

# Not Just Dirt: An Analysis of Composting Policy in the State of Vermont

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## **Abstract**

Due to the growing amount of waste generated within the state and the rising cost of current methods of waste management, Vermont is facing a future in which current waste management practices look increasingly unsustainable. Composting the organic portion of the waste stream has emerged as an environmentally friendly and economically viable option. To fully appreciate the need to consider composting as an option, this thesis first explores the history of waste management in the United States and then the history of waste management in Vermont to highlight the lessons that have already been learned. It then examines various successful composting policies throughout the nation to provide examples of potential tactics that Vermont could adopt. It concludes with two examples from Vermont, the Intervale and Vermont Compost Company, which have experienced difficulties operating under current composting regulations. It recommends that Vermont composting policy change to promote greater composting statewide, reducing waste and generating a useful product.

## **Introduction**

Proper waste disposal has become a big problem in recent years. As resources dwindle and new science emerges identifying more and more dangers resulting from improper waste disposal, policy makers have started to search for methods that utilize waste. Waste management has begun to look at the various components of the waste stream instead of viewing it as a single entity. The organic portion of the waste stream has been identified as a segment that can be dealt with in a more environmentally friendly and productive fashion. While once seen as only waste, it is now viewed as a resource that can be utilized. For Vermont, a small agricultural state in the northeastern United States, this change in attitude is desperately needed.

To understand not only how important revisions to current waste legislation are but also the choices that we are faced with, one must first look at the history of waste disposal within the United States. Through this history, one can trace the changing attitudes in society, starting with conscious and thrifty settlers who could often only afford the basics as they tried to start new lives and improve their conditions. In many ways these settlers could not afford to generate a lot of waste.

However, industrialization ushered in not only a new way to produce goods but also a new way to look at waste. For consumers, it came to down to the fact that, in many cases, it was actually cheaper to buy a new product than it was to repair an old product. As a result, waste generation increased and the country looked to various disposal methods, from incineration to reduction. Recycling and composting, once so common, became less frequent.

The prosperity that flooded the United States after World War II again altered the waste stream in the country. In the consumer economy of the postwar era, the pursuit of desires

replaced that of mere needs. This mass consumption, combined with the built-in obsolescence that increasingly characterized the production of consumer goods, led many people to dispose of unwanted items with an almost carefree abandon. However, as waste disposal costs rose and landfills started to reach peak capacity, such habits seemed increasingly unsustainable. One result of this was that composting was incorporated as an alternative waste disposal method into some state waste management strategies during the latter part of the century.

Vermont was not immune from these national trends. Within this small state, waste management issues became a prominent topic in the latter part of the twentieth century. Recycling facilities were built and efforts were made to close all landfills that did not meet safety standards. Composting organic material from the waste stream was researched by the state because it reduced the total amount of waste needing to be disposed of. Initially, composting was seen as a less ideal option because it cost more than other disposal options at the time and has not been seriously considered as a waste disposal technique until the last few years.

Composting, which is a viable option for dealing with the organic material in the waste stream, has evolved into a more scientifically based process than it was in the past. It is now recognized as a valuable soil enhancer,<sup>1</sup> where heat generated through the decomposition process has sanitized the material, reducing pathogens.<sup>2</sup> It can be used for a variety of purposes, from preserving topsoil to preventing erosion to increasing water retention in the soil.<sup>3</sup> The process

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<sup>1</sup> "Composting: Basic Information," *U.S. Environmental Protection Agency*, 20 November 2006, <<http://www.epa.gov/epaoswer/non-hw/composting/basic.htm>> (28 July 2007).

<sup>2</sup> "STA Program Details," *U.S. Composting Council, United States Government*, 2002, <<http://www.compostingcouncil.org/section.cfm?id=37>> (6 August 2007).

<sup>3</sup> "A Watershed Manager's Guide to Organics: the Soil and Water Connection," *Composting Council Research and Education Foundation*, March 1997.

reduces the amount of organic material involved as some of the biodegradable components are converted to carbon dioxide.<sup>4</sup>

Modern compost is created by combining organic wastes with bulking agents until the material is stabilized. Organic wastes include such things as yard trimmings and food waste while bulking agents include such things as wood chips.<sup>5</sup> The success of composting depends on the natural materials involved and the moisture content. The carbon to nitrogen ratio should be kept at approximately thirty parts carbon to one part nitrogen measured by weight for optimal composting. If there is insufficient nitrogen, the process slows and if there is too much, there is a build-up of ammonia gases, leading to an unpleasant smell.<sup>6</sup> A good general guideline when trying to ration carbon and nitrogen is that green and moist materials are typically high in nitrogen while materials that are brown and dry are typically high in carbon.<sup>7</sup> The compost has reached maturity when the temperature becomes stable.<sup>8</sup>

Current policies and regulations within the state have made pursuing composting difficult. Other states have developed policies to accommodate further composting, which can serve as a guide to Vermont. While Vermont is unique because of its size and largely agricultural landscape, it can still learn from the states around it to create a policy of its own.

I hope to demonstrate that Vermont needs to take steps towards further compost implementation as a waste management technique. The state is not alone in its quest to find alternative waste disposal options and it has the ability to promote environmentally friendly

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<sup>4</sup> "Composting Process," *Ecochem: Solutions to Heal a Damaged Environment*, 2007, <[http://www.ecochem.com/t\\_compost\\_faq2.html](http://www.ecochem.com/t_compost_faq2.html)> (15 August 2007).

<sup>5</sup> "Composting: Basic Information"

<sup>6</sup> "Composting: The Basics," *HowToCompost.org: Your Compost Resource*, 2006, <[http://www.howtocompost.org/info/info\\_composting.asp](http://www.howtocompost.org/info/info_composting.asp)> (15 August 2007).

<sup>7</sup> "Compost Chemistry," *Cornell Composting: Science & Engineering; Cornell Waste Management*, January 2002, <<http://compost.css.cornell.edu/chemistry.html>> (15 August 2007).

<sup>8</sup> "Composting Process"

techniques. Greater compost production in the state will not only divert a significant amount of organic material from the waste stream but it will also produce a useful product to enhance soil quality. This thesis does not attempt to dictate what state policy makers should do; rather, intends to call attention to a promising technique in waste management.

## Chapter I

### Literature Review

Composting is a broad topic on which a lot has been written. I chose to place composting in the broader context of waste management, which not only demonstrates the need for waste management revision but also highlights its evolution as a waste management option. From this point, I explored Vermont's waste management history in an effort to demonstrate that Vermont is not alone in the challenges that it is currently facing. History has taught us a lot about waste management and provides us with a number of lessons. From this, I provide a number of examples of composting policies and projects to show both successful and unsuccessful programs from which Vermont can learn. The Intervale and Vermont Compost Company are topics addressed at the end of this paper to reiterate the fact that Vermont and Vermonters are facing a number of challenges with current policies. I will address the literature on each of these subjects.

First, I found ample information on the history of waste management in the United States. I relied heavily on the works *Designing America's Waste Landscapes* by Mira Engler, *Gone Tomorrow: The Hidden Life of Garbage* by Heather Rogers, *Garbage in the Cities: Refuse, Reform and the Environment* by Martin Melosi and *Waste and Want: A Social History of Trash* by Susan Strasser. Engler's excellent work traces the evolution of societal attitudes towards trash, the treatment of this trash, and how waste generation has changed over the years. Roger's work was valuable because it drew relationships between past actions and our current situation, providing a tremendous amount of background on what got us into our current predicament.

Melosi's work provides great insight into how the development of cities in the United States contributed to both the generation of garbage and disposal techniques. Strasser's work, similar to Engler's, looked at societal influences on attitudes and treatments of garbage. These four works provide a very comprehensive picture of the history of waste management in the United States.

I found a number of supplemental works, of which Ted Steinberg's *Down to Earth: Nature's Role in American History*, was significant. While this book was not particularly concerned with waste management, it connected garbage to greater environmental issues. My research also found a number of articles on the subject. Many environmental historians argue that our current waste crisis is a result of our tendency to opt for cheap and quick options. American values have promoted waste management techniques that do not consider the best interest of future generations. These historians further point out that, in most cases, profits trump environmental considerations, a mentality that has led us to where we are today. They advocate measures that will serve the greater good, considering not only profit but sustainability.

To support this argument, they rely on a plethora of examples from our previous waste management practices. For example, we started to use dumps because land was cheap and plentiful, not because we considered it good for the environment. These historians are careful to point out that our knowledge base has expanded significantly during the development of the country so we might have chosen options that had negative environmental reverberations without being conscious of it. However, they maintain that our continuation of poor waste management practices is a direct result of this mentality.

Americans are going to have to change their lifestyles and mindsets to alter the poor precedent that they have set. The current rates of consumption and waste generation are no

longer feasible. Nor can our society afford to allow people avoid individual responsibility for waste with impunity. While none of these authors specifically suggest how these changes might occur, they all seem to agree that they are needed.

My second focus, the waste management history of Vermont, proved to be more challenging to research. I found my best sources through state publications. Vermont produced waste management studies, of which I closely examined three. These reports were from 1970, 1989 and 1999 and provided a venue through which I could examine the various factors that policymakers considered when proposing and implementing waste management policy. In many ways, these three sources were all that I needed to provide a picture of Vermont's waste management history. I utilized Vermont's state website, where I was able to find information on both Act 78 and Act 250. I also accessed two Supreme Court cases, *C & A Carbone, Inc* and *United Haulers Association*, which can be retrieved from a number of on-line databases. These cases set precedents for how municipalities can regulate waste disposal.

The number of secondary sources on the history of waste disposal in Vermont is limited. Thus there has been relatively little scholarly and scientific discussion of the effects of composting legislation. Instead, I relied on the primary sources cited above to identify problems with policies. These primary sources provided unexpected assistance in understanding the reasons why legislators made the decisions that they did. They were not simply accounts of what happened; they were rationalizations of why the state chose to do what it did. It was in these explanations that I was again confronted with a theme already mentioned; economic issues trumped the environmental concerns. However, the most recent report, the *Revised Solid Waste Management Plan*, gave me hope that the state has embarked on a new path. In this document, I

found references to changed priorities in which the state recognized composting as an environmentally friendly option.

The third topic I addressed, the composting process itself, was by far the easiest area to research. There is a tremendous amount of literature on the topic, ranging from what materials to use to how composting can actually help stop the spread of avian flu. For the purposes of my work, it was unnecessary to devote a significant amount of space to this literature. Thus its main use was in helping me to understand and explain the basic scientific process of composting. However, I did find that there have been a number of studies conducted specifically on both the destruction of pathogens during the composting process and how to most effectively compost in various situations. This information is extremely useful to the general public, with many of these sources describing how to perform the various techniques. These studies also encourage development in the area because they prove that it is a healthy use of organic waste.

My fourth focus, examples of commercial food scrap and agricultural waste composting, was addressed frequently in the magazine *BioCycle*. From this source, I was able to find a number of examples of composting operations, with specific information on the regulations that influenced their operations. This source served as a good jumping off point for further research on each topic. My fifth topic was animal mortality, where I again found *BioCycle* to be the best source.

While I was able to find a number of examples of various composting operations and policies, I did not find many sources that addressed exactly how states could or should modify their policies to promote better composting. While clearly promoting composting, many studies skirted around the issue of how composting could be integrated into policy and practice on a large scale. There were many examples of both successful and unsuccessful policies to provide

some guidance to states but actual regulations that could be followed were only produced by individual states in state studies. There is no work that compares state policies to one another, which is an area that deserves greater attention.

My sixth and final focus, on the Intervale and Vermont Compost Company, proved to be more difficult than I had initially expected. This was due, in part, to the very recent developments in both areas. I found local newspapers to be the best resource, including the *Burlington Free Press*, the *Times Argus* and *Seven Days*. These sources provided a clear picture of the variety of issues occurring at the Intervale, although they did not cover Vermont Compost Company's struggles with the same amount of thoroughness. I also felt that I could not draw any definitive conclusions from these two examples because they are still evolving. Nevertheless, I felt that it was important to highlight both how current policies within Vermont are challenging to Vermont composters and, by providing examples of other policies, demonstrate that Vermont can change its policies to encourage composting operations in the state.

## Chapter II

### The History of Waste Management in the United States

There is currently a waste problem in the United States. There are many factors contributing to the issue and in no way can this be considered an easy fix. One of the most pressing issues is how to deal with the waste generated. This is not a new problem, as generations before have attempted to use different methods with little overall success and no solution emerging.<sup>1</sup> Society seems somewhat repelled by dirt and waste, as if their existence goes against society's established order.<sup>2</sup> With the acquisition of new knowledge regarding waste, current ideals are moving away from such a black and white view of the issue, yet many reservations still exist concerning waste management.

Organic waste, in particular, is a segment of the waste stream that currently requires greater attention. This portion of the waste stream is emerging as an area that possesses the potential to be of greater use. Composting, in particular, would convert this waste into a useful soil amendment. This technique is not new and has been utilized by some Americans since the birth of the country. However, a variety of factors have prevented it from being utilized as a major resource-recovery technique. To fully appreciate the current debate surrounding composting, it is useful to trace the history of waste management in the United States.

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<sup>1</sup> Mira Engler, *Designing America's Waste Landscapes* (Baltimore: The Johns Hopkins University Press, 2004), 1.

<sup>2</sup> Mary Douglas, *Purity and Danger* (New York: Routledge Classics, 1996), 2.

## Pre-1800

The history of waste management in the United States starts with the earliest colonists who migrated to the New World. These people utilized land differently than their predecessors, exploiting it with little or no attention to sustainability. Farmers could use a piece of land until its nutrients were exhausted and then move, starting the process all over as they moved throughout the countryside. Colonists' greatest challenge was performing the amount of labor needed to maintain their farm. For them, the decision was easy; moving from one plot of land to another was less labor intensive and therefore the logical choice.<sup>3</sup> This technique was fairly standard until the beginning of the nineteenth century.

## 1800s

It was during the nineteenth century, as the landscape of early America started to change, that farmers were brought face to face with their irresponsible use of the land. Declining crop yields in the face of increased demand from developing cities forced farmers to seek ways to get more out of their land.<sup>4</sup> They turned to Old World methods, where they utilized waste by adding it to the soil to increase the soil's nutrients. This lengthened the life of their soil and promoted a more cyclical approach to farming; utilizing waste to increase production.<sup>5</sup> At this point, these techniques used by farmers were rudimentary forms of composting.

It is important to remember that the living conditions during the 1800 were not very sanitary. In fact, many of the cholera and yellow fever epidemics during this time were related to

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<sup>3</sup>Heather Rogers, *Gone Tomorrow: The Hidden Life of Garbage* (New York: The New Press, 2005), 33.

<sup>4</sup>Rogers, 33.

<sup>5</sup> Rogers, 33.

exposure to filth.<sup>6</sup> Experiments in England and America during the middle part of the century drew relationships between communicable diseases and waste. Edwin Chadwick's work in England during the 1840s led the way for improvements in waste disposal in both England and America.<sup>7</sup> Louis Pasteur's discoveries about disease transmission through infectious germs made people far more conscious of their relationship to waste.<sup>8</sup> At this point, most people thought that diseases were caused by environmental factors, an idea known as the 'miasmatic' or 'filth' theory. This theory greatly impacted American attitudes towards sanitation in the 1890s, maintaining that "gases emanating from putrefying matter or sewers were the cause of contagious diseases, and city cleanliness, proper drainage and sewerage, and adequate ventilation of buildings would improve the health of city dwellers."<sup>9</sup> People began to desire distance from their waste in a way that had not been expressed before.

Overall, there was very little waste up until and during the mid-nineteenth century. People utilized cloth until it practically disappeared. Cart men in cities gathered things like bottles and rubber to sell to factories for reuse.<sup>10</sup> Cooking grease, for example, was always utilized, and in most cases was used to make soap.<sup>11</sup> Refrigerators, or 'iceboxes,' which were created in 1827, were another tool to encourage the utilization of leftovers.<sup>12</sup> In some respects the reuse of materials went a bit too far. For example, Benjamin Miller, in *Fat of the Land*, discussed how sugar refiners and fertilizer manufacturers utilized animal blood.<sup>13</sup> Animal blood could be utilized as a clarifying agent, in some cases being added to boiling sugar with egg

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<sup>6</sup> Rogers, 39.

<sup>7</sup> Martin V Melosi, *Garbage in The Cities: Refuse, Reform and the Environment* (Pittsburgh: University of Pittsburgh Press, 2005), 21.

<sup>8</sup> Engler, 55.

<sup>9</sup> Melosi, 21-22.

<sup>10</sup> Rogers, 36.

<sup>11</sup> Susan Strasser, *Waste and Want: A Social History of Trash* (New York: Metropolitan Books, 1999), 31.

<sup>12</sup> Strasser, 33.

<sup>13</sup> Cited in Rogers, 36.

whites until froth appeared, which when scraped off, revealed pure sugar.<sup>14</sup> Dr. Ezra Pulling, a volunteer sanitation inspector, described how “rotting food scraps, stale bread, and dead cats, rats and puppies were ‘introduced into a post mortem fellowship’ to produce sausage that was sold at sailors’ boarding houses.” In many cases, whatever was left over was used as hog food.<sup>15</sup>

City dwellers in the early 1800s seemed to run into greater problems dealing with their waste than those in rural areas. They had more solid waste than the countryside, yet utilized less of it.<sup>16</sup> Animals, including dogs, pigs and goats, roamed the streets, eating many of the food scraps thrown out by people.<sup>17</sup> Some cities, in an effort to get rid of their waste, exported it to neighboring farming communities. This organic waste, often comprised of street sweepings of horse manure and kitchen slop, could be incorporated into soil enrichment techniques farmers performed.<sup>18</sup>

The outbreak of the Civil War provided a much needed push to the sanitation movement. This movement combined science and professionalism, promoting “sanitary science” and a new way to look at waste.<sup>19</sup> With the war came greater organization in the form of the United States Sanitary Commission, whose focus was on coordinating humanitarian logistics and sanitation in military camps.<sup>20</sup> The war also brought economic and technological change, altering the amount and quality of garbage that was produced. Many of these city dwellers had neither the time nor the space to repair things, opting to throw items out and replace them with new ones. Previous

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<sup>14</sup> Paul L. Vogt, *The Sugar Refining Industry in the United States: Its Development and Present Condition* (Philadelphia: University of Philadelphia, 1908), [http://books.google.com/books?hl=en&lr=&id=b8UJAAAIAAJ&oi=fnd&pg=PR1&dq=sugar+refining,+blood,+history&ots=ccycdLhcBa&sig=GJ-se8I\\_rFJJ3B1MdVZhVn6RKUg#PPR1.M1](http://books.google.com/books?hl=en&lr=&id=b8UJAAAIAAJ&oi=fnd&pg=PR1&dq=sugar+refining,+blood,+history&ots=ccycdLhcBa&sig=GJ-se8I_rFJJ3B1MdVZhVn6RKUg#PPR1.M1) (7 March 2008), 13-14.

<sup>15</sup> Rogers, 36-37.

<sup>16</sup> Melosi, 1.

<sup>17</sup> Strasser, 29-30.

<sup>18</sup> Rogers, 34.

<sup>19</sup> Rogers, 52.

<sup>20</sup> Rogers, 42-43.

generations no longer utilized things like fat and ash. As the country urbanized, reformers advocated improving the sanitation infrastructure.<sup>21</sup>

This movement was compounded by the beginnings of an environmental awareness in the nineteenth century. On the one hand, urbanites became “sensitive to impure water supplies, poor drainage and sewerage, and smoky skies,”<sup>22</sup> a feeling that spread throughout North America, Europe and their colonial holdings<sup>23</sup> and compelled people to want waste simply removed to some distant place. On the other hand, the conservation movement was given a significant boost by President Theodore Roosevelt who believed that the federal government needed to preserve the nation’s natural resources from exploitation. He, along with Gifford Pinchot who he appointed as head of the U.S. Forest Service, advocated the efficient use of natural resources.<sup>24</sup> People, who had once thought of environmental resources as inexhaustible, began to worry about their rapid depletion.<sup>25</sup>

With this awareness came a new perspective on garbage. Suddenly, people started to recognize it as a problem and began placing an emphasis on community responsibility, removing individual responsibility.<sup>26</sup> The local governments started to require that households separate their waste because they could often profit from the sale of recyclable materials. Anti-dumping ordinances followed, preventing people from throwing out their waste in the streets or in locations where it was exposed to others. In many cases, efforts at sanitary reform were also targeted at highlighting shortcomings in the local government, rather than thinking about it on

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<sup>21</sup> Rogers, 48-50.

<sup>22</sup> Melosi, 17.

<sup>23</sup> Paul R. Josephson, *Resources under Regimes: Technology, Environment, and the State* (Cambridge: Harvard University Press, 2004), 33.

<sup>24</sup> Ted Steinberg, *Down To Earth: Nature’s Role in American History* (Oxford University Press: New York, 2002), 138.

<sup>25</sup> Josephson, 32.

<sup>26</sup> Melosi, 17.

the federal level.<sup>27</sup> By the time the 1890s rolled around, civic groups were working hard to reform sanitation.<sup>28</sup> The popular solution at the time was focused on rapid removal of waste, working to halt contact between the general population and the waste that the general population produced.<sup>29</sup> Waste was no longer seen as just an eyesore.<sup>30</sup>

The twentieth century witnessed an important revolution in how people related to their waste. Suddenly, waste was to be removed as quickly as possible with little forethought about what the impacts of certain waste removal techniques would have. It was enough to just get the waste out. This alteration in attitudes and treatment of waste precipitated the problems that we are dealing with today.

## **1900-1959**

At the beginning of the twentieth century, the country utilized a number of methods to deal with waste. The ‘reduction process,’ for example, was a process “for the extraction of oils and other by-products through the compression of city garbage.” The by-products of this compression were used in lubricants, perfume bases and fertilizers.<sup>31</sup> This method, introduced by Bruno Terne, was used into the beginning of the twentieth century,<sup>32</sup> with twenty-two reduction plants operating in the United States in 1914.<sup>33</sup> There was a great amount of controversy surrounding this method, with some arguing that it had limited applicability. Its detractors

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<sup>27</sup> Strasser, 114, 119 & 121.

<sup>28</sup> Rogers, 51.

<sup>29</sup> Engler, 55.

<sup>30</sup> Melosi, 17.

<sup>31</sup> Melosi, 41.

<sup>32</sup> Strasser, 135. Melosi, 187.

<sup>33</sup> Strasser, 135.

pointed out a number of flaws: its inability to handle anything but organic waste, with 70 to 90 percent of waste requiring a different disposal method; the fact that it required an initially high cost of construction and operation; that it had an unreliable byproduct market; and that reduction plants often had a nasty stench associated with them.<sup>34</sup> In the end, reduction did not prove lucrative enough and fell by the wayside in the 1930s.<sup>35</sup>

Other techniques included dumping garbage into landfills and dumping organic waste into bodies of water.<sup>36</sup> This was done even though the federal Marine Protection Act of 1888 outlawed it<sup>37</sup> and it was frowned upon by the public.<sup>38</sup> In some cases, the dumping of organic waste into “wastelands” like ravines was performed with the goal of making the land useful in the future. This technique, known as the “fill method,” was incorporated beginning in the 1880s,<sup>39</sup> by places like Davenport, Iowa, that used it to build levies.<sup>40</sup> However, these techniques were performed with little to no oversight by a governing body.

At the turn of the century, it was bacteriology that was making waves in the world of waste disposal. It emerged as the culmination of a number of people’s study, from Louis Pasteur to Joseph Lister, who “successfully identified microorganisms, modes of transmission and means of sterilization to guard against contamination.”<sup>41</sup> This discovery made it clear that disease did not “generate spontaneously in substance like garbage” and that the key to keeping disease away

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<sup>34</sup> Melosi, 159, 160 & 161.

<sup>35</sup> Rogers, 83.

<sup>36</sup> Strasser, 126. Rogers, 67.

<sup>37</sup> Rogers, 69.

<sup>38</sup> Melosi, 181.

<sup>39</sup> Strasser, 127.

<sup>40</sup> Melosi, 153.

<sup>41</sup> Douglas, 44. Rogers, 59.

could be found in cleaning techniques and vaccines.<sup>42</sup> For many people, this translated into having as little contact with their garbage as possible.

By the start of the twentieth century, products were mostly sold out of barrels and vats but producers like Heinz were selling packaged items.<sup>43</sup> Selling out of barrels posed a number of problems, from contaminating the product with germs to under-weighing items. The introduction of packaging ensured consistency in products and also earned the trust of consumers who no longer had the personal relationship with producers that they had had in generations before.<sup>44</sup> This use of packaging encouraged consumers to simply throw away the excess packaging without any thought about where it would end up. By the 1920s, this behavior had spread nationwide.<sup>45</sup>

This emerging consumer culture fostered the practice of regularly replacing consumer goods with the newest models, a practice that the upper and middle classes enjoyed, or at least felt compelled to engage in. This increasingly led people to associate reuse and recycling with a “new class of impoverished scavengers.” These scavengers, typically the poor, subsisted by picking through the garbage in the early part of the twentieth century. However, municipal trash collection brought an end to this, first impacting cities and then filtering out into the countryside. This shift in traditional practices was mirrored in the development of new salvaging organizations, which regarded charity as “degrading,” emphasizing instead that one should help himself. These organizations provided jobs where the poor repaired clothing and furniture or

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<sup>42</sup> Rogers, 59.

<sup>43</sup> Strasser, 113.

<sup>44</sup> Rogers, 66.

<sup>45</sup> Strasser, 200.

sorted paper.<sup>46</sup> The result of this association doomed any re-utilization waste management strategies at the time.

The early part of the 1900s also saw the dawning of Fordism, the name given to mass assembly-line production. This new production technique had three negative impacts on waste generation. First, it greatly reduced the amount of materials recycled from independent junk traders, relying instead on large materials handlers. Second, it generated new forms of waste as production lines attempted to cut labor costs in an effort to boost overall profit. Third, it increased productivity and availability of products, which allowed greater consumption, which in turn, generated greater garbage.<sup>47</sup> Greater profits did not translate to better use of resources.

Obsolescence also became an issue, becoming an accepted part of production by the 1920s.<sup>48</sup> This can be seen in the decline of Ford and the rise of General Motors, an automobile company that started annual model changes. This technique was used by other producers and became the reason why consumers purchased new products before the ones they currently had were beyond repair or no longer useful.<sup>49</sup> Sadly capitalism seemed to promote this trend because American production was so efficient that it was often cheaper to buy new items than it was to repair old ones.<sup>50</sup> Gradually, the concept of wearing something out started to fade away.

In the early 1900s, many towns had progressed to requiring that households divide their waste into three categories; garbage, ashes and rubbish.<sup>51</sup> In 1902, approximately four-fifths of cities with more than twenty-five thousand people required some sort of separation of their waste. Other studies conducted throughout the following two decades put that number anywhere

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<sup>46</sup> Strasser, 113, 139 & 141.

<sup>47</sup> Rogers, 104.

<sup>48</sup> Strasser, 191. Rogers, 112.

<sup>49</sup> Strasser, 193 & 195.

<sup>50</sup> Rogers, 105.

<sup>51</sup> Rogers, 57.

between 59-83 percent.<sup>52</sup> “Garbage” referred to organic material, including table scraps and waste. While this separation helped to reutilize some of the waste generated, the fact that the working classes in cities were tossing out more and more waste, adding up to more than twice the amount of Europeans in their same position, ensured that the waste stream increased.<sup>53</sup>

The sanitation movement gained momentum to deal with the growing demand, focusing on aesthetic and civic duties.<sup>54</sup> At this point, garbage was treated as “an innocuous and unavoidable class of debris,” to be discarded in a place far away from the general population and with the intention of permanently removing it. However, waste management experienced two alterations, the first of which was the separation of the public health and the waste collection departments. This division demonstrates how waste was no longer considered simply a health issue.<sup>55</sup> The second change was that municipalities separated the tasks of street sweepings and garbage collection. By 1917, more than 90 percent of American municipalities oversaw the cleaning of their streets, which marked a transition from the contract system of the century before.<sup>56</sup>

This movement emerged when there were changing attitudes toward garbage. “At this formative time, flush toilets, indoor plumbing, more consistent street cleaning and improved refuse disposal were all making the act of wasting easier both logistically and aesthetically.” This was also a time where a disconnect between the individual and the individual’s waste

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<sup>52</sup> Strasser, 129.

<sup>53</sup> Rogers, 57 & 65.

<sup>54</sup> Melosi, 93.

<sup>55</sup> Rogers, 60, 61 & 72.

<sup>56</sup> Rogers 61 & 63.

started, where the individual produced waste but did not have to dispose of that waste and see the results of his actions.<sup>57</sup> Responsibility for waste was taken away from the individual.

Not surprisingly, garbage continued to be a problem into the mid-twentieth century. Quantities of garbage increased in cities well into the 1930s. Disposal became an increasingly, if not completely, municipal operation. By 1956, there were service charges for garbage removal in at least 310 cities with populations over ten thousand people.<sup>58</sup>

By the mid-twentieth century, the United States had experimented with a number of waste disposal options. Feeding swine was just one way that cities dealt with their waste.<sup>59</sup> In 1939, the U.S. Public Health Service estimated that approximately fifty-two percent of cities were feeding food waste to swine.<sup>60</sup> However, the 1930s were also a time when a link was established between trichinosis outbreaks in humans and garbage-fed hogs.<sup>61</sup> It was found that people who ate pork that was undercooked could contract the disease, which led the U.S. Public Health Service to restrict the interstate transport of raw garbage during World War II.<sup>62</sup> However, WWII was a time where feeding swine organic waste was especially popular.<sup>63</sup> Later, the swine disease vesicular exanthema, also found in swine that were fed garbage, led to the extermination of over 400,000 pigs between 1953 and 1955.<sup>64</sup> By the early 1970s, only about four percent of collected food waste was fed to pigs.<sup>65</sup>

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<sup>57</sup> Rogers, 73.

<sup>58</sup> Melosi, 170, 171, 176 & 186

<sup>59</sup> Melosi, 187.

<sup>60</sup> Rogers, 83.

<sup>61</sup> Rogers, 84. Melosi, 188.

<sup>62</sup> Rogers, 84.

<sup>63</sup> Melosi, 154.

<sup>64</sup> Rogers, 84. Melosi, 188.

<sup>65</sup> Rogers, 84.

Incineration was another method utilized to deal with waste, with the country's first incinerator built on New York City's Governors Island in 1885 by Lieutenant H.J. Reilly.<sup>66</sup> Concerns about air quality at the start of the century<sup>67</sup> did not halt the growing support, with roughly 180 furnaces built between 1885 and 1908. By the year 1914, there were roughly three hundred plants working in the United States and Canada,<sup>68</sup> although it did not reach its height until the Depression.<sup>69</sup> They were in particular demand in the south, where the warmer climate made it necessary that waste was dealt with in a timely manner.<sup>70</sup> In some cases, attempts were made to harness power from disposing of refuse, as done in England and Germany, where steam and electricity had been generated.<sup>71</sup> This movement never gained momentum. This can be attributed, in part, to the inability of Americans to adapt European technology to the different conditions of the United States. One of the greatest differences between the two was that American waste had a significantly larger moisture content than European waste.<sup>72</sup> Incineration was also up against abundant and low-cost energy already available in the United States.<sup>73</sup>

Large-scale composting, another method used to deal with waste, started in Italy, in 1914. "Fermentation" or "the Beccari Method" first appeared in the United States in 1923 in Scarsdale, New York. During this process, raw garbage was placed in an enclosed space where anaerobic bacteria could break down the organic waste. In just over a month, the organic wastes were transformed into humus, which was then dried, ground and "bagged and sold for fertilizing purposes." This method marked a more exact method of composting, evolving out of earlier

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<sup>66</sup> Rogers, 69.

<sup>67</sup> Steinberg, 234.

<sup>68</sup> Strasser, 135

<sup>69</sup> Rogers, 80.

<sup>70</sup> Strasser, 135.

<sup>71</sup> Melosi, 156, 158 & 165.

<sup>72</sup> Melosi, 166 & 167.

<sup>73</sup> Rogers, 81.

techniques. However, this method could not compete with burial, as composting proved to be more expensive and therefore was halted as a major option before World War II.<sup>74</sup>

Waste disposal techniques were chosen as a balance between “the three pillars of modern refuse management- efficiency, sanitation and cost.” However, the United States had the availability of many cheap energy options, making the conversion of waste into energy seem unnecessary.<sup>75</sup> Land dumping emerged as the cheapest disposal option.<sup>76</sup>

The development of the sanitary landfill changed waste disposal significantly. Up until this point, dumping was considered convenient but less desirable because of the unsanitary conditions associated with it, from vermin infestation to offensive odors to posing a fire hazard.<sup>77</sup> The first sanitary landfill, constructed in 1934 near Fresno, California, seemed to solve these problems.<sup>78</sup> Jean Vincenza was responsible for promoting this technique,<sup>79</sup> where garbage was compacted and covered by dirt, reducing the smell and discouraging rodents. This method also required minimal labor, making it very popular in the thirties and forties<sup>80</sup> and the primary disposal option from after World War II until the 1980s.<sup>81</sup> It was even used to reclaim land, as in the case of Seattle, Washington, which built a thirty-five acre playing field over a site.<sup>82</sup> The most important reason, however, that sanitary landfills became the most popular disposal option is because of their minimal cost.<sup>83</sup> After World War II, waste disposal costs for sanitary landfills

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<sup>74</sup> Rogers, 85 & 86.

<sup>75</sup> Melosi, 167.

<sup>76</sup> Rogers, 81. Strasser, 135, Melosi, 156.

<sup>77</sup> Melosi, 181.

<sup>78</sup> Rogers, 87. Melosi, 182.

<sup>79</sup> Melosi, 183.

<sup>80</sup> Rogers, 88 & 89.

<sup>81</sup> Melosi, 182.

<sup>82</sup> Rogers, 90 & 99.

<sup>83</sup> Melosi, 182.

ranged anywhere between 40 cents to \$1.50 per ton, while incineration, for example, ran between \$2 to \$6. per ton.<sup>84</sup>

World War II brought about many changes in the United States, including to American waste. Prosperity and large metropolitan growth increased the complexity and volume of garbage.<sup>85</sup> New packaging and the transformation of items into nondurable goods like throw-away razors and food containers, only increased the problem and placed a greater strain on waste disposal.<sup>86</sup>

However, what seemed like a dramatic shift in consumption attitudes was actually not nearly as extreme upon closer inspection. Consumerism was present, as usual; it was just disguised as patriotism. People were encouraged to buy war bonds and to support scrap drives, which was just channeling their consumption.<sup>87</sup>

It was after the war that people began consuming at a disturbing rate. Consumer spending increased by 60% between 1945 and 1950, with Americans purchasing 21.4 million cars, 20 million refrigerators and moving into over one million housing units each year in just the four years following World War II.<sup>88</sup> Americans increased the amount of solid waste they produced per person, from two to four pounds between 1940 and 1968.<sup>89</sup> This can be attributed to a number of factors, including the rising levels of affluence, cheaper consumer products<sup>90</sup> and population increase.<sup>91</sup>

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<sup>84</sup>Rogers, 96.

<sup>85</sup> Engler, 64.

<sup>86</sup> Brenda Platt et al., *Beyond 40 Percent: Record-Setting Recycling and Composting Programs* (Washington: Island Press, 1991), 2.

<sup>87</sup> Strasser, 260-261.

<sup>88</sup> Rogers, 109.

<sup>89</sup> Steinberg, 234.

<sup>90</sup> Matthew Gandy, *Recycling and Waste* (Brookfield: Avebury Studies in Green Research, 1993), 31.

<sup>91</sup> Platt, 3.

Disposability was a huge selling point in products, changing the composition of many items to paper and lightweight plastics.<sup>92</sup> In fact, the use of paper stock in production rose from 7.3 million tons to 10.2 million tons between 1946 and 1966. This was also the result of the rise in self-service merchandising in places like supermarkets.<sup>93</sup> People were encouraged to throw things away after using them, which manufacturers argued, saved the consumer time and labor “not only of food preparation but of washing pots and dishes.”<sup>94</sup> It was argued that this disposability granted the consumer a freedom not experienced before,<sup>95</sup> and citizen’s endorsement of this notion transformed America into a “throwaway society.”<sup>96</sup>

By the 1950s, most people were completely unaware of what happened to their trash and yet this trash was becoming increasingly difficult to manage.<sup>97</sup> Synthetic materials and toxic chemicals complicated not only how waste was collected but also how it was disposed of. The percentage of paper, plastics and aluminum in the waste stream grew steadily in the middle of the century,<sup>98</sup> yet the development of the compaction garbage collection truck made it possible to gather more waste at one time and lower labor costs.<sup>99</sup>

Waste disposal was also changing as people tried to utilize the cheapest strategy and minimize labor costs.<sup>100</sup> In-sink grinders, or “disposals,” which were invented in the 1930s,<sup>101</sup> became popular in the 1950s.<sup>102</sup> By 1959, over four million disposers were installed in American

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<sup>92</sup> Strasser, 267. Melosi, 177.

<sup>93</sup> Melosi, 177.

<sup>94</sup> Samuel P. Hays, *Beauty, Health and Permanence: Environmental Politics in the United States, 1955-1985*, (New York: Cambridge University Press, 1987), 80. Strasser, 268.

<sup>95</sup> Strasser, 270.

<sup>96</sup> Melosi, 177.

<sup>97</sup> Strasser, 271.

<sup>98</sup> Melosi, 177.

<sup>99</sup> Rogers, 127.

<sup>100</sup> Melosi, 179.

<sup>101</sup> Steinberg, 229.

<sup>102</sup> Melosi, 180.

homes.<sup>103</sup> Techniques like source separation never really caught on because of their expense and the labor required.<sup>104</sup> It was only in the 1950s that a few plants were built by private companies to receive salvageable materials that included organic waste.<sup>105</sup> These companies, in turn, charged municipalities for taking the waste in an effort to increase their profits.

The first half to the twentieth century further perpetuated citizen's distance from their waste. An individual's sense of responsibility for their part in creating their waste was removed as cities and local governments took on the job of removing waste. The affluence after World War II, built-in obsolescence and production line assembly all contributed to a growing waste stream. Waste management was faced with the challenge of dealing with the results.

## 1960s

The 1960s marked a turning point in the history of American waste disposal. In 1960, roughly 70% of the population resided in urban areas.<sup>106</sup> Economic trends were changing, encouraging a "one-way material flow from producer to consumer, ending up at the garbage dump,"<sup>107</sup> and resulting in the average American throwing out 2.5 pounds of trash daily in 1960.<sup>108</sup> Yet, the 1960s were a time of wide media coverage on environmental disasters and scientific research linked negative impacts on the environment with human actions.<sup>109</sup> At the same time, America was becoming suburban, with many cities facing financial problems and developmental challenges.<sup>110</sup> There was also a new emphasis on having nice lawns, creating a

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<sup>103</sup> Steinberg, 230.

<sup>104</sup> Melosi, 178.

<sup>105</sup> Melosi, 188.

<sup>106</sup> Melosi, 168.

<sup>107</sup> Platt, 1.

<sup>108</sup> Rogers, 105.

<sup>109</sup> Gandy, 10.

<sup>110</sup> Melosi 191 & 192.

large amount of organic waste that constituted the second largest portion of the waste stream by weight in the late 1960s.<sup>111</sup>

However, the waste disposal techniques at the time came under fire. The discovery that landfills were producing toxic leachate, which could contaminate drinking water and could also produce combustible gas, spread concern about continuing to use them as a waste disposal option.<sup>112</sup> Many of these landfills had accepted a variety of hazardous materials and, in some cases, continued to do so until the 1980s. Incinerators were also criticized for the smoke that they emitted,<sup>113</sup> resulting in a large number of abandonments.<sup>114</sup> It became clear that waste disposal had far reaching implications and required a greater level of care than it previously had been given.

Gradually, this decade saw a shift in attitude towards the environment, where waste was no longer considered undesirable.<sup>115</sup> Instead, it was seen as a resource, which also loosened its relationship to such things as class and aesthetics.<sup>116</sup> Waste management went from a local issue to a national one.<sup>117</sup>

Producers and manufacturers responded to public criticism by forming Keep America Beautiful. In the late 1960s, this organization started a non-profit research group, the National Center for Solid Waste Disposal, which soon evolved into the National Center for Resource Recovery. This organization promoted incineration as a method of waste disposal and seemed to

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<sup>111</sup> Steinberg, 230.

<sup>112</sup> David R. Powelson and Melinda A. Powelson. *The Recycler's Manual For Business, Government, and the Environmental Community* (New York: Van Nostrand Reinhold, 1992), 18. Gandy, 36. Platt, 3. Melosi, 190.

<sup>113</sup> Rogers, 155 & 157.

<sup>114</sup> Melosi, 187.

<sup>115</sup> Engler, 2.

<sup>116</sup> Engler, 69.

<sup>117</sup> Melosi, 189.

put little effort into pursuing other tactics.<sup>118</sup> In many ways, it exhibited a strong bias towards promoting certain consumption practices instead of better waste management techniques.

The American public started to take action against the waste management practices of the time. The late 1960s saw the rise of a grassroots recycling movement,<sup>119</sup> as some people searched for a way to decrease landfills use. Suddenly, urbanites were trying to reach out to the environment, embracing natural values, viewing landscapes as beautiful and valuable only if left in their natural conditions.<sup>120</sup> People considered the environment valuable to their well-being and quality of life, a change in focus from the preservationist mentality of generations before them.<sup>121</sup> This counter-culture started a movement to get ‘back to the land,’ promoting rural environments.<sup>122</sup> Alice Bay Laurel’s *Living on the Earth* and the *Whole Earth Catalog* endorsed these ideals.<sup>123</sup> “These more holistic approaches viewed the ‘three Rs’ in a hierarchical fashion: first, reduce consumption, then reuse goods in their already manufactured form as long as possible, and then, only as a last resort, recycle.”<sup>124</sup> As a result, criticism was generated around lifestyles that utilized a great amount of resources and stress was placed on a personal responsibility to live in accordance with the “wider natural world.”<sup>125</sup>

Popular ecology, which emerged at this time, was a reflection of this new mindset. People started to think about how they impacted the environment, stressing the relationship between the two. Importantly, there was an emphasis on improving how humans and the

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<sup>118</sup> Platt, 3.

<sup>119</sup> Platt, 4.

<sup>120</sup> Hays, 22, 23 & 24.

<sup>121</sup> Hays, 26.

<sup>122</sup> Rogers, 138 & 139.

<sup>123</sup> Strasser, 283.

<sup>124</sup> Rogers, 140.

<sup>125</sup> Hays, 29 & 30.

environment interacted.<sup>126</sup> For example, dumps were no longer seen exclusively as an end; instead, they could be considered a resting place.<sup>127</sup>

Alternative waste management techniques started to emerge, including recycling and composting. In many cases, these were cost-effective and more environmentally friendly than competing options.<sup>128</sup> Recycling was started in a serious way after World War II, but it gained momentum as advocates stressed its positive relationship to natural cycles.<sup>129</sup> However, this renewed interest brought up the issue of source separation, something that was the root of much contention.<sup>130</sup> It was felt that community-organized reuse centers were not only the best thing for the environment but they also served as a way for the community to come together.<sup>131</sup> Compost, on the other hand, didn't take off in the same way. It was restricted by an inability to sell large quantities and the high cost of transport which resulted in only three out of thirteen operations still actively producing compost in 1967.<sup>132</sup>

These waste management initiatives finally received federal recognition under the Lyndon B. Johnson administration. His administration was the first to pass federal regulation concerning solid waste in the United States. The Solid Waste Disposal Act, part of the 1965 amendments to the Clean Air Act, was the first legislation to directly involve the federal government in national waste disposal.<sup>133</sup>

The 1960s were a decade of significant change in attitudes towards the environment. This shift affected waste management as people started looking at not only how different waste

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<sup>126</sup> Hays, 27.

<sup>127</sup> Engler, 2.

<sup>128</sup> Platt, 10 & 11.

<sup>129</sup> Hays, 27 & 81. Strasser, 283.

<sup>130</sup> Melosi, 196.

<sup>131</sup> Engler, 3.

<sup>132</sup> Melosi, 188.

<sup>133</sup> Melosi, 190, 200 & 201.

disposal options impacted the environment but at how waste could be utilized as a resource. The federal government, for the first time, created policies to address national waste management issues. This transitional time was important to waste management.

## **1970s**

During the 1970s, the national focus shifted slightly, centering on how to protect the environment while still encouraging economic growth.<sup>134</sup> President Nixon, in his State of the Union Address, said, “The 1970s absolutely must be the years when America pays its debt to the past by reclaiming the purity of its air, its waters and our living environment. It is literally now or never.” The decade was off to a good start, running on the momentum generated in the sixties and commencing with the first Earth Day.<sup>135</sup>

However, there were challenges in the waste management sector, where the average price per ton for waste management had been steadily rising.<sup>136</sup> By the seventies, it required both federal and state action to address the problem. The picture was made even gloomier because of a popular perception that there was a looming garbage crisis.<sup>137</sup>

The waste stream, at this point, included recyclable materials, toxic substances and plastics, with the organic portion steadily declining into the following decades.<sup>138</sup> Organic waste started to enter sewers as a result of electric disposers, creating other problems,<sup>139</sup> but reducing the presence of organic material in the waste stream.<sup>140</sup>

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<sup>134</sup> Gandy, 10.

<sup>135</sup> Rogers, 129 & 132.

<sup>136</sup> Gandy, 37.

<sup>137</sup> Melosi, 193 & 195.

<sup>138</sup> Melosi, 206 & 207.

<sup>139</sup> Strasser, 272.

<sup>140</sup> Steinberg, 230.

The federal government took stronger steps towards improving waste management during the seventies. Congress passed the Resource Recovery Act in 1970, which focused federal involvement on recycling and resource recovery. It created the National Commission on Materials Policy and required that the federal government develop a system to deal with storing and disposing of hazardous wastes.<sup>141</sup> This was soon followed by the Resource Conservation and Recovery Act of 1976, which evolved out of the Solid Waste Disposal Act of 1965.<sup>142</sup> This act finally outlined how the federal government would deal with hazardous waste, requiring the EPA to keep track of it. The act forced the closure of most open dumps and provided standards for waste management facilities.<sup>143</sup>

Recycling programs really took off as environmental enthusiasts<sup>144</sup> tried to halt the largest growing sector of the waste stream; beverage containers. States stepped in, with Oregon leading the way, by passing the first deposit law in the country in 1972. By 1976, every state legislature had proposed a policy to restrict packaging in some form.<sup>145</sup>

The later part of the decade witnessed efforts to move away from using landfills. The Department of Energy (DOE) and the EPA promoted incineration again.<sup>146</sup> The Public Utilities Regulatory Policies Act, known as PURPA, was passed during the Carter administration in 1978. This act offered a number of subsidies to incinerator firms in an effort to create “energy independence.”<sup>147</sup> At this point, there were two methods of incineration; the first burned waste

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<sup>141</sup> Melosi, 202.

<sup>142</sup> Powelson, 210. Melosi, 203. Platt, 3.

<sup>143</sup> Melosi, 203.

<sup>144</sup> Engler, 66.

<sup>145</sup> Rogers, 134, 147 & 150.

<sup>146</sup> Platt, 3.

<sup>147</sup> Rogers, 159.

to reduce the volume that was to be landfilled and the second was the waste-to-energy (WTE) facility. This method burned waste but captured the hot flue gases to generate power.<sup>148</sup>

The seventies were a time of widespread promotion of alternative waste management measures. There was a concerted effort by the federal government to develop programs that dealt with waste more efficiently and that supported recycling. The environmental focus of the sixties made policy alterations in the seventies possible and set the stage for further efforts to revamp waste management practices in the eighties.

## 1980s

The following decade was one focused on sustainable growth and development. This focus combined the previously “polarized positions on the environment and economic growth.” Public concern was heightened as scientific discoveries about such things as climate change and ozone depletion came to the forefront.<sup>149</sup> Recycling became even more popular because it stretched existing resources and generated less waste,<sup>150</sup> although it was not without its detractors, known as anti-recyclers, who were concerned about the unstable markets and the cost of recycling.<sup>151</sup> However, recycling programs grew, starting with only two cities in 1970 and growing to over two hundred cities by 1982.<sup>152</sup>

The 1980s witnessed a dramatic rise in the cost of waste disposal, promoting the two major alternatives to landfilling at the time; incineration and materials recovery.<sup>153</sup> As a result, over 3,500 landfills closed between 1979 and 1986, owing to a combination of factors including

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<sup>148</sup> Melosi, 217.

<sup>149</sup> Gandy 13, 14 & 15.

<sup>150</sup> Melosi, 220.

<sup>151</sup> Melosi, 223.

<sup>152</sup> Strasser, 284.

<sup>153</sup> Platt, 1.

lack of space, failure to comply with federal safety standards,<sup>154</sup> and the exhaustion of existing sites.<sup>155</sup> Landfills were also a bone of contention in the environmental justice movement, which emerged mid-decade. Advocates were against landfills primarily because many of the sites were in areas where minorities lived.<sup>156</sup>

NIMBY (Not In My Backyard,) and NIABY, (Not In Anybody's Backyard) also contributed to the decline in landfill sites. These acronyms refer to oppositional attitudes towards development in an area, ranging from the construction of human service facilities to nuclear plants. In many cases, efforts by these groups either halted or slowed development nationwide.<sup>157</sup>

Municipal solid waste hauling had also been centralized, controlled by only four big firms, where it had once been dominated by over ten thousand independent firms. This gave these firms a great amount of control over the execution of waste management.<sup>158</sup> It also meant that company interests could be promoted with less opposition.

The government took further steps to deal with waste management, revising RCRA in both 1980 and 1984.<sup>159</sup> In 1989, the EPA produced *The Solid Waste Dilemma: An Agenda for Action*. This document recommended that integrated waste management systems be used, combining the four techniques of source reduction, recycling, combustion and landfills to address the disposal problems that the country faced.<sup>160</sup> 1989 was also the year that the EPA

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<sup>154</sup> Steinberg, 235. Melosi, 209.

<sup>155</sup> Gandy, 37.

<sup>156</sup> Melosi, 211 & 213.

<sup>157</sup> Michael Dear, "Understanding and Overcoming the NIMBY Syndrome." *Journal of American Planning Association*, 53, no. 3. (Summer 1992): 288.

<sup>158</sup> Strasser, 284.

<sup>159</sup> Powelson, 210.

<sup>160</sup> Melosi, 202 & 203.

reissued new Source Performance Standards, which required that there was at least a minimum of 25% material recovery rate in order to obtain a permit to build a waste incineration facility.<sup>161</sup>

Waste management was given particular attention in the 1980s. Environmentally conscious waste disposal methods were seen as economically viable, opening doors for the development of new policies. A rise in the cost of landfilling waste and the environmental justice movement further compelled regulators to consider more environmentally friendly methods.

### **1990s**

The EPA followed up this policy with the implementation of new landfill standards in 1991.<sup>162</sup> Under RCRA, the EPA was granted a significant amount of power over regulation relating to solid waste, especially concerning incineration and landfills. This, coupled with the Clean Air Act passed in 1990, which limited emissions from incinerators,<sup>163</sup> demonstrated the government's attempts to promote alternative methods. By 1993, the EPA reported that domestic recycling had tripled by weight, from seven to almost twenty-two percent since 1970.<sup>164</sup> However, municipal solid waste increased from 121.1 million tons per year to 231.9 million tons per year between 1975 and 2000, with the amount per capita increasing from 3.3 to 4.5 pounds per day. However, interstate movement of waste became common during this time as people tried to dispose of the waste generated.<sup>165</sup>

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<sup>161</sup> Platt, 2.

<sup>162</sup> Powelson, 6. Melosi, 214.

<sup>163</sup> Melosi 214 & 219.

<sup>164</sup> Rogers, 168. Strasser, 290.

<sup>165</sup> Melosi, 205 & 215.

## 2000s

The new century did not bring the dramatic improvement that it could have. Instead, Americans threw out nearly 500 billion pounds of garbage, including paper, plastic, metal and dead electronics in 2003. This amounts to more than 4.5 pounds of rubbish per person per day. Packaging alone constitutes the largest portion of this waste, amounting to over 30%. Some of this waste is shipped overseas.<sup>166</sup>

Currently, the government is taking some steps to encourage more environmentally conscious methods to deal with American waste. Recycling, for example, is really not backed by the federal government, in most cases being left up to states and resulting in a “highly fragmented patchwork of legislation.”<sup>167</sup> Its implementation also runs into difficulty because of the inconsistent market for discards.<sup>168</sup> The future is not looking promising, with disposal costs only continuing to increase along with the amount of waste generated.<sup>169</sup>

In 2006, the *State of Garbage in America*, (SOG) a study done by *BioCycle* and the Earth Engineering Center of Columbia University, was released. This document analyzed data that was collected over the fall/winter of 2005 and 2006 and included information from reports from individual states on 2004. The study found that the nation generates a total of 388 million tons of municipal solid waste a year. Of this, only 28.5% is recycled and composted and 64.1% is landfilled. Even more depressing, the study found that there has been an increase in municipal solid waste generation. On the bright side, the study also found that recycling rates also increased.<sup>170</sup>

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<sup>166</sup> Rogers, 2, 5 & 8.

<sup>167</sup> Powelson, 12 & 210.

<sup>168</sup> Rogers, 158.

<sup>169</sup> Powelson, 18 & 19.

<sup>170</sup> Phil Simmons et al., “The State of Garbage in America.” *BioCycle* 47: 4, April 2006, -(1 March 2008): 26.

### **Conclusion of the United State's Waste Management History**

The history of waste management in the United States has demonstrated that not only are current waste management techniques not working efficiently, greater waste is being generated. By looking at this history, one can see clearly what has not worked. Landfilling, reduction and incineration do not seem to be doing the job in efficient and environmentally friendly ways.

In conclusion, it can safely be said that the United States needs to support development of alternative waste disposal methods. Composting is one of the techniques that shows promise but would require the country to endorse a method which, although environmentally friendly, may not initially be the most economically rewarding. At this point the country needs to start thinking of programs that will have the best effects in the long term rather than those that are instantly gratifying.

## Chapter III

### Vermont: Where We Are In Managing Our Waste

The national waste management situation is mirrored, in many ways, in the state of Vermont. Here, postwar prosperity also encouraged the development of a throw-away society. The late 1960s brought about the passage of a state law that required municipalities to provide proper waste disposal to meet the growing demand. Vermont passed the Bottle Bill soon after, which instituted a beverage deposit-redemption system, making Vermont one of the first states to pass such a bill.<sup>1</sup>

While still considered a rural state through the following decades, with over two-thirds of its residents living in towns with populations under 5,000, Vermont's landscape was changing. Farming was displaced as citizens' primary occupation, and an increasing number of people began commuting to near-by urban centers for work. Many small towns on the outskirts of these areas became bedroom communities, with over two-thirds of residents in more than half of Vermont towns working outside of their resident town. The changing dynamics of the state, compounded by the fact that most of the land was not suitable for landfills, generated a need for a more comprehensive waste management plan.<sup>2</sup>

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<sup>1</sup> "Vermont Solid Waste Management Program," *State of Vermont: Agency of Natural Resources & Department of Environmental Conservation*, (Waterbury: GPO, 1989), 1-2.

<sup>2</sup> *Vermont Solid Waste Management Program, 1989*, 1-2 & 1-3.

## **Report of the Governor's Task Force on Solid Waste Management**

This report was produced in 1970, analyzing the status of waste management in the state of Vermont. This report found that garbage was increasingly comprised of plastics as a result of demand for convenience products and greater sanitization in hospitals. It was estimated that approximately 400,000 tons of waste was disposed of per year.<sup>3</sup> The report also specified that over ninety percent of small towns within the state dispose of their refuse in open dumps or substandard landfills. This, in turn, meant that a large portion of the state was polluting the areas around these sites.<sup>4</sup>

A solid waste management proposal was also contained within this report. It outlined a waste management strategy for the state which included a plan to close all of the dumps in violation of state policy. This plan also promoted the creation of more sanitary landfills within the state and encouraged the development of recycling. The report addressed composting as a waste disposal option but concluded that it was not as lucrative an option as others and would consequently not be pursued.<sup>5</sup>

## **Act 250**

Before 1969, Vermont had made few attempts to encourage local planning. In that year Governor Deane Davis finally took the initiative and created the Governor's Commission on Environmental Control. This commission was chaired by State Representative Arthur Gibb and

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<sup>3</sup> "Report of the Governor's Task Force on Solid Waste Management," *State of Vermont*, September 1970; 13 & 15.

<sup>4</sup> "Report of the Governor's Task Force on Solid Waste Management," 16 & 19.

<sup>5</sup> "Report of the Governor's Task Force on Solid Waste Management," 22, 44 & 46.

started a movement in Vermont towards promoting responsible land development across the state.<sup>6</sup>

The year 1970 was a pivotal year for Vermont because it passed the *Land Use and Development Law*, commonly known as *Act 250*. This law was passed as a reaction to recent developmental pressures around the state, from the completion of Interstate Highway 89 to establishment of an IBM primary facility in Essex Junction. The passage of this law marked the first state-level legislation that targeted land use and the environment,<sup>7</sup> recognizing that the state's natural beauty and quality of life are what make it a special place, and therefore need to be protected.<sup>8</sup>

*Act 250* created nine District Environmental Commissions, of which members were citizens, not governmental officials. These commissions would make decisions based on ten criteria for reviewing development and subdivision. This Act also created the Vermont Environmental Board to review appeals from District Commission rulings. By 1994, the state had identified areas for improvement within the law and passed a number of changes. In 2005, the Environmental Board and the Water Resources Board were combined into one entity, known as the Natural Resources Board, by *Act 115*. This board was divided into two panels, the Land Use Panel and the Water Resource's Panel. The Land Use Panel was charged with overseeing the *Act 250* program. The general appeal function was moved over to the Environmental Court at this time. In recent years, the District Commissions receive anywhere between 600 to 800

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<sup>6</sup> "Act 250: A Guide to Vermont's Land Use Law" *State of Vermont, Natural Resources Board*, August 2006, <<http://www.nrb.state.vt.us/lup/publications/act250brochure.pdf>> (29 February 2008).

<sup>7</sup> "Guidelines and Standards for Reviewing Act 250 and Section 248 Applications" *Chittenden County Regional Planning Commission*, 2005 <<http://www.ccrpcvt.org/vertical/Sites/%7BB8DFDB70-7812-4FAE-9861-8A26C79323B6%7D/uploads/%7BB13F72DA-BB2D-4F5B-A2D2-0514CF0E0598%7D.PDF>> (29 February 2008): 2, 3.

<sup>8</sup> Peter Young, "Natural Resources Board: Welcome From Chair Peter Young" *State of Vermont*, 2003. <[http://www.nrb.state.vt.us/chairs\\_greeting.htm](http://www.nrb.state.vt.us/chairs_greeting.htm)> (29 February 2008).

applications per year, granting over 98% approval of proposals with attached conditions and modifications.<sup>9</sup>

The ten criteria listed in Act 250 are targeted at a number of environmental issues. These criteria address issues from water and air pollution to water supply and negative effects on it to the aesthetics of the area.<sup>10</sup> Importantly, it is designed to “control development proposed on a relatively large scale, and/or in sensitive areas.”<sup>11</sup> This can be challenging to composters because the act impacts composting operations without addressing them specifically. This has led to confusion over how to apply the Act to various composting operations.

## **Act 78**

Vermont’s legislative waste management history in particular can trace its roots back to the passage of Act 78 in 1987. This Act was passed to meet the growing need for a more efficient way to deal with waste generated in Vermont. It placed “the highest priorities on waste reduction and on the re-use and recycling of more waste materials,” aimed at reducing the volume of solid waste put into Vermont landfills and encouraging the creation of new lined landfills. It recognized that the state government must assist waste management programs throughout the state, providing technical and financial assistance for the planning and implementation of revised systems. State programs were expanded and Act 78 allowed for the development of inter-regional facilities to deal with certain portions of the waste stream.<sup>12</sup>

This Act was passed at a time when Vermont had roughly 535,000 residents, with 65% of them living in rural towns. The average population density throughout the state was 60 people

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<sup>9</sup> “Act 250: A Guide to Vermont’s Land Use Law,” 3, 10.

<sup>10</sup> “Act 250: A Guide to Vermont’s Land Use Law,” 11, 12, 13.

<sup>11</sup> “Act 250: A Guide to Vermont’s Land Use Law,” 16

<sup>12</sup> “Vermont Solid Waste Management Program,” 1989, 1-1.

per square mile, with Chittenden County containing roughly 25% of the state's population. However, in 1985, there were an estimated eight million seasonal residents and visitors to the state.<sup>13</sup> Manufacturing was the state's largest industry, creating a specialized waste stream. Fast food restaurants and disposable products used in health care systems also contributed to greater generation of waste. All of these factors not only increased the amount of waste generated in the state but also made the waste more difficult to dispose of because of its complexity.<sup>14</sup>

Waste was dealt with in a number of ways in 1987. On a basic level, many residents burned paper during the winter in wood or coal stoves and furnaces to heat their homes. Many burned waste in their backyard, a process that had many negative environmental impacts. Lots of Vermont homes had food disposers, which diverted some of the food waste into sewage systems. Recycling, which had caught on in the years before, was responsible for diverting roughly 42,000 tons of material from the waste stream. In many cases, regions imported or exported waste across borders in an effort to deal with it more effectively. The state contained two municipal incinerators in Stanford and Readsboro, the Vicon energy recovery facility, eleven hospital incinerators and fourteen small incinerators.<sup>15</sup> Act 78 was passed with the hopes that it would promote utilization of state resources to perform better waste disposal techniques.

There were some factors that decreased waste generation. An increase in the cost of raw materials encouraged the reuse of scraps, which in turn, encouraged technologies to utilize this other source. There was also an increase in the cost of disposal, which encouraged residents to find alternative waste disposal methods.<sup>16</sup>

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<sup>13</sup> "Vermont Solid Waste Management Program," 1989, 1-5.

<sup>14</sup> "Vermont Solid Waste Management Program," 1989, 1-5, 1-7, 1-25 & 1-26.

<sup>15</sup> "Vermont Solid Waste Management Program," 1989, 1-7, 1-16, 1-17 & 1-23

<sup>16</sup> "Vermont Solid Waste Management Program," 1989, 1-25 & 1-26.

Act 78 addressed planning commissions for these new facilities. Regional planning commissions and solid waste districts were identified as responsible for planning new facilities and disposal techniques. However, these regional planning commissions were restricted in implementing their plans. This was because of the following two reasons: 1) commissions request annual appropriations which they distribute to member municipalities; they cannot authorize municipalities direct access to funds; 2) member municipalities are permitted to leave a regional planning commission at any point, which, in turn, means that the member municipalities cannot be committed to long-term contracts or long-term debt.<sup>17</sup> Approval of these plans is needed by the Secretary of Development and Community Affairs.<sup>18</sup> This structure ensured a consistency among member municipalities because each one received approval from the same source.

### **State Solid Waste Program**

In 1989, Vermont produced the *State Solid Waste Program* as a requirement of Act 78. This program took the first comprehensive look at Vermont's waste disposal techniques, identifying areas to be improved and coming up with solutions to promote the ideals of Act 78. It provided financial aid to encourage development of collection facilities around the state. It identified certain state responsibilities, from educational programs which provided funding to the Association of Vermont Recyclers to assist in this goal of developing recycling programs. Importantly, it stipulated that regional plans include a user's fee, which required disposers to pay for the amount of waste they were disposing of, instead of being charged a flat rate.<sup>19</sup>

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<sup>17</sup> "Vermont Solid Waste Management Program," 1989, 1-5.

<sup>18</sup> State of Vermont. *Act 78*, (Montpelier, GPO, 1987), Section 6603b.

<sup>19</sup> "Vermont Solid Waste Management Program," 1989, 1-26 & 1-27.

This plan estimated that up to 80% of the waste stream, aside from special wastes, could be recovered by either recycling it or composting it. Food and yard waste combined with sludge from waste water treatment centers alone totaled roughly 80,000 tons of potentially compostable material. However, the total demand for compost around the state was only 5,000 tons in 1987.<sup>20</sup>

Composting the organic material in the waste stream would reduce the total mass of material by 25-30% overall because of the decomposition of organic material during the process and it is a method that could be applied to up to 70% of the waste stream. However, one of the greatest challenges mentioned in the Plan is that there is not much of a market for compost within the state.<sup>21</sup> The challenge becomes making composting lucrative by finding a market for it.

### **Revised Solid Waste Management Plan**

The 1999 *Revised Solid Waste Management Plan* was published by the state as a requirement of Act 78, exploring the state's current waste management plan and making proposals for the state in the next five years.<sup>22</sup> The document first addressed the changes in Vermont since the adoption of the first plan in 1989. The greatest change in the overall structure of waste management programs was the development of more solid waste districts, increasing from six to ten, with the addition of three inter-municipal organizations. The public sector was responsible for much of the growth within the area, improving the organization of municipal programs.<sup>23</sup> The Supreme Court decision in *C & A Carbone, Inc. v. Town of Clarkstown* in

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<sup>20</sup> "Vermont Solid Waste Management Program," 1989, 1-29 & 1-30.

<sup>21</sup> "Vermont Solid Waste Management Program," 1989, 1-39.

<sup>22</sup> "Revised Solid Waste Management Plan," *State of Vermont: Agency of Natural Resources & Department of Environmental Conservation*, (Waterbury: GPO, 1999) Introduction-1.

<sup>23</sup> "Revised Solid Waste Management Plan," 1999, Introduction-2.

1994 “severely restricted the ability of municipalities to require that wastes generated in the municipality be delivered to municipal facilities. The lack of ‘flow control’ meant that municipalities (including districts) could no longer be assured of the revenue from tipping fees necessary to finance municipal facilities.”<sup>24</sup>

### **C & A Carbone, Inc. v. Town of Clarkstown**

The *Clarkstown* case is of particular note because of the precedent it set for solid waste management. This town in New York, which previously housed a landfill, agreed to build a solid waste transfer station over the site in 1989. This facility would receive the solid waste from the surrounding area, separating recyclables from the heap and shipping them to a recycling facility. The other waste would be moved to a landfill or incinerator.<sup>25</sup>

The town, in an effort to finance the new facility, agreed to a deal with a local private contractor who would construct and operate the facility for five years, after which time the town would regain ownership of the facility for one dollar. In an effort to entice the contractor, the town guaranteed him a minimum waste flow of 120,000 tons per year and charged haulers a tipping fee of \$81 per ton, which was a higher fee than the disposal cost of unsorted solid waste in the private market. If, for some reason, the station did not receive the guaranteed amount of waste, the town agreed to pay the tipping fee deficit.<sup>26</sup>

To meet this yearly quota, the town adopted a flow control ordinance, *Local Laws 1990, No. 9 of the Town of Clarkstown*. This ordinance required all nonhazardous solid waste generated within the town to be brought to the transfer station for disposal, with the punishment

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<sup>24</sup> “Revised Solid Waste Management Plan,” 1999, Introduction-4.

<sup>25</sup> Supreme Court of the United States, *C & A Carbone, Inc. v. Town of Clarkstown*, 511 U.S. 383, 1994 (Washington, D.C.: GPO, 1994). Justice Kennedy, Opinion of the Court.

<sup>26</sup> *C & A Carbone, Inc. v. Town of Clarkstown*, Opinion of the Court.

of as much as a \$1,000 fine and up to fifteen days in jail for noncompliance. Issues arose when it was discovered that a local, privately owned company that processed solid waste, C & A Carbone, Inc., was found to be exporting bulk solid waste and not sending it to the town transfer station. C & A Carbone, Inc. objected to transferring their bulk solid waste to the transfer station because it was charged a tipping fee for material that it had already sorted.<sup>27</sup>

The issue was eventually brought before the Supreme Court, where the court debated whether the ordinance violated the Commerce Clause of the United States Constitution. The court found that the ordinance did, in fact, violate the Commerce Clause, because it unfairly deprived competitors of access to a local market.<sup>28</sup> As Justice O’Conner stated in her concurring opinion, the town could have ensured financial viability to the transfer station through other means that would have a significantly smaller impact on the flow of goods.<sup>29</sup> This case set the precedent that municipalities were unable to place such severe restrictions on waste management techniques. This precedent was later challenged by the *United Haulers Association, Inc.* case in 2007.

### **Vermont Since 1989**

As a result of a variety of factors, very few new landfills have been built in Vermont since 1989. In fact, by 1999, there were only three small, unlined municipal landfills, (each limited to accepting less than 1000 tons of solid waste per year), only one construction and demolition site that was privately owned, and two privately owned and operated lined landfills. The rest of Vermont’s waste, amounting to 24%, was exported to other states. By 1999, there was also a large amount of consolidation in the solid waste management industry, with roughly

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<sup>27</sup> *C & A Carbone, Inc. v. Town of Clarkstown*, Opinion of the Court.

<sup>28</sup> *C & A Carbone, Inc. v. Town of Clarkstown*, Opinion of the Court.

<sup>29</sup> Supreme Court of the United States, *C & A Carbone, Inc. v. Town of Clarkstown*, 511 U.S. 383, 1994 (Washington, D.C.: GPO, 1994). Justice O’Conner Concurring Opinion.

500 licensed haulers in 1987 and 277 in 1999. This shortage of waste disposal sites was also compounded by the fact that there were only a few large solid waste management companies that owned the majority of the landfills and were responsible for the collection and transport of the waste.<sup>30</sup> In 1999, there were only five municipal landfills, with only two of them being lined.<sup>31</sup>

However, there were a number of transfer stations built during this time. Between 1987 and 1999, the number of transfer stations within the state increased from 41 to 89. These buildings provide locations to drop off waste for disposal, often providing resources for drop-off recyclables, bulky wastes and special wastes.<sup>32</sup>

The 1989 Plan laid the foundation for a number of new initiatives concerning solid waste in the state. In the realm of consumer education, there were programs promoting home composting and providing source reduction education, and giving financial aid. Programs aimed at businesses included the Waste Cap Program, where Vermont offered free waste reduction assessments to Vermont businesses between 1990 and 1993, and the Retired Engineers Assistance Program (REAP), which offered on-site waste reduction opportunity assessments.<sup>33</sup>

State and local government initiatives were also launched. User's fees were established, with "pay-as-you-throw" or "pay per bag" programs that encouraged people to reduce waste generation. The state legislature also enacted legislation that limited the use of heavy metals in packaging in Vermont.<sup>34</sup>

By 1994, roughly 164,000 tons of material was diverted from the waste stream, representing approximately 35% of the total disposable waste. This percentage remained

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<sup>30</sup> "Revised Solid Waste Management Plan," 1999, Introduction-4.

<sup>31</sup> "Revised Solid Waste Management Plan," 1999, 1-16.

<sup>32</sup> "Revised Solid Waste Management Plan," 1999, 1-16.

<sup>33</sup> "Revised Solid Waste Management Plan," 1999, 1-2 & 1-3.

<sup>34</sup> "Revised Solid Waste Management Plan," 1999, 1-3 & 1-4.

constant into 1999. By that year, the number of recycling, reuse and composting collection sites throughout the state increased to 200, a dramatic rise from 1989.<sup>35</sup> By 1999, Vermont had disposed of 78% of its solid waste in-state, with the remaining portion being shipped out of state.<sup>36</sup>

Biosolids and septage management were another area under further investigation during this time. This area of the waste stream generated 85 million gallons of biosolids in 1998. This material can be used for land application or compost after further treatment. In 1997, only 40% of biosolids were beneficially reused, with the rest going into landfills or being incinerated. Interestingly, about half of the biosolids generated in Vermont in 1999 were managed out of state.<sup>37</sup> There were 47, certified, facilities in the state that either land applied untreated organic waste or composted biosolids.<sup>38</sup> Septage, another source of biosolids, could have been used for composting, although most of it was land applied.<sup>39</sup> However, the state found that public concern regarding health and environmental risks posed by composting or landspreading biosolids derived from septage posed a significant hindrance to any plan.<sup>40</sup>

The state attempted to support greater composting during this time. One large composting facility and seven on-farm facilities started accepting organic waste. The Agency of Natural Resources (ANR) distributed fifteen grants to set up seven new food compost projects. In 1997, the Agency started the Waste Management Division Compost Center, which provided a

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<sup>35</sup> "Revised Solid Waste Management Plan," 1999, 1-5 & 1-6.

<sup>36</sup> "Revised Solid Waste Management Plan," 1999, 1-16.

<sup>37</sup> "Revised Solid Waste Management Plan," 1999, 1-22-1-23.

<sup>38</sup> "Revised Solid Waste Management Plan," 1999, 1-26.

<sup>39</sup> "Revised Solid Waste Management Plan," 1999, 1-27 & 1-28.

<sup>40</sup> "Revised Solid Waste Management Plan," 1999, 1-29.

number of services from providing backyard composting education kits to compost use demonstration projects.<sup>41</sup>

Illegal disposal continued to be a problem between 1989 and 1999. It was estimated that over 18,000 households illegally burned about 14,000 tons of trash in 1997. This contaminated the air, which, in turn, had a negative environmental and human health impacts. In addition, this meant that those who illegally disposed of their waste were also getting away with not paying for waste disposal, thereby punishing those who did properly dispose of their waste. In response, there was increased enforcement of the regulations, but due to a lack of resources, the state was unable to pursue all complaints.<sup>42</sup>

The 1999 Plan included three main changes from the Plan introduced in 1989. First, municipalities were expected to plan and implement regulations intended to promote “waste reduction, reuse and recycling, and environmentally sound disposal.” This meant that municipalities must be given the authority to raise revenues to pay for these programs. Second, it recognized that the private sector would provide the majority of services in the waste management arena, from collection to disposal. Third, Vermonters wanted to promote programs that were environmentally responsible and economically competitive, which means that the state must pursue programs that may not be economically rewarding initially such as waste reduction education and household hazardous waste collection.<sup>43</sup> The focus was on promoting a better end result.

The 1999 Plan identified a number of important issues that needed to be addressed and created goals for the following years. The number one goal was the reduction of waste

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<sup>41</sup> “Revised Solid Waste Management Plan,” 1999, 1-9 & 1-12.

<sup>42</sup> “Revised Solid Waste Management Plan,” 1999, 1-20 & 1-21.

<sup>43</sup> “Revised Solid Waste Management Plan,” 1999, Introduction-4.

generation within the state. In fact, the plan hopes for an overall diversion rate of 50% by 2005. This was followed closely by the need to create programs that protect human health and the environment with great care to implement programs that are equal and consistent.<sup>44</sup>

Importantly, composting was identified as an area deserving particular attention. The Plan calls for support of composting programs state-wide, including funding the Master Composter program.<sup>45</sup> The Plan also encouraged recognition by the state of businesses that compost in their food management programs. This will be accomplished through the Vermont Business Environmental Partnership program.<sup>46</sup>

### **The Vermont Waste Composition Study**

The Vermont Waste Composition Study, conducted in 2002, provided an overview of the waste management program in Vermont. This study found a number of interesting things. First, roughly 24 percent of the waste stream consists of recyclable papers, bottles and cans, with food scraps comprising the largest single material on a weight basis in the waste stream.<sup>47</sup>

This report identified barriers to greater food sorting, with recognition that greater sorting would require more containers to put the materials in and a great space devoted to waste. This would also require additional labor. Separation of organic waste, in particular, could also increase odor and introduce potential health issues.<sup>48</sup>

### **United Haulers Association, Inc. et al., v. Oneida-Herikimer Solid Waste Management Authority et al.**

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<sup>44</sup> “Revised Solid Waste Management Plan,” 1999, 1-39, 1-40 & 2-3.

<sup>45</sup> “Revised Solid Waste Management Plan,” 1999, 2-8.

<sup>46</sup> “Revised Solid Waste Management Plan,” 1999, 2-9.

<sup>47</sup> DSM Environmental Services, Inc. *Vermont Waste Composition Study*. Ascutney, 2002: iii, v,

<sup>48</sup> *Vermont Waste Composition Study*, 29

This case, only recently decided by the Supreme Court in April of 2007, altered waste management policy yet again. Two counties in the state of New York, Oneida and Herkimer, were confronted with a waste management problem. In total, these counties are comprised of over 2,600 square miles and are home to 306,000 people. However, it became clear in the 1980s that many of the landfills that these residents were relying on for their garbage disposal were operating without permits and in violation of state regulations. These problems were compounded by a challenging relationship that many of the towns had with their local waste management companies, of which some had increased prices dramatically and overcharged for services.<sup>49</sup>

The New York legislature and governor established the Oneida-Herkimer Solid Waste Management Authority. This public benefit corporation was given the power to collect, process and dispose of solid waste generated within the counties. This new body was also given the power to limit competition in a reasonable fashion, which could mean requiring that all waste be delivered to one solid waste facility in particular. In 1989, both counties entered into an agreement with the Authority, granting it with the power to manage all of their waste. Private haulers would be used to gather all of the trash but the Authority would be the one to process the trash and send it for disposal. The Authority agreed to purchase and develop a facility that would be able to perform not only basic recycling but many additional waste management services not always found in a traditional facility.<sup>50</sup>

The Authority created a facility that went above the standards of many other waste facilities, recycling 33 different materials, composting and dealing with hazardous waste along

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<sup>49</sup> Supreme Court of the United States, *United Haulers Association, Inc. et al. v. Oneida-Herkimer Solid Waste Management Authority et al.*, 000 U.S. 05-1345, 2007 (Washington, D.C.: GPO, 2007) Opinion of the Court.

<sup>50</sup> *United Haulers Association, Inc. et al. v. Oneida-Herkimer Solid Waste Management Authority et al.*, Opinion of the Court.

with other services. However, the Authority also charged a higher tipping fee than surrounding facilities to cover its expenses. In an effort to ensure that the Authority's facility would be viable, the counties enacted "flow control" ordinances which required that all solid waste generated within the counties be taken to the Authority's facility. If one was to be found violating this by not transporting waste to the facility, there were penalties of fines, permit revocation and even imprisonment.<sup>51</sup>

The Supreme Court ruled that the ordinance did not violate the Commerce Clause because it did not unfairly discriminate for the purposes stated. Because the ordinance was created to support a state, it should be viewed differently than an ordinance created to support private business. In this case, ordinances that were created to support local governments should be considered differently than those that regulate inter-state commerce, as was the case in *Carbone*. "The dormant Commerce Clause is not a roving license for federal courts to decide what activities are appropriate for state and local government to undertake, and what activities must be the province of private market competition."<sup>52</sup>

## **Conclusion**

Vermont's waste management history contains many of the same lessons found in the United States' waste management history. This small state has started to recognize the importance of instituting more efficient and productive waste management strategies, yet it still has a long way to go. The two

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<sup>51</sup> *United Haulers Association, Inc. et al. v. Oneida-Herkimer Solid Waste Management Authority et al.*, Opinion of the Court.

<sup>52</sup> *United Haulers Association, Inc. et al. v. Oneida-Herkimer Solid Waste Management Authority et al.*, Opinion of the Court.

United States Supreme Court cases mentioned above set important precedents for the state and dictate how the state can implement new waste management practices. As Vermont moves forward in generating new policies, it should reflect on how its previous policies impacted waste management and how new policies can combine alternative waste management practices with traditional methods.

## Chapter IV

### State Policies and Individual Operations Concerning Commercial Food Scraps, Agricultural Waste and Animal Mortality

Waste management is an issue that the entire nation is facing. Vermont is not alone in its desire to create regulations that promote diversion of organic matter from the waste stream or in its aim to protect the environment to the best of its ability. However, current regulations within the state could be improved to further promote these goals. One of the best ways to accomplish this is to look at what others are doing well and adapt their strategies to Vermont's unique situation.

The following are examples of both good and poor composting techniques for either commercial food scraps or agricultural waste or a combination of the two. I chose to look at these two sections of composting because they are particularly important to Vermont, a small agricultural state with a few urban areas. While some of these situations are very specific, the point is that they are possible under certain states' legislation.

#### **Toyota Motor Manufacturing Kentucky, Inc.**

Located in Georgetown, Kentucky, this plant sits on 1,400 acres and employs over 10,000 workers. In 2005, the plant was designated a zero-landfill facility, which meant that it needed to either reuse or recycle all materials generated on the site and that nothing could be shipped to a landfill. To accomplish this, the company installed a rotary drum as a way to deal with organic waste generated on site. The food waste is broken down in a series of steps, from being shredded down into small pieces and then mixed with other organic materials and then

transported into the drum for initial composting. The material is then moved to windrows where it further degrades.<sup>1</sup>

This system did not require a permit from the state of Kentucky because all of the material used in the composting process was both generated on-site and used on-site. The start-up costs to buy the machinery for the composting operation amounted to roughly \$90,000 which paid for itself in six months. The compost generated is used in the company's gardens, and the vegetables grown there are utilized by the six cafeterias at the plant.<sup>2</sup>

## California

California has achieved a great amount of success at waste diversion efforts in recent years. In the last sixteen years, there has been over a 40% increase in the waste diversion rate, amounting to over 50%.<sup>3</sup> Their total waste amounts to roughly 88 million tons, which leaves 42 million tons destined for landfills.<sup>4</sup>

California is currently aiming for state-wide zero waste. To accomplish this noble goal, the state is endorsing a number of measures to support composting. First, it is requesting suggestions from the community on ways to further encourage greater organic materials diversion.<sup>5</sup> It has conducted two studies, the *Assessment of California's Compost and Mulch Producing Infrastructure* (2001) and the *Second Assessment of California's Compost and Mulch*

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<sup>1</sup> Robert Spencer, "In-Vessel Option For On-Site Food Waste Composting" *BioCycle* 49, no. 1, 2008. <[http://www.jgpress.com/archives/subscription\\_required/001551.html](http://www.jgpress.com/archives/subscription_required/001551.html)> (29 February 2008): 35.

<sup>2</sup> "In-Vessel Option For On-Site Food Waste Composting"

<sup>3</sup> Margo Reid Brown, "California Links Organics Recycling to Sustainable Future" *BioCycle* 48, no. 6, June 2007, <[http://www.jgpress.com/archives/subscription\\_required/001354.html](http://www.jgpress.com/archives/subscription_required/001354.html)> (29 February 2008): 20.

<sup>4</sup> Brown, 20.

<sup>5</sup> "Barriers to Siting Organic Diversion Facilities," *California Integrated Waste Management Board*, 2008, <<http://www.ciwmb.ca.gov/Organics/Siting/default.htm>> (29 February 2008).

*Producing Infrastructure*, (2004).<sup>6</sup> California does not require that compost and mulch facilities report process and production data to the California Integrated Waste Management Board.<sup>7</sup> It was found in the *Second Assessment of California's Compost and Mulch Producing Infrastructure*, that composters and processors found regulations to be the number one issue confronting their production.<sup>8</sup>

In California, there used to be a significant regulatory difference between those who produced and used their own compost, known as “composters” and those who process the material but do not actively compost, known as “processors.”<sup>9</sup> A large majority of the facilities within the state process green materials, with a small percent, amounting to 23%, processing manure and only 22% processing agricultural byproducts.<sup>10</sup> PR 1133, which was targeted at air and odor emissions in the region surrounding Los Angeles, was cited in the study as being somewhat difficult to comply with and often resulted in the use of odor suppressants.<sup>11</sup>

For California, compost provides not only a waste management option but also an agricultural asset. For a state that is the leading agricultural producer in the nation, compost provides a soil additive that is extremely beneficial. However, the state does have some perplexing legislation, namely their policy of alternative daily cover. Under this rule, cities can claim diversion credit for covering garbage in landfills with ground up green materials.<sup>12</sup>

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<sup>6</sup> “CIWMB Publications Home Page” *California Integrated Waste Management Board: State of California*.2007. <<http://www.ciwmb.ca.gov/Publications/default.asp?cat=2>> (29 February 2008).

<sup>7</sup> “Second Assessment of California’s Compost and Mulch-Producing Infrastructure,” *State of California: Integrated Waste Management Board*, Integrated Waste Management Consulting: Nevada City, 2004.

<<http://www.ciwmb.ca.gov/Publications/Organics/44204007.pdf>> (29 February 2008): 12.

<sup>8</sup> “Second Assessment of California’s Compost and Mulch-Producing Infrastructure,” 29.

<sup>9</sup> “Second Assessment of California’s Compost and Mulch-Producing Infrastructure,” 18.

<sup>10</sup> “Second Assessment of California’s Compost and Mulch-Producing Infrastructure,” 19.

<sup>11</sup> “Second Assessment of California’s Compost and Mulch-Producing Infrastructure,” 40, 42.

<sup>12</sup> Rich Flammer, “California Company Closes the Composting Loop,” *BioCycle*, 48 no. 12, (December 2007), <<http://www.jgpress.com/archives/free/001527.html>> (29 February 2008).

Unfortunately for California, there is a growing feeling in certain quarters of the state that biosolids are an undesirable waste product, and locations where composting occurs are seen as ‘dumping grounds.’ In an effort to reduce public disapproval by decreasing visibility and the potential for offensive odors, some composters are looking at indoor composting facilities. One company bought an old warehouse and converted it into a composting facility. The design and construction costs for converting this building and the site into one that is compost friendly totaled \$56 million and when combined with the purchasing price of the land the total came to \$71 million.<sup>13</sup>

***Community Recycling & Resource Recovery, Inc.***

Community Recycling & Resource Recovery, Inc., based in southern California, began food residuals collection in 1994. The company started servicing 28 stores with Vons/Safeway supermarkets and has now expanded to servicing over 1,200 stores, including some restaurants. The company also owns and operates California’s largest composting facility, a transfer station, a materials recovery facility, a C & D recycling operation and a farm. Its facilities are in Sun Valley, Lamont and Dinuba.<sup>14</sup>

The composting process begins on four acres adjacent to the company’s Sun Valley Transfer Facility for preprocessing, where organic materials are mixed and ground. The company takes approximately 800 tons a day of source-separated, green material from the city of Los Angeles alone. The material is then transferred to the Lamont composting site.<sup>15</sup>

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<sup>13</sup>C. Alix et al. “Supersized Indoor Composting Facility” *BioCycle* 47, no. 3, March 2006, <[http://www.jgpress.com/archives/subscription\\_required/000810.html](http://www.jgpress.com/archives/subscription_required/000810.html)> (1 March 2008) : 22.

<sup>14</sup> Rich Flammer. “California Company Closes the Composting Loop” *BioCycle*. 48: 12, December 2007. <<http://www.jgpress.com/archives/free/001527.html>> (29 February 2008): 23.

<sup>15</sup> “California Company Closes the Composting Loop”

The Lamont composting site is situated on 480 acres. On this site, the company has a composting pad, areas for research and finished product receiving, processing and curing. It has a permit to windrow 3,692 tons a day, although they only presently receive somewhere around 2,000. Research farming is performed on 80 of these acres and compost generated on site is utilized on nearby, company owned land as a part of Community's marketing strategy. In 2006, over 300,000 tons of compost was produced at the Lamont Composting Site, with roughly 95% going to growers, 3% being bagged and sold in supermarkets and 2% donated to communities and schools.<sup>16</sup>

California's compost policies seem to do a good job of promoting composting within the state. While composters in California have criticized the permitting process as being too restrictive, its policies do seem to be accommodating enough. The state goal of zero-waste and its support for new methods are two things that Vermont could adopt in its waste management policies.

## **New Jersey**

In New Jersey, composting facilities are regulated according to the size of the operation and the origin of the feedstocks used. On-site producers have certain exemptions, including no limit to the quantity produced if all of the material was generated on-site. If the operation accepts materials generated off-site, then the operation falls under different restrictions, which is also the case in Vermont. Operations desiring to take materials from off-site sources, in addition to or besides yard trimmings, must have a Class C permit. This process can cost \$25,000 in

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<sup>16</sup> "California Company Closes the Composting Loop"

permitting fees alone in the first year, and \$16,000 in annual permit fees.<sup>17</sup> The process, which was designed for municipal composters, can be overwhelming, costly and time consuming for those who wish to start a small-scale operation.<sup>18</sup>

New Jersey is currently in the process of trying to combine their two parallel regulatory systems. It hopes to produce one set of regulations that will combine standards for manure waste and compost operations and encourage development of more composting facilities.<sup>19</sup> New Jersey's composting regulations are designed to prevent farmers from taking in more waste than they can handle. They have also instituted policies to reduce odors, which had been a problem in previous composting facilities. However, their regulations seem to be too strict.

### ***AG Choice, LLC, New Jersey***

AG Choice is the first New Jersey Department of Environmental Protection (DEP) approved composting operation to collect and receive agricultural waste and compost it for non-farm use.<sup>20</sup> AG Choice is currently operating under a Research, Development and Demonstration (RD&D) assignment granted to them by the NJDEP. This RD&D is giving them the chance to prove that composting can be performed according to NJDEP standards without meeting some of the requirements that it demands.<sup>21</sup> AG Choice also took actions to have its compost approved by the Northeast Organic Farming Association of New Jersey. This means

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<sup>17</sup> Rhodes Yepsen, "Pragmatic Farm Composters Forge New Path to Resource Recovery," *BioCycle* 48, no. 11, November 2007, <<http://www.jgpress.com/archives/free/001496.html>> (29 February 2008): 36.

<sup>18</sup> "Pragmatic Farm Composters Forge New Path to Resource Recovery."

<sup>19</sup> "Pragmatic Farm Composters Forge New Path to Resource Recovery."

<sup>20</sup> "AG Choice, LLC." AG Choice, LLC. 2006. <<http://www.ag-choice.com/about.html>> (29 February 2008).

<sup>21</sup> "Pragmatic Farm Composters Forge New Path to Resource Recovery."

that it needs to meet the additional requirements stipulated by this agency, from avoiding wax cardboard to not using grass clipping from local lawns.<sup>22</sup> AG Choice is promoting quality compost that is generated at a small farm.

Like Vermont, New Jersey is experimenting with policies that promote greater composting statewide. By granting special allowances like the one given to AG Choice, the state is investigating ways to improve its policies while still maintaining the authority to halt operations if the project seems to be causing environmental harm.

## Ohio

The Ohio Environmental Protection Agency (OEPA) and the Ohio Department of Natural Resources' (ODNR) Division of Recycling and Litter Prevention have joined forces to boost the state's composting rate of food residuals that was at a mere three percent in 2007. To accomplish this goal, ODNR provided a number of grants to support efforts that would divert food residuals from the waste stream.<sup>23</sup> The state is particularly concerned with getting food scraps out of the waste stream. This waste alone accounts for 474 pounds per person annually.<sup>24</sup>

The state has promoted a number of initiatives to make composting easier. They have created a website that offers a number of resources concerning composting and provides one of the clearest articulations of composting standards that I have seen.<sup>25</sup>

In Ohio, composting facilities are divided into four different classes based on the materials that the facility accepts. Class I facilities can accept all municipal solid waste; Class II

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<sup>22</sup> "Pragmatic Farm Composters Forge New Path to Resource Recovery."

<sup>23</sup> Jerome Goldstein, "Ohio Targets Food Residuals Composting" *BioCycle* 48, no. 9, September 2007  
<<http://www.jgpress.com/archives/free/001427.html>> (29 February 2008): 21.

<sup>24</sup> Goldstein, "Ohio Targets Food Residuals Composting"

<sup>25</sup> Further information can be found at [http://www.epa.state.oh.us/dsiwm/document/currentrule/3745-27-45\\_Current.pdf](http://www.epa.state.oh.us/dsiwm/document/currentrule/3745-27-45_Current.pdf)

can accept organic waste from outside sources, including animal and yard waste; Class III facilities can take only yard trimmings and animal waste while Class IV can only take yard trimmings.<sup>26</sup>

### ***Paygro***

Paygro is a large compost company in Ohio. Owned by Garick, a corporation which also has facilities in Georgia, Connecticut and North Carolina, it produces a number of products, from mulch to topsoil to compost.<sup>27</sup> It has a Class I composting site between Dayton and Columbus. At this site, nearly 75,000 cubic yards of feedstocks, (including yard trimmings, manure and food waste) are processed a year. A grinder at the facility allows it to receive mixed food waste that it might otherwise be unable to handle. The organic waste is then moved to one of two aerated concrete beds that measure 400 by 20 by 10. Additional aeration is provided by a number of fans along the structure. After a period of two to three weeks, the organic materials are transferred from the in-vessel system to curing piles. In September 2007, the company was recycling over 300 tons of food waste a week.<sup>28</sup>

### **Minnesota**

Minnesota is running into some logistical trouble with their current composting policy. Under their regulations, there are essentially only two types of composting facilities; those that deal with yard waste and those that deal with solid waste. Source separated organics are only accepted at the solid waste plants. This situation makes it difficult for anyone wishing to

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<sup>26</sup> “Ohio Targets Food Residuals Composting”

<sup>27</sup> “About Garick” *Paygro: A Garick Corporation Division* <<http://www.paygro.com/about-us/>> (29 February 2008).

<sup>28</sup> “Ohio Targets Food Residuals Composting”

compost.<sup>29</sup> Currently, there is a large amount of organic waste entering the general waste stream, amounting to roughly 200,000 tons a year in the residential sector and 180,000 tons per year in the commercial sector.

In an effort to encourage waste disposal options besides landfilling, Minnesota charges a tax on source separated compostable materials that are brought to a landfill or incinerator. The state also requires that yard trimmings be composted separately from mixed municipal solid waste. However, there are only four composting facilities in the state that can take source separated organics, (SSO). Minneapolis/ St. Paul only has one facility close by that can handle some organic waste and the additional cost of collection of SSO makes it a less appealing option.<sup>30</sup>

In response to these challenges that composters face, a demonstration project is showing that food waste and soiled paper can be collected in trucks that are used to collect yard trimmings and processed at sites that normally deal with just yard trimmings. It is hoped that this study will prove that commingled collection and processing is a viable option for Minnesota and will lead to a review of current regulations on composting.<sup>31</sup>

Pilot programs were tried in St. Paul and Wayzata. In both of these areas, residents were provided with cart-based collection service for food waste and other separated household organics. This reduced the amount of waste generated in each household and only required a trash service every other week, lowering costs for the residents. It was estimated that in St. Paul alone, 10,000 tons of SSO could be diverted from the waste stream.<sup>32</sup>

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<sup>29</sup> “Commingled Organics at Yard Trimmings Composting Site.” *BioCycle* 48, no. 9. September 2007, <[http://www.jgpress.com/archives/subscription\\_required/001425.html](http://www.jgpress.com/archives/subscription_required/001425.html)> (1 March 2008): 23.

<sup>30</sup> “Commingled Organics at Yard Trimmings Composting Site.”

<sup>31</sup> “Commingled Organics at Yard Trimmings Composting Site.”

<sup>32</sup> “Commingled Organics at Yard Trimmings Composting Site.”

Minnesota's current composting policies are not promoting composting effectively. Instead, the simplicity of current stipulations does not allow for the complex nature of composting and is therefore unnecessarily restrictive.

### **Animal Mortality**

Animal carcasses have become a logistical challenge in recent years. Rendering services are charging higher prices as consumer demands for materials gathered from these carcasses have fallen. These facilities and slaughterhouses are also closing because of tighter restrictions on producing animal feed. For many farmers, this issue was compounded in 2003 when the USDA banned nonambulatory, "downer" cattle from the human food supply. This decision alone increased the number of animal carcasses by 150,000 a year.<sup>33</sup>

In many cases, farmers turned to burial methods to remove these animals, often in shallow pits. This practice can not only contaminate nearby water sources but it can endanger the health of other animals in the area. For farms that are milking herds from 300 to 500 a day, this can mean over 40 downer cows a year.<sup>34</sup> For poultry farmers, disposal of carcasses in landfills can be costly because of the tipping fee and transportation to the site.<sup>35</sup>

Studies by people in the agricultural sector have revealed that composting animal carcasses that have shown no signs of neurologic disease can prevent these issues while disposing of the bodies in an economical fashion.<sup>36</sup> Composting is also appealing because it is a disposal method that can be done year round, even in cold winter regions like Vermont, and can

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<sup>33</sup> Nora Goldstein, "Static Piles Succeed as "Downer" Cattle Disposal Option" *BioCycle* 45 no. 5, May 2004, <[http://www.jgpress.com/archives/subscription\\_required/000166.html](http://www.jgpress.com/archives/subscription_required/000166.html)>: 27.

<sup>34</sup> Goldstein, "Static Piles"

<sup>35</sup> Eric S. Bendfeldt, Robert W. Peer and Gary A. Flory, "In-House Composting as a Rapid Response to Avian Influenza." *BioCycle* 47, no. 5, May 2006, <<http://www.jgpress.com/archives/free/000976.html>> (29 February 2008): 38.

<sup>36</sup> Goldstein, "Static Piles"

be performed with the resources that many farms already have.<sup>37</sup> Test piles formed in a study by Brian Jerosé of Waste Not Resource Solutions, Bohhotal and Craig Williams at Penn State University found that carcasses weighing roughly 1,000 pounds decomposed in unturned piles between eight and twelve months.<sup>38</sup> However, smaller carcasses like deer and sheep take less time to compost but require stacking and more labor to create the necessary amount of heat for decomposition.<sup>39</sup> This study by Jerosé also found that animals that were properly composted can retain and inactivate two strains of the avian flu virus within three to four weeks during cold weather and less time during warm weather.<sup>40</sup> Other studies have found similar results.<sup>41</sup> Research done on poultry found that ten days of composting would inactivate the avian flu virus.<sup>42</sup> This does not mean that all pathogens will be killed in the composting process and the subject needs further investigation.<sup>43</sup> However, researchers did not advocate that compost derived from animal carcasses be used on areas where crops would be grown for human or animal consumption.<sup>44</sup>

Composting is also appealing because it is a biosecure method of disposing of animal carcasses. By keeping animals on the farm, the potential of transferring any pathogen is greatly reduced.<sup>45</sup> A study commissioned by the Iowa Department of Natural Resources found that poultry that were exposed to dust from finished compost from birds that had tested positive for

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<sup>37</sup> Laibach, Theresa and Jean Bonhotal, "Composting Road-Killed Deer in New York" *BioCycle* 45, no. 5, May 2004, <[http://www.jgpress.com/archives/subscription\\_required/000165.html](http://www.jgpress.com/archives/subscription_required/000165.html)> (28 February 2008): 25.

<sup>38</sup> Goldstein, "Static Piles"

<sup>39</sup> "Composting Road-Killed Deer in New York"

<sup>40</sup> "Static Piles Succeed as "Downer" Cattle Disposal Option"

<sup>41</sup> D. Glanville et al. "Composting Livestock Mortalities" *BioCycle* 47: 11, November 2006 <<http://www.jgpress.com/archives/free/001151.html>> (29 February 2008): 42.

<sup>42</sup> "In-House Composting as a Rapid Response to Avian Influenza."

<sup>43</sup> "Composting Road-Killed Deer in New York"

<sup>44</sup> "Static Piles"

<sup>45</sup> "In-House Composting as a Rapid Response to Avian Influenza."

avian flu resulted in negative serum antibody results. These findings mean that composting is a reasonably biosecure option.<sup>46</sup>

In some cases, complaints have been raised about unpleasant odors associated with the process but if it is done correctly, odors are kept to a minimum. Leachate and soil or water pollution also seem to be a very minor occurrence, again, if the process is performed correctly. One study did find high levels of ammonia-nitrogen in the soil below the composting site, which requires greater research.<sup>47</sup>

Based on the success of a pilot program in New York, a number of counties within the state have received approval to compost road-killed deer carcasses.<sup>48</sup> The Virginia poultry industry has also become a supporter of composting, recognizing it as the “most acceptable method of disease containment and carcass disposal for all bird types and poultry house structures.”<sup>49</sup>

### **Animal Mortality in Vermont**

In Vermont, composting animal carcasses has become a part of some farms day to day operations. There are nearly 300,000 cows in the state, with roughly 16,000 of them dying a year. The state is only serviced by two rendering companies, which only go to certain parts of the state, leaving some Vermonters with few options. For those with access to a rendering service, the cost can be prohibitive, with renderers charging \$75 a head. Composting, which a

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<sup>46</sup> “Composting Livestock Mortalities”

<sup>47</sup> “Composting Livestock Mortalities”

<sup>48</sup> “Composting Road-Killed Deer in New York”

<sup>49</sup> “In-House Composting as a Rapid Response to Avian Influenza.”

Cornell University study found to be equivalent to \$37 a head, is emerging as an economical option for many.<sup>50</sup>

In most cases, these farmers who are composting their animal carcasses do not need to file for a state permit. This is because their on-site composting falls under a farming activity and is exempt. However, people who wish to compost animal carcasses in other contexts, like a butcher, need to apply for a state permit for off-site composting.<sup>51</sup>

### **The Intervale**

The Intervale, located in Burlington, Vermont, has been the site of recent controversy. In the early 1980s, Burlington Electric Department had planned to build the Joseph C. McNeil Generating Station next to the current site. Before utilizing sand from the neighboring area that had been a junkyard, the company had an archeological study conducted on the area, which revealed that it was archeologically significant.<sup>52</sup>

At this point in the early 1980s, the area was being utilized as a junkyard, having previously been the site of a municipal dump earlier in the century.<sup>53</sup> Will Raap saw potential in the land and moved his company, *The Gardener Supply*, there in 1985.<sup>54</sup> Raap developed this

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<sup>50</sup> Andrew Barker, "What Happens When Bossy Dies?" *Times Argus*, 23 January 2005, <<http://www.timesargus.com/apps/pbcs.dll/article?AID=/20050123/NEWS/501230301/1013>> (29 February 2008).

<sup>51</sup> "What Happens When Bossy Dies?"

<sup>52</sup> Mike Ives, "Waste Not?" *Seven Days*, 3 October 2007 <<http://www.7dvt.com/2007/waste-not#>> (23 February 2008).

<sup>53</sup> Laura Sayre and Dan Sullivan, "Making Farms the Engine of Economic Growth ... and Community Connection" *The New Farm*, The Rodale Institute, 9 December 2004,

<<http://www.newfarm.org/features/1204/intervale/overview/index.shtml>>

<sup>54</sup> Molly Farrell, "Doing Business the Vermont Way" *In Business*, July-August, 2004, 26, No. 4, <<http://www.jgpress.com/inbusiness/archives/free/000634.html>>: 18.

business and exerted a tremendous amount of effort towards restoring the area. Importantly, he encouraged utilization of sustainable agriculture on the river plain.<sup>55</sup>

A partnership between Raap, the City of Burlington and the Chittenden Solid Waste District led to the development of a small composting operation, known as Intervale Compost Products (ICP), on the site in 1993.<sup>56</sup> Initially, it charged \$40/ton for a tipping fee, which compared with the \$91/ton tipping fee charged by the local transfer station in 1994. In 1995, it received the state's first full compost permit and began selling finished compost commercially. By 1996, it had reduced its rate to \$25/ton to encourage a greater diversion rate.<sup>57</sup> By the late 1990s, this operation had decided to make the Intervale its permanent location,<sup>58</sup> having purchased a number of acres and formalized leases and loans on the rest of the land.<sup>59</sup> ICP had looked into relocating but the cost of land in other parts of Chittenden County was prohibitive.<sup>60</sup> In 2002, the Intervale entered into a liquid-waste contract that increased their food-waste intake and helped the establishment grow.<sup>61</sup> Approximately 4,700 tons of this waste would have ended up in landfills.<sup>62</sup> Casella Waste Management is responsible for collecting more than 95% of the commercial food scraps brought to the ICP, demonstrating ICP's reliance on the local community.<sup>63</sup>

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<sup>55</sup> "About Us" Gardener's Supply Company. 13 March 2007.

<<http://www.gardeners.com/About+The+Intervale/5446,default.pg.html>>

<sup>56</sup> Molly Farrell, "Leaf Composting Project Grows Up With Multiple Feedstocks" *BioCycle* October 2004, 45, No. 10, <[http://www.jgpress.com/archives/\\_subscription\\_required/000273.html](http://www.jgpress.com/archives/_subscription_required/000273.html)> (27 February 2008); "Waste Not?"

<sup>57</sup> Farrell, "Leaf Composting Project Grows"

<sup>58</sup> "Waste Not?"

<sup>59</sup> "Doing Business the Vermont Way"

<sup>60</sup> "Leaf Composting Project Grows"

<sup>61</sup> "Waste Not?"

<sup>62</sup> Candace Page, "More Trouble for Intervale Compost," *Burlington Free Press* (6 February 2008).

<<http://www.burlingtonfreepress.com/apps/pbcs.dll/article?AID=/20080206/NEWS02/802060321>> (27 February 2008).

<sup>63</sup> "Leaf Composting Project Grows"

Composting is just one of the activities that takes place at the Intervale. The composting site is comprised of at least 15 acres and can accommodate over 20,000 tons of organic material annually, but requires careful planning to accomplish sufficient drainage because it is flat.<sup>64</sup> The site has one asphalt pad, on which liquid food waste can be combined with other yard wastes and manures and then put into windrows. The site receives organic waste in various forms, from horse manure to food waste from the Fletcher Allen Hospital to yard waste from local landscapers. The Intervale charges a tipping fee of \$25/ton for food waste and takes in manure and yard waste free of charge because it is essential that those materials are utilized to achieve the correct consistency.<sup>65</sup>

The Intervale uses an outdoor windrow system to compost the waste that it receives. These windrows typically end up being 12 feet wide by 5 feet high by 500 feet long. These piles are turned on a regular basis, which introduces more oxygen to the mix and keeps odors down. However, attempts at minimizing odors do not always solve the problem, and neighbors of the facility have lodged informal complaints. The piles are actively composted for roughly twenty-five weeks, and then combined into large piles which are cured for twelve weeks. The finished product, mature compost, is then sold in bulk or in bags.<sup>66</sup>

Over the years, the Intervale has evolved into a viable business. In 1996, total revenues were \$225,100. while production costs amounted to \$185,200 or \$29/ton. The Intervale makes the separation of organics an economically appealing option for businesses because they are only charged a tipping fee of \$25/ton for disposing of their organic materials compared to landfilling

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<sup>64</sup> Mike Ives. "Intervale Working to Right Wrongs." *Seven Days*. 26 December 2007. <<http://www.7dvt.com/2007/intervale-working-right-wrongs-0#>> (27 February 2008); Pfluke; "Leaf Composting Project Grows."

<sup>65</sup> Paul Pfluke and Vicky Viens, "Case Study: The Intervale Compost Project," *Vermont Department of Environmental Conservation* <<http://www.anr.state.vt.us/dec/wastediv/compost/98Winterpdf/INTERVALE45.pdf>> (27 February 2008).

<sup>66</sup> Pfluke

the waste for \$65-\$87/ton. However, it should be made clear that while the Intervale is now economically self-sufficient, it received funding from the Chittenden Solid Waste District, the Intervale Foundation and grants from the state.<sup>67</sup>

The Intervale has become important to the community within Burlington and the surrounding area. Much of the land is divided up into small farms, each of which is run by individuals who grow different things. Currently, these farms provide seven to eight percent of the fresh food consumed in Burlington.<sup>68</sup>

However, the Intervale has been running into trouble recently. Some of its trouble stems from complaints filed by Judy Dow, a member of the Vermont Commission on Native American Affairs.<sup>69</sup> She claims their operations are not respectful of Abenaki burial grounds found there.<sup>70</sup> Natural Resources' secretary, George Crombie, has said that the Intervale needs to address this issue.<sup>71</sup>

The Intervale was also cited for never obtaining an Act 250 permit, something that it has acknowledged that it did unintentionally twenty years ago when it opened. The Intervale has agreed to start the permitting process.<sup>72</sup> This issue is compounded because the Agency of Natural Resources changed its classification from a 'farm' to a 'commercial enterprise.'<sup>73</sup> This is because over 51% of its product was actually generated off-site and brought on-site to be

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<sup>67</sup> Pfluke

<sup>68</sup> Bill McKibben, *Deep Economy* (New York: Times Books, 2007) 78, 80.

<sup>69</sup> John Dillon. "Intervale Says Composting Operation is Clean, Should Continue For Another Five Years" *Vermont Public Radio* 14 January 2008. <[http://www.vpr.net/news\\_detail/78931/](http://www.vpr.net/news_detail/78931/)> (20 February 2007).

<sup>70</sup> Brian Joyce "Environmental Officials Restrict Burlington Intervale Operations" WCAX-News, 16 August 2007, <<http://www.wcax.com/Global/story.asp?s=6938315>> (20 February 2007); Dillon.

<sup>71</sup> Dillon

<sup>72</sup> Joyce

<sup>73</sup> "Waste Not?"

composted.<sup>74</sup> It was also accused of a number of permit violations by the Agency of Natural Resources, including dumping contaminated wastewater.<sup>75</sup> Concern was expressed that toxic materials, of which e-coli was one, were polluting local waters.<sup>76</sup> These issues resulted in an order to limit operations until an Act 250 permit is obtained.<sup>77</sup>

Challenges were compounded in the winter of 2008, when the State gave the City of Burlington a letter informing it that the Intervale appears to violate federal flood-plain management because it lies in a floodway. The notification specified that measures must be taken by March 14<sup>th</sup> to ensure that these floodway encroachments will not increase water levels during a 100-year flood or the City runs the risk of losing federally subsidized flood insurance.<sup>78</sup>

However, on January 14<sup>th</sup>, the Intervale announced that scientific tests show that their fifteen years of composting seem to have had no negative effect on the environment. Results were compiled from the research conducted by three different firms that analyzed water quality, flood risk and runoff.<sup>79</sup> Then in late February the Intervale made the announcement that it would no longer continue the composting section of its operation. It cited costs directed toward “uncertain and increasingly expensive” permitting processes as the key reason.<sup>80</sup> The Intervale did leave the option open for composting at a later date if the regulatory situation changes. The

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<sup>74</sup> Louis Porter, “Who is Minding Compost in VT?” *Rutland Herald* 1 October 2007, <<http://www.ruralvermont.org/archives/003380.html>> (22 February 2008).

<sup>75</sup> “Intervale Working to Right Wrongs”

<sup>76</sup> Kate Duffy, “New Study Exonerates Intervale” 3 WCAX-TV News, 14 January 2008, <<http://www.wcax.com/Global/story.asp?S=7623599>> (28 February 2008).

<sup>77</sup> Joyce

<sup>78</sup> Page

<sup>79</sup> “Studies Show Intervale Compost Doesn’t Pollute” *Rutland Herald*. 16 January 2008. <<http://www.rutlandherald.com/apps/pbcs.dll/article?AID=/20080116/NEWS03/801160329/1004/NEWS03>> (23 February 2008); Duffy.

<sup>80</sup> Candace Page, “Intervale to Cease Composting Operation” *Burlington Free Press* 29 February 2008, <<http://www.burlingtonfreepress.com/apps/pbcs.dll/article?AID=200880227030>> (29 February 2008).

Agency of Natural Resources' Secretary, George Crombie, stated that he believes that the Intervale is the wrong place for composting.<sup>81</sup>

The district has since been taking action to find alternate methods of waste disposal. It is running into trouble because other private companies that could take over the area, like Casella Waste Management of Rutland, are hesitant because of the risk of investing in a venture which might be denied the requisite environmental permits.<sup>82</sup>

The Intervale is one example of how current legislation in the state of Vermont is not working to promote composting as effectively as it should. While there are many aspects of the issue, clarification of current composting policies is needed. The Intervale's composting operation has provided a tremendous service to the community and it would only be beneficial to promote the development of other businesses like this one to utilize organic waste generated in other communities around the state.

### **Vermont Compost Company**

Karl Hammer started Vermont Compost Company in Montpelier, Vermont. At his farm, he feeds 1,200 chickens food scraps from local communities<sup>83</sup> and sells roughly 15,000 eggs a year.<sup>84</sup> He feeds his chickens the food scraps as they are going through the composting process, which is important because he is first using the organic waste as a feed for his animals. He is also providing more than simply food scraps to his chickens because of the fungi that develop during the composting process. The composting process generates additional substances that are

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<sup>81</sup> Candace Page, "Intervale Compost to Close" *Burlington Free Press*, 28 February 2008, <<http://www.burlingtonfreepress.com/apps/pbcs.dll/article?AID=200880228006>> (29 February 2008).

<sup>82</sup> "Intervale Compost to Close"

<sup>83</sup> "Who is Minding Compost in VT?"

<sup>84</sup> Louis Porter, "Capital Composter Raising a Crop of Questions on Farm" *Times Argus* 8 October 2007 <<http://www.timesargus.com/apps/pbcs.dll/article?AID=2007710080343&template=printart>> (22 February 2008).

valuable to his chickens. He does not even buy grain to feed his chickens as a supplement.<sup>85</sup> He also has four donkeys, three mules and grows vegetables and flowers.<sup>86</sup> Vermont Compost Company also utilizes a site in East Montpelier, owned by Fairmont Farms, from which it purchases organic material to use in its composting process.

Hammer has taken a number of steps to make his operation environmentally friendly and neighborly. First, he has stacked his compost piles on terraces that are built into the hillside, where wood chips and stone grout filters block runoff from leeching out. Second, he has made efforts to divert any runoff through beds of Jerusalem artichokes and hay bays, which are intended to catch compost particles. Third, he has put in a large culvert and built a driveway over a stream on his property in an attempt to prevent any negative impact that his operation might have on it.<sup>87</sup>

While Vermont Compost Company does perform a good service, some neighbors were concerned because of negative effects resulting from the process. Crows and gulls visit the composting site and then carry organic waste to neighboring areas, leaving unwanted presents on local people's lawns. Some have expressed concern that run-off from the composting operation will have a negative effect on a small brook located just down the hill from the operation. These concerns prompted state officials to look into the matter.<sup>88</sup>

Vermont Compost Company, like the Intervale, came under fire as two state agencies disagreed over whether the operation should be classified as a farm or as a solid waste facility. The Agency of Agriculture believes that his operation should be considered a farming activity

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<sup>85</sup> Porter, "Capital Composter"

<sup>86</sup> Terri Hallenbeck, "Another Composting Site Faces Act 250" *Burlington Free Press*. 25 January 2008, <<http://www.burlingtonfreepress.com/apps/pbcs.dll/article?AID=/20080125/NEWS02/801250302>> (26 February 2008).

<sup>87</sup> Porter, "Capital Composter"

<sup>88</sup> Porter, "Capital Composter"

while the Agency of Natural Resources thinks that it should be considered an organic waste processing center. Interestingly, the Agency of Natural Resources helped Hammer buy his first flock of chickens by providing a grant.<sup>89</sup>

The real issue at hand is whether Hammer will be required to meet specifications under Act 250, which would be the case if his operation is considered a solid waste management facility. Hammer would like his operation to be considered a farm because both Act 250 and local zoning ordinances have exemptions for farms. However, to be considered a farm, over 51% of the product must be generated on-site, which is not a clear cut answer for Hammer.

In late January, 2008, District 5 Environmental Commission Coordinator, Edward Stanak, decided that Hammer's operation could no longer be considered exclusively as a farming operation and that the composting section is subject to Act 250. Hammer is therefore required to complete the land-use permitting process, which may result in the discontinued production of compost because of the potentially costly and time-consuming permitting process.

## **Conclusion**

Vermont's current policies are making it difficult for the development of composting operations. It is clear that composting is an efficient and productive use of the organic portion of the waste stream. This means that development of composting operations within the state is a productive and sustainable way to manage waste. However, to encourage greater composting, current regulations need to be changed to recognize the complexities of composting. Changes to composting policy will allow businesses like the Intervale and Vermont Compost Company to thrive and others to develop.

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<sup>89</sup> "Who is Minding Compost in VT?"

## Conclusion

Vermont is not alone in its efforts to find more sustainable and economical waste disposal techniques. Other states around the nation are facing the same problem, asking themselves how to create policies that achieve their goals. For policymakers, the best resources are learning from history and the current practices occurring throughout the US and the world.

The history of waste management in the United States holds a variety of lessons for us. First, it is clear that landfilling is not the best method for disposing of our waste. Science has proven that it can have negative environmental impacts, and the increasing price of land has made it impractical in some areas. This does not mean that it is not a method that cannot or should not be used in some capacity; it simply means that it should not be the only disposal option.

Second, other waste management techniques should be promoted. For example, recycling has removed items from the waste stream but it is still an underutilized option. In many areas, a combination of waste management techniques can be used to make the most out of materials disposed of.

Third, past policies have been based on spending as little as possible to remove waste, not on what option would serve the greater good for the longest. Composting is an example of this. In Vermont's waste management history, it was considered as an option but ruled out because of its expense and the lack of a market for the finished product. Other, cheaper, options were chosen instead.

Fourth, the public has become more aware of the negative impact that their waste is having on the environment, so there is pressure on policymakers to create regulations that

respect the environment. This means that waste management must consider how each waste disposal method impacts the environment, in a way that policymakers before did not.

Fifth, it is clear that our previous policies have not worked. As a result, regulations should be attempts to try new options. The question should be how alternative methods can be incorporated into the current system. There have been a number of initiatives by states to support the development of these systems, but none of them have profoundly altered policy.

All of these lessons are clear after reading a history of waste management in the United States. These lessons can be applied to Vermont, whose waste management history clearly demonstrates that it has not found a solution to its problem. Policies within the state have evolved, yet it is clear that they are still not what they should be. Vermont needs to take action and promote methods that will deal with waste generated within the state in a more environmentally conscious and sustainable way.

Composting is one option that the state of Vermont should explore more thoroughly. This option utilizes the organic portion of the waste stream and generates a useful substance. Mature compost can be utilized for a variety of purposes, from improving fields to promoting better drainage beside roads. By utilizing it in a variety of ways, more markets open and make it an economically viable option. Importantly, composting removes a significant portion of material from the general waste stream. This, in turn, reduces the amount of waste that requires more complex disposal.

Vermont can learn from other states who are facing similar challenges. Other states provide examples of policies that have either been successful or not, each of which are valuable for Vermont's policymakers. No single state seems to have developed a program that works without a hitch, but some have come close, giving Vermont some guidance.

Vermont needs to commit to promoting greater composting statewide. Our small state has proven that it is environmentally conscious yet it has stopped short of fully supporting this waste management technique. Committing to composting would require the state to encourage greater composting, not to halt other waste disposal techniques. This would allow for an easy transition statewide and it would give the state time to develop more efficient methods and improve current composting policies.

The state needs to change its current waste management regulations to promote composting. Most agricultural activities within the state fall under different restrictions than other types of operations under Act 250 stipulations. However, composting in some capacities is recognized as an industrial activity under Act 250, when it is clearly not. The questions the state should be asking is: what is the end goal? What is current policy hoping to accomplish?

The answers to these questions are pretty clear. Current policies hope to support agricultural practices while still protecting the environment. The state should focus on trying to change current policies to meet this goal by allowing for the complexities within composting practices. Regulations should concern the compost produced instead of the production process. This will enable a myriad of composting operations while still regulating run-off and producing quality compost.

To encourage greater composting, the state should focus on two key approaches: schools and demonstrations. While the state currently has some programs in elementary schools, it is not reaching as many children as it could. Elementary schools are great places to reach out to a younger generation that is receptive to new ideas and that will inform their parents about what they are learning in school, reaching an even greater audience. Demonstrations and projects at larger farms will also educate farmers about how to properly compost and it will spread the word

about a new way to deal with organic waste and animal mortality. These two techniques will reach a wide audience without costing the state much money.

In essence, the state needs to start focusing on creating sustainable techniques that produce a quality end product instead of the most financially rewarding for the greatest quantity of waste. This shift will recognize that we are conscious inhabitants of our environment who are responsible for the impact that we have on it.

Vermont is faced with a waste management challenge. Our current methods are not sustainable and soon we are going to run out of ways to dispose of our garbage. Vermont needs to start looking into alternative methods now, implementing programs that will benefit the environment and be economically viable even if they are not the most lucrative. This thesis argues that composting is one possible solution to this problem, recognizing that Vermont is not alone and that other states have developed successful programs. Composting is one way that Vermont can make a proactive impact on its current waste management techniques.

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