23152-C Harbor View Rd.
Port Charlotte, FL 33980
(813) 426-1288

[Brazoria, Matagorda Counties, TX]

Lubrication Specialists Inc.
P.O. Box 75369
Oklahoma City, OK 73147
(405) 943-4429

[San Patricio, Calhoun, Cameron, Jackson, Kennedy, Nueces, Refugio, Willacy Counties, TX]

Walton Distributing Co. Inc.
P.O. Box 790036
San Antonio, TX 78279-0036
(210) 344-6277

[Chambers, Galveston, Jefferson Counties, TX]

Industrial Lubrication Specs.
5906 Dwyer
Humble, TX 77396
(713) 441-1666

Contacts for Recycling Batteries:

Battery Council International
111 East Wacker Dr.
Chicago, IL 60601
(312) 644-6610

Sanders Lead
P.O. Box 707
Troy, AL 36081
(800) 633-8744

Skuylkill Metals
2400 Brooklawn Dr.
Baton Rouge, LA 70807
(504) 775-3040

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