



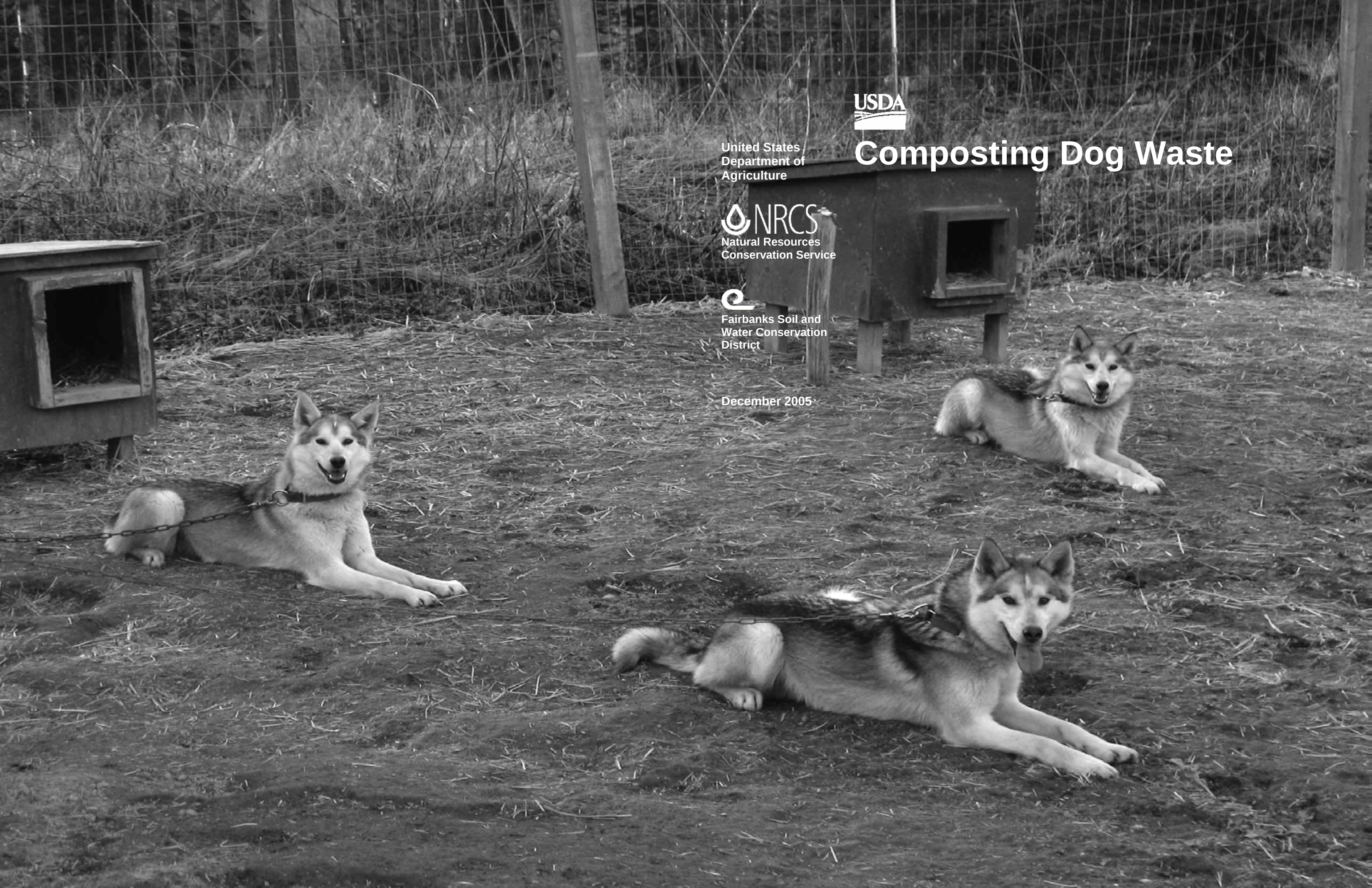
United States
Department of
Agriculture

Composting Dog Waste

 **NRCS**
Natural Resources
Conservation Service

 **Fairbanks Soil and
Water Conservation
District**

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Credits

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Introduction

Archeological evidence shows that dogs have been used in Alaska for hundreds of years as transportation, hunting, and pack animals. The tradition of living close to canines continues today as Alaska dogs function as devoted pets, competitive athletes, and tireless laborers.

The Environmental Protection Agency estimates that the typical dog excretes three quarters of a pound of waste per day—or 274 pounds per year¹.

A musher with a modest-sized kennel of 20 dogs must dispose of more than two tons of dog waste annually!

To get an idea of the scale of the dog waste generated in Alaska, consider that in Fairbanks and Anchorage alone, an estimated 20 million pounds of dog waste is produced each year.

Left alone, dog waste can pollute ground and surface water, attract flies and pests, cause an unpleasant odor, and create unsanitary living conditions for dogs.

Dog waste can also transmit parasites and infectious diseases.

Composting dog waste is a simple and inexpensive method for disposing of dog waste that can enhance the environment and reduce the amount of waste deposited in landfills².

Dog waste is a safe soil additive for revegetation and landscaping when it is composted properly.

The goal of the study was to develop easy yet effective dog waste composting practices that reliably destroy pathogens found in some dog feces.

This publication draws upon the results of the original study and more than a decade of additional experience.

The Benefits of Composting

- Composting removes raw dog waste from the environment where it can pollute groundwater and streams.
- Good composting destroys pathogens and produces a safe soil amendment.
- Good on-site composting eliminates transporting dog waste to a disposal facility. This saves time, money, energy, and landfill space.
- Good composting produces a quality soil additive that improves both the physical condition and fertility of the soil.



Composting can reduce the volume of dog waste by 50 percent. The mature compost pile in the foreground once filled the bin seen in the background.

The Dog Waste Compost Study

In 1991 the Fairbanks Soil and Water Conservation District, with technical assistance from the USDA Natural Resources Conservation Service, conducted a study with dog kennel operators to evaluate the possibility of composting dog waste in northern climates.

¹ The actual volume of dog waste depends on the dog and its diet. Working dogs that are fed high protein, high energy diets of concentrated feed will produce less waste than less active dogs that are fed a less concentrated feed.

² This study only included dog waste. Cat and other pet wastes were not studied. Cats may carry parasites that are harmful to human fetuses. We do not recommend adding cat waste or cat litter to your compost.

Uses for Dog Waste Compost

Compost is an excellent source of organic matter to add to your garden or potted plants. It helps improve soil structure which contributes to good aeration and moisture-holding capacity. Compost is also a source of plant nutrients.

Compost can also be used as a mulch material.

Dog waste compost can be used as a soil additive for revegetation, lawn establishment, and planting beds. It should not be used on crops grown for human consumption. When used in a potting mix or flower beds, a 25 percent compost blend is recommended. Compost has a relatively high salinity and is not recommended for germinating seedlings.

What is Composting?

Composting is the controlled breakdown or degradation of organic material into a product known as humus. Dog waste composting is a natural process that requires air, water, organic matter, microbes and a little human intervention.

Supplies

Composting requires a supply of nitrogen-rich materials (sometimes referred to as green or wet materials) and carbon-rich materials (dry or brown materials).

Nitrogen rich (wet) materials include:

- dog waste
- green grass clippings
- vegetable waste
- other animal manures
- bagged fertilizer

Think Protein!

Nitrogen is a major component of protein, so when you look for nitrogen rich materials for your compost, look for materials high in protein like fish waste, blood meal, cottonseed meal, and some kitchen scraps.

Carbon rich (dry) materials include:

- sawdust
- chopped straw or hay
- shredded newspaper
- dog bedding
- fallen leaves

- A long-stemmed thermometer is necessary to monitor compost temperature and can be found at some garden supply stores.
- You might find a moisture meter helpful for monitoring the moisture content of the compost pile.
- You will also need a shovel or fork for turning the compost. Our experience was that a long-handled hay fork is easiest to use when turning and mixing, while a shovel is handy for adding and measuring ingredients.
- You will need some kind of bin to contain the composting material. You can compost in a pile or a pit, but it will be difficult to reach the high temperatures needed to destroy pathogens and the process will take longer. Bins improve aeration and facilitate easy turning of the compost. See bin designs on page 4. You will

need at least two bins, one for collecting waste while the other is actively composting.

- You will also need a reliable supply of water. Although water from a garden hose is fine, you may want to temper your water by letting it sit in the sun to warm before adding it to the compost. Cold water, even from rain, will lower the temperature of the compost. This is one reason to keep a cover on your compost bin.

REMEMBER—Small particles have greater surface area than large



particles. The finer your composting ingredients are chopped, the hotter your compost will be and the faster it will

progress. The best carbon source identified in our study was fine sawdust like that found at a woodworking shop or construction site.



Dog bedding is a ready source of carbon rich material in some kennels.

Composting Dog Waste—Step by Step

There are two methods you can use to build your compost pile. The first is to collect the materials separately and then mix them all at once. The advantage of this method is that the materials will not begin to decompose until mixed. You will get the highest temperatures and the fastest compost when dog manure, carbon, water, and air are all introduced at the same time. However, this method might have a higher “gag factor.”

The second method is to add the carbon source to the dog waste as you collect it from the dog yard and mix it as it is placed in the bin. This method is easier and as long as the pile remains dry, very little decomposition should happen until you are ready to turn the pile and add water. Because the pile of mixed dog waste and carbon will have a less offensive odor than if the materials are collected separately, many people prefer this method.

- To begin, choose a sunny, dry site near the dog area for your compost bin. The site should not be near pregnant or nursing dogs, or where runoff from the pile would flow into the dog yard.
- For every two shovels full of dog waste, add one shovel full of sawdust or other carbon source. Mix thoroughly after each addition.
- Add water in small amounts until the compost mixture is as moist as a wrung out sponge.
- Continue adding ingredients until the compost is two to three feet deep. Once a bin is full, do not continue adding fresh materials.
- Place a cover on the compost mixture. Microbes will begin breaking down the organic materials. As the microbes go to work, they release heat and increase the temperature of the compost pile.
- Insert the compost thermometer daily and record the internal temperature. When the temperature starts to decline—usually in two weeks—it is time to turn the compost.

Compost Recipe

Proportions:

- 2 shovels full of dog waste
- 1 shovel full of sawdust or other carbon rich material

Build the pile:

- Thoroughly mix sawdust and dog waste, adding water as you go.

Keep covered and let it “cook.”
When the temperature drops, turn the pile.

Repeat until the temperature stops rising after turning.

Cooking time varies from 6 to 8 weeks.

- Turn the entire compost pile—from the outside to the inside—in order to ensure that all the material reaches the high temperatures needed to kill pathogens. Repeat the turning process each time the internal temperature of the compost drops. After several cycles, the compost will not heat up. This indicates that the compost process is complete.
- Cure your finished compost for several months or even a year before using it. This will stabilize the pH and ensure that the decomposition process is complete.



REMEMBER—It takes at least 10 dogs, preferably 20, to generate enough waste to maintain a bin.

A large pile (3 to 5 foot cube) is needed to provide insulation and keep temperatures high in the pile’s center. For fewer dogs you can keep a separate compost bin for dog waste and add grass clippings or other nitrogen sources to increase the volume. Treat the finished compost as you would other composted dog manure.

Compost and Temperature

The temperature of a compost mixture is very important. It reflects the level of microbial activity. The center of the compost mixture is the hottest, so insert the thermometer toward the center when taking the temperature. Repeat this in several places. Write the temperature with any comments in a daily record.

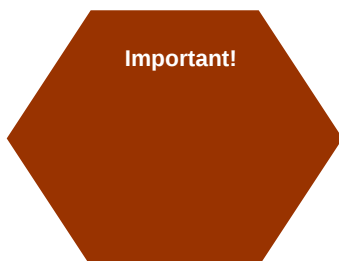
A thermometer and good record keeping are essential to successfully composting dog waste.



Temperatures in fresh compost mixtures rise quickly—up to 160° F and greater—then decline slowly until the compost temperature approaches air temperature. If you do not see this rapid rise and gradual decline of internal temperatures, the compost recipe may need to be adjusted (see Troubleshooting tips on page 8).

Declining temperatures indicate it is time to turn the compost. Take care to mix the outside materials towards the center. It will take several turnings over a period of six weeks or more for the compost to be mature.

Compost temperatures can get too high. Don't plunge your hand into the center of an active compost pile. In very rare cases, extremely high temperatures can cause a pile to ignite. Add water to a very hot pile to quickly drop the temperature.



Composting and Winter

It is possible to compost into the fall, but eventually the cold inhibits the microbial activity. The result is a build up of dog waste in the winter months. With a little planning, the buildup can be added to bins during the winter, and then effectively composted in the warmer months. During the Fairbanks Soil and Water Conservation District study, these steps encouraged good composting throughout the year:

- When clearing waste from the dog area, add the carbon source directly to your bucket, wheelbarrow or whatever receptacle you use for collection. Mix the carbon source and dog waste together, then add the mix to the compost bin.
- Store the compost ingredients directly in the bins; after spring thaw, turn the pile and add water to begin composting.
- Avoid mixing excess snow with the dog waste.
- Don't let your pile grow too large. If your winter compost pile will exceed five feet across before spring, either start a second pile or consult local NRCS staff for more information on large-scale animal waste composting systems.

Compost Bin Designs

There are many bin designs to choose from and new ideas come along every year. Spend a little time learning about bins now, and you might save yourself frustration and expense later on. Choose a system that meets your individual needs and fits your site.

Wire Cylinder

Wire bins were overwhelmingly preferred by mushers participating in the Fairbanks study. They are inexpensive and can often be built from materials on hand (see instructions on page 7 to easily construct this bin). Some have a wooden frame to provide support, and many can be made larger or smaller to accommodate the amount of material available for composting.



The compost material in wire bins is very easy to turn. The bin can be disassembled then reassembled next to the compost pile. The compost is then turned back into the same bin.

Wire bins allow the most air to reach the material, resulting in high compost temperatures and more complete destruction of pathogens. Wire bins produce hot, fast compost that will mature quickly, but the bins need to be tended more intensively than do other designs.

Wire bins are a good choice where rodents or other pests are a problem.

One drawback to wire bins is that they do not retain heat as well as plastic or wood bins and so probably are not a good choice for cool, wet climates or areas with an extremely short compost season.

Some wire bins are not very sturdy and can be crushed in a busy dog yard. Don't expect light weight wire bins to last more than a few years.

Wire Bin (Puppy Pen)

Puppy pens are a good choice for composters with only a few dogs and who plan to add a lot of leaves and grass clippings to their compost. You can find commercial versions of these wire bins, which makes them convenient for those who don't want to build their own.



Be aware that wire bins with large openings may have trouble containing compost. But like other wire bins this design provides the most air to the compost material, which produces hot, fast compost.

Wire bins do not retain heat as well as plastic or wood bins. They are probably not a good choice for cool, wet climates or areas with a frost-free season of two months or less.

Rigid Plastic Bins

These bins are small and blend in with gardens and landscaping. They tend to stay warmer in cool, wet weather than some of the other designs, which can extend the composting season into the fall months.



If time to tend the pile is limited, then rigid plastic bins are a good choice. You can add material at the top and use an aerator tool for mixing. Finished compost is extracted from an opening in the bottom.

These bins allow less air to reach the material than do wire bins and therefore do not reach the high temperatures you can expect with wire bins. They also are too small to compost waste for large numbers of dogs.

Pallet Bin

Wooden bins that are made from pallets or slab wood are cheap and effective. You can build a bin with four pallets and a few feet of twine in less than an hour.



Pallet bins are not very flexible in terms of size, are very heavy and can make turning the compost difficult. Wood tends to decompose over time and bins will have to be replaced after a few years—particularly in wet climates.

Pallet bins are an excellent choice for storing carbon materials and finished compost.

Pallet bins allow the compost material to receive plenty of air but they are not a great choice if rodents or other pests are a problem. Lining a pallet bin with hardware cloth is an option if pests are a problem.

Tumbler Bins

Tumbler-type compost bins tend to be more expensive to build or purchase. Some incorporate a pipe for passive aeration but all are intended to be rotated to stir the compost.



For many tumbler models, rotating the bin is more difficult than it looks. Physics is on your side but you are still moving the entire contents of the bin at one time. Some bins have the annoying habit of losing the lid and dumping the contents on your feet. If possible, try using the tumbler before you purchase it.

These bins should not be filled more than about one-half full to leave room for mixing. Tumblers allow less air to reach the compost material than do many other systems and do not reach the high temperatures you can expect with wire bins.

Stacking Type

You can purchase a three-tier stacking bin made of recycled plastic or build your own out of wood. Either way, this kind of bin is easy to turn and very tidy looking.



These bins share many of the drawbacks of the rigid plastic bins. They are small and do not allow a lot of air to reach the compost material, but they retain heat well and may extend the compost season.

Passive Aeration

Passive aeration can be used with a variety of bin types. The idea is to get oxygen into the center of the pile without having to turn or stir the compost. Perforated pipe is inserted into the compost as the pile is constructed. The ends of the pipe are left open to allow air exchange.



The initial construction of a passive aeration system requires a little more forethought and a lot more management than a turned pile, but it eliminates much of the work. The compost temperature should

be monitored and water must still be added regularly.

One step up from the passively aerated pile is a forced air system where a blower or pump is connected to pipes to force air into the center of the pile.

For help designing forced aeration and other complex systems consult NRCS or another qualified professional.

Compost Maturity

The easiest way to determine if compost is mature—meaning all the organic materials have degraded—is by monitoring the temperature. If, after several turnings, rewetings and aerations, the compost does not reheat spontaneously, it is probably mature.

Compost maturity has important implications for plant growth. The final step in composting is to cure the compost for at least a month and preferably over winter.

Cured compost does not compete with plants for nutrients. If unfinished compost is mixed into the soil, it may tie up oxygen and nutrients necessary for plant growth. These nutrients are not gone from the soil, but made unavailable to the plants until the organic matter is broken down.



Mature compost has a dark color, is moist and crumbly, and has a pleasant earthy odor.

Health Concerns

All compost contains mold and fungus spores which may cause an allergic response in sensitive individuals.

Keep animals, particularly puppies and pregnant females, away from the compost area to prevent transmitting any disease to other dogs, livestock, and wildlife.

Dogs can transmit diseases to humans regardless of whether you are petting a dog or shoveling waste into a compost bin. Children can be at greater risk because they frequently put their hands and other items in their mouths.



REMEMBER—The best way to decrease health risks associated with dog waste is to have healthy dogs. Follow a worming schedule developed by a veterinarian familiar with local conditions.

Health risks vary depending on the climate, so ask a local veterinarian to recommend a parasite control program suitable for your area.

Although there are many potential pathogens, the primary agents for disease are roundworm eggs. They are too small to see with the human eye. Dogs become infected with roundworms by swallowing the eggs in soil where other dogs have defecated. Infected female dogs pass on roundworms to their puppies. Roundworm eggs hatch in the dog's intestine, migrate through the liver and lungs and return to mature in the intestine. The adult roundworm lays eggs which are passed on to the soil, thus completing the life cycle. If humans ingest the eggs, they hatch in the intestine and migrate to other body tissue like lungs, liver, and spinal cord. The larvae can even attack the retinas in the eye.

In certain geographical areas, other parasites may be a problem. One tapeworm (*Enchinococcus sp.*) found in remote regions can produce life-threatening cysts if ingested.

Disease transmission from most parasites one might encounter when composting dog waste can be avoided by not coming in contact with the eggs.

Do not compost waste from dogs showing signs of disease or illness. This waste should be disposed of in another manner.

Decrease health risks by:

- Wearing rubber gloves and always washing hands after handling dogs or dog waste
- Confining dog waste to a specific area
- Not including waste from unknown dogs
- Keeping dog waste tools and clothing separate from other tools and clothing
- Not feeding dogs raw meat or fish
- Do not allow children to play in areas where dog waste compost has recently been applied
- Consulting a veterinarian about a parasite control program for your area
- Not applying dog waste compost to crops intended for human consumption

Building A Wire Compost Bin

Materials:

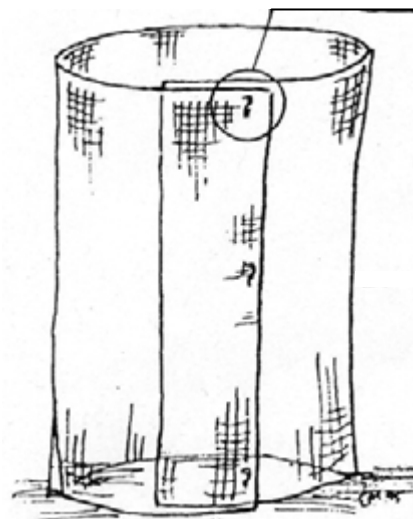
- ✓ 10' of ½" hardware cloth, 3' wide
- ✓ 3 swivel snaps
- ✓ Wood or plastic for bin cover

Tools:

- ✓ Wire cutters
- ✓ Gloves
- ✓ Tape measure

Cut a 10' length of hardware cloth. The cloth will naturally form a circle because it has been stored in a roll. Overlap the edges of the cloth by at least 6". Use the wire cutters to remove one side of a ½" square. This makes it easier to clip the swivel snaps into the hardware cloth. The cut will need to go through both layers of hardware cloth. Make three of these cuts evenly distributed along the overlap as shown in the drawing. Clip the bin together using the three swivel snaps. Stand the bin upright and fill the bin with materials to be composted. Cover the bin with a sheet of plastic or piece of plywood to retain heat and keep out rain.

Finished Bin



Clipping the Bin Together



Brass Swivel Snap



Troubleshooting

Condition	Possible Cause	Solution
Compost does not heat up or heats up slowly	➤ Not enough nitrogen source	Add dog waste or other nitrogen source
	➤ Not enough moisture	Add water
	➤ Not enough air	Turn compost pile
	➤ Too much moisture	Add dry materials, mix and cover
Compost smells bad	➤ Too much nitrogen source	Add sawdust or other carbon source
	➤ Too much moisture	Add dry materials, mix and cover
	➤ Not enough air	Turn the compost pile and/or consider an alternative bin design
Fly infestation	➤ Fresh materials near the surface	Cover new compost with a layer of finished compost, sawdust or wrap bin in porous weed control fabric
Extremely high temperatures in excess of 160°F	➤ Compost pile too large or too much air	Divide compost, add water and turn You can add water in an emergency to quickly lower temperatures

Kennel Name _____

Starting Date _____

[illegible]