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Solid Waste Management in Local Municipalities

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Resource challenges for local governments

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For most of the era since 1960, when environmental policy and resource policy have been central public issues, the focus of public debates on those policies was at the federal and state levels. But as we enter the last decade of the century, we find that more and more of the decisions and policies that will determine the quality of life for our citizens are being made at the local level. Issues that have historically been local prerogatives-water supply, solid waste disposal, sewerage disposal, land use planning, and transportation infrastructure - are increasingly identified as crucial for effective environmental policy and for insuring "quality of life." To be sure, those local decisions are often constrained by a wide variety of state and federal policies on environmental policy and resource use. But clearly, effective management of quality of life issues by local governments will require more than reluctant reaction to rules and deadlines imposed from above.

In this series of articles, three authors (Dennis Gale, Steven Deller, and George Criner) examine the match between the increasing demands for local action on environment-related issues and the local resources available to meet those demands. Local planning efforts under Maine's growth management law, local transportation infrastructure decisions, and local solid waste planning are each examined. (A later article by Nick Houtman separately examines local water planning.) The narrow funding base afforded by the property taxis, as always, an important concern. But a common concern also emerges over the ability of small governmental units, which often rely heavily on the New England tradition of volunteer government, to manage the new array of technical issues. The fourth author, Christopher Spruce, asks i/we should not think more carefully about the creation of an increasingly complex set of intergovernmental special districts at the municipal level. Might a single broad-based general governmental unit, perhaps a form of reinvigorated county-level government, provide a better umbrella for cooperative efforts by local governments?

(The papers in this collection were completed prior to the announcement by Governor McKernan, as part of his budget amendments, that he would seek to delay or eliminate a number of mandates imposed on local government by state government. Although the pressures of certain deadlines may be relieved, these resource issues will certainly not disappear from the agendas of towns and cities across Maine.) - *Editor*

Solid waste management in local municipalities

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On the evening of October 9, 1991, several hundred people gathered in the Hermon High School gymnasium to hear personnel from the Siting Office of the Maine Waste Management Agency

(MWMA) outline the special waste landfill siting procedure, which had made their town (along with adjoining Hampden) one of five sites under consideration for two proposed special waste landfills. (Benton and Alton in central Maine and Arundel/ Biddeford and Buxton in southern Maine are the other landfill site candidates.) The primary component of the special waste that requires landfilling is the ash remaining from the incineration of municipal solid waste (MSW).

While those outside the five potential landfill sites may be tempted to ignore the waste siting issue, there are a number of other waste siting issues on the horizon. A medical waste incinerator has been proposed for Etna. A number of demolition debris sites must be constructed around the state. The spreading of various kinds of wastes, including sludge from septics, ash from wood-fired electric plants, and some types of compost already have generated some local controversies. Recycling, while politically fashionable, is likely to require recycling facilities that most households would prefer not to have as neighbors. New disposal options, such as composting, will require dedicated waste facilities. Technological breakthroughs, such as cleaner-burning small incinerators, may make smaller, local facilities more attractive than one large regional facility. (The siting process itself is discussed in a separate article in this issue by David Laws and Lawrence Susskind.)

The Hermon gathering, and others like it, are one result of a comprehensive solid waste management law passed in 1989 by the Maine Legislature. This legislation has impacted virtually every aspect of Maine's solid waste management and recycling activities. Some of the major provisions of the new law include:

1. The MWMA is responsible for developing a solid waste management plan for the state (with appropriate input from agencies, institutions and individuals). The plan establishes state goals along with a progress timetable.
2. No new privately-owned solid waste management facilities (e.g., waste incinerators or landfills) will be developed. All future facilities will be state or regionally owned. (Existing private facilities may expand, but only if "in agreement" with the state management plan.)
3. Various financial incentives were initiated to foster waste reduction and recycling for businesses and municipalities.
4. The bottle deposit law was expanded to include a much wider array of beverages, including juices and bottled water. The sale of the aseptic "brick pack" was also banned in Maine.
5. As a last resort, the state has the responsibility of siting new landfills.
6. The rules and regulations for establishing compost facilities to handle leaf and yard waste were made easier.

In addition to this 1989 law, future solid waste management practices will also be heavily influenced by the closure of most older municipal landfills and by the rise of incineration as the most popular waste disposal practice. In 1985, the vast majority of Maine's solid waste was discarded at municipal landfills. Many of these landfills did not meet modern engineering standards and have since closed. Since 1985, the primary disposal practice has shifted from landfilling to incineration. In approximate terms, Maine now incinerates half of its solid waste, recycles fifteen percent, and landfills the remaining thirty-five percent.

Disposal and recycling

The changes in state MSW disposal and recycling legislation, coupled with the shift toward incineration, have had a profound impact on local governments. The closure of the municipal landfill can be financially traumatic to municipalities for two reasons. First, when a landfill is closed, there are the direct costs of closing the landfill. Second, the disposal options that replace the old landfill are likely to be significantly more expensive.

In a survey completed in 1990 (Criner, Halstead *et al.* 1991), the average municipal solid waste management budget for Maine municipalities was $69,986 for 1987. By 1990, the average MSW management budget had increased to $182,226. By 1993, it is expected that the MSW management budget for Maine municipalities will average $256,015. Although municipalities have initiated recycling programs in an attempt to lower MSW management costs, recycling to date has not been very economical. In 1990, Maine municipalities estimated that their revenues from recycling were $11,324 while their recycling program cost $47,731.

The cost of closing a landfill includes the cost of capping the landfill with dirt or other fill to create a "rounded-out" shape that insures proper diversion of precipitation. There may also be costs incurred to drill monitoring wells around the closed site and some on-going costs to monitor those wells. Since most municipal landfills do not have state-of-the-art engineering standards, there is a greater likelihood that these facilities will leak as compared to the regional facilities. The potential costs of remediation for a leaking landfill would overwhelm most small communities.

Municipalities in some cases will be offered material from MSW incineration facilities for the purposes of physically shaping the landfill for closure. This material is the residue from the MSW incineration preparation process and is called front-end process residue (FEPER). Municipalities that accept FEPER are usually paid, and, depending on the amount of material needed for landfill closure, the payment can amount to over a million dollars. However, the decision to accept FEPER may be agonizing for municipalities, since FEPER has an organic fraction (*e.g.* food and yard waste) and may produce odor problems. In addition, the municipalities that accept FEPER must deal with the large number of tractor-trailers transporting it to the landfill on their secondary roads. (The interstate highway system is typically not used since its load limit is lower than that of the rural roads.)

In addition to the costs associated with closing a landfill, there is the continuing cost of waste disposal. When municipalities use their own landfill for MSW disposal, operating costs are minimal. However, once a municipality begins sending wastes to a regional disposal facility, a per ton disposal cost, or "tipping fee," is incurred. Although the ripping fees in Maine are below the New England average, they are shockingly high when compared to what a typical town previously budgeted to operate its old, local landfill. (As there are often hidden costs of operating municipal landfills, the low past operating budgets frequently understated the true costs of such landfills. The high costs of closing old landfills is in essence a deferred cost of old MSW practices.)

Not only are the costs of waste disposal higher, but also the costs are proving more difficult to manage. Many municipalities signed what they believed were long-term contracts with incinerators only to find that the terms were subject to substantial renegotiation. Towns and cities face complicated new choices in contractual arrangements with landfills and incinerators. Contracts may be negotiated for varying lengths. Contracts may contain minimum or maximum volumes of trash to be delivered, with financial penalties for deliveries below or above those limits. These contracts, once signed, determine the relative economics of alternative waste options, such as recycling.

Whatever the economics of recycling, municipalities are expected to make reasonable progress towards waste reduction and recycling. This includes the establishment of a town or city recycling committee. The MWMA has established a state goal of a fifty percent reduction in MSW by 1994, although this goal is not currently subject to any type of penalty or enforcement action. Future MSW tonnage penalties for non-cooperating municipalities have been mentioned as a possibility.

Several factors have seriously limited municipal recycling efforts. Markets for recycled materials have been weak. The bottle bill, although a fantastic anti-litter program, removes the most valuable of the recyclables from the waste stream, which leaves little of value for municipal recycling programs (Criner, Jacobs, and Peavey 1991). Most Maine municipalities do not have a population large enough to support an efficient recycling program. Maine, with its large geographic area and relatively rural nature, faces inherently higher costs for the collection and transportation of recyclables. For some recyclables, relatively expensive baling or packaging equipment is required to ready the product for shipping. The state is encouraging towns to form inter-town units to overcome some of the problems of inherently small scale recycling.

There is a good deal of essentially volunteer effort involved in recycling at present. Not only do many towns rely upon voluntary drop-off, but some also use volunteer labor to sort products and prepare them for market. This volunteer effort is certainly laudable, and these volunteer efforts may help launch the recycling movement in Maine. However, it is difficult to imagine a long-run waste management strategy that relies primarily upon volunteer labor. Even civic organizations that offer much more rewarding activities than sorting unpleasant-smelling trash have difficulty maintaining adequate volunteer levels. Successful programs to collect and market recyclables almost certainly require a solid, long-term economic foundation.

Successful economics for recycling is likely to require more professional management of municipal recycling. Several aspects of a recycling program can make a large difference in the economics of the program, including marketing of materials, cost-effective design of collection and sorting, and quality control during the collection and sorting process. For municipal solid waste, quality control is especially difficult. One ceramic coffee cup can render a shipment of recyclable glass valueless. While industrial recyclers often have a very uniform (and easily monitored) stream of waste material, households and small commercial establishments generate a highly variable stream of waste and it is difficult to insure rigorous sorting standards. Even to determine what wastes are present in large enough volumes to warrant recycling may require relatively technical data collection and analysis.

As the options for recycling increase, there will also be an increasing set of technological options for municipal solid waste managers to consider. For example, properly designed composting facilities may be able to handle yard waste and organic waste (such as food) at relatively low cost.

Conclusions

It is hardly a secret that waste management has become expensive for municipalities. What may be less obvious is that the increasing importance of waste management activities is creating pressures for more professional management of these activities. Long-term disposal contracts create demands for professional input for both contract negotiation and for cost-control under signed contracts. For some towns, existing landfills must be closed and, in some cases, must be monitored thereafter. Alternative disposal and recycling options must be evaluated at least periodically. Recycling will require increasing sophistication in operations and marketing. For many smaller municipalities, it will be impossible to justify a full-time waste management staff. Various forms of cooperation between municipalities may be economically attractive to provide that professional management.

George Criner is an associate professor of agricultural and resource economics. His area of study includes the economics of waste management, production and marketing of fruits and vegetables, and electrical demand forecasting. He is a member of the steering committee of WASTECAP, a program established by the Maine Waste Management Agency to help industry reduce waste and to recycle.