

# 2

## **Foundation And Practice Of Conventional Solid Waste Management**

---

The landfill showed him smack-on how the waste stream ended, where all the appetites and hankerings, the sodden second thoughts came runneling out, the things you wanted ardently and then did not....To understand all this. To penetrate this secret. The mountain was here, unconcealed, but no one saw it or thought about it, no one knew it existed except the engineers and teamsters and local residents, a unique cultural deposit, fifty million tons by the time they top it off, carved and modeled, and no one talked about it but the men and women who tried to manage it, and he saw himself for the first time as a member of an esoteric order, they were adepts and seers, crafting the future, the city planners, the waste manager, the compost technicians, the landscapers who would build hanging gardens here, make a park one day out of every kind of used and lost and eroded object of desire.

-- Don DeLillo<sup>1</sup>

The generation of waste materials is "a consequence of everyday life<sup>2</sup>." Serious health and environmental problems have resulted from the unmanaged discardment and/or accumulation of wastes since at least medieval times<sup>3</sup>, so that addressing waste disposal problems is an integrative part of the workings of virtually every community. Solid waste management (SWM) is the planned channeling of a society's wastes from generating source to ultimate end-use or "non-use". The basic principles of SWM comprise a framework used every day for addressing the solid waste disposal problems of communities within the US. and worldwide.

However, SWM as conventionally carried out in the U.S. can be reliably successful only when applied to the broad spectrum of communities fitting conventional dictates of western government authority, culture, and resources. Indian reservations do not fit the structure of a "conventional community", so here conventional SWM does not always work. The purpose of this chapter is to present a conceptual framework of conventional SWM (CSWM) and examine its premises. The state of SWM on Indian Reservations, and the limitations of CSWM engineering in addressing it, are introduced in Chapter 3. Why CSWM is limited on reservations is examined in Chapters 4 - 6.

To understand the nature of CSWM, and thus, why its application to tribal communities might fail, this chapter includes the following discussion sections:

- (1) Definition of SWM
- (2) Conceptual Framework of CSWM
- (3) Underlying Assumptions of CSWM
- (4) Conclusions

### **2.1 DEFINITION OF SWM**

SWM is the prevailing means of planning and executing control of a community's solid wastes. Controlling wastes includes collection, hauling, and disposal, as well as recycling, reuse, and reduction<sup>4</sup>. The entire community generates wastes, and is involved to a greater or lesser extent in waste control activities. But it is the community SWM program, typically within a Department of

Public Works for conventional communities, that manages the community's wastes, by planning how the waste is controlled, and ensuring the waste plan is implemented.

## **Waste Services and Facilities**

Depending on community demographics, financial resources, and political and public directives, the program may operate its own waste services and facilities, or it may contract with, or oversee permitting of, private firms<sup>5</sup>. Not all waste-related businesses are overseen by the SWM program. Market forces can determine whether auxiliary waste businesses, such as metal scrap dealers, composting, used goods stores, and private materials recovery facilities (MRFs) locate in a community<sup>6</sup>. However, these businesses are used indirectly by effective SWM programs to control wastes by accounting and planning for their impact on the wastestream. Additionally, the program may have some oversight directly or indirectly through permitting requirements<sup>7</sup>.

## **Institutional Regulation**

Wastes are controlled for reasons of health, aesthetics, and public norms<sup>8</sup>. These factors generally are incorporated into institutionalized regulations emanating from local, state, and federal governments<sup>9</sup>. So, to a large degree, control of wastes is prescribed for the SWM program. Municipal and county ordinances, designed to meet state and federal mandates, as well as public concerns, may stipulate along with allowable disposal methods such details as collection days, waste container types and sizes, targeted recycling rates and materials, and prohibited articles<sup>10</sup>.

## **Integrated Solid Waste Management**

Integrated Solid Waste Management (ISWM) is the use of a set of solid waste treatment, disposal, and/or prevention methods in a complementary manner<sup>11</sup>. For example, the choice of mandatory household collection with landfill disposal and voluntary paper, glass and aluminum recycling is common for suburban communities<sup>12</sup>. The optimal set of waste alternatives is chosen based on minimizing costs, while meeting institutional and environmental constraints<sup>13</sup>.

## **Need for Enforcement and Education**

SWM is distinguished from other environmental engineering fields because community behavior is heavily involved. While water and wastewater are channeled through pipes, wastes are generated and discarded wherever, and however, according to public wont. Conventional SWM programs, therefore, include education and enforcement components to implement the chosen waste plan, through changing community disposal behavior<sup>14</sup>.

## **Community Involvement**

While the community creates the wastestream volume and location, and consequently the waste situations that must be managed, it is also involved in waste management in four ways. First, as described already, the community provides direct and auxiliary waste services. Some of these concerns are not market-driven; school education programs and group recycling drives can result in additional recycling or collection facilities. Second, certain organizations aid the SWM program in promoting sound waste disposal. These entities include schools, health departments, and

environmental groups through education, and police and court systems through enforcement efforts. Third, commercial, public, private, and government bodies such as waste businesses, concerned citizens, and health departments affect how much waste is generated and what is done with it through political lobbying and/or its eventual regulatory outcome. Fourth, feeder and training organizations such as universities and SWM professional groups supply personnel and hence, ideas, to the SWM program and the governmental environmental agencies regulating it.

## **2.2 CONCEPTUAL FRAMEWORK OF CSWM**

A conceptual representation of conventional SWM for a typical community is provided in Figure 2-1. As noted above, the responsibility of managing the community wastestream lies with the central SWM program. With its active planning and implementation of community waste management, what happens to the wastes is within the purview of this program, regardless of the community situation. The framework can be simplified to the basic elements of a conventional SWM program, shown in Figure 2-2. The focus of the simplified model is on the SWM program, with the general community waste situation implicit within program planning.

The basic nature of the model in Figure 2-2 facilitates comparative and general analysis on the wide range of diverse conventional and tribal communities, and is used in the remainder of this work. Note, however, community behavior is important for both conventional and tribal SWM programs because it creates the waste circumstances that must be dealt with. Essentially, for any waste situation, the local SWM program carries out mandates from the several levels of government agencies, including those dealing with health, SWM, and general environmental matters, as conceptualized in the top box of Figure 2.2. In the box below, central administrative functions and management decisions of the program are separated from the program's three practical functions, ISWM, enforcement, and education. In other words, the SWM manager's decisions are reflected in the "administration box", and enforcement, education and daily ISWM implementation are reflected in their respective boxes.

For example, the decision to construct a landfill is affected by regulatory requirements that prescribe to a large degree what the City Council and/or SWM program will be deciding. How the landfill is affected by administrative factors such as costs, jobs created, etc., are examined, as well as any impacts on enforcement, education, and ISWM. Enforcement and education might be considered in light of their greater need in convincing the community to use the new facility. In terms of ISWM, the landfill is compared with other alternatives and present services. Again, the model is quite general, and intended to demonstrate only the major aspects of SWM program decision making and plan implementation.

## **2.3 UNDERLYING ASSUMPTIONS OF CSWM**

The relevance of the above model to tribal SWM problems rests in several premises described briefly below. Discussion of each is elaborated upon in the next four chapters.

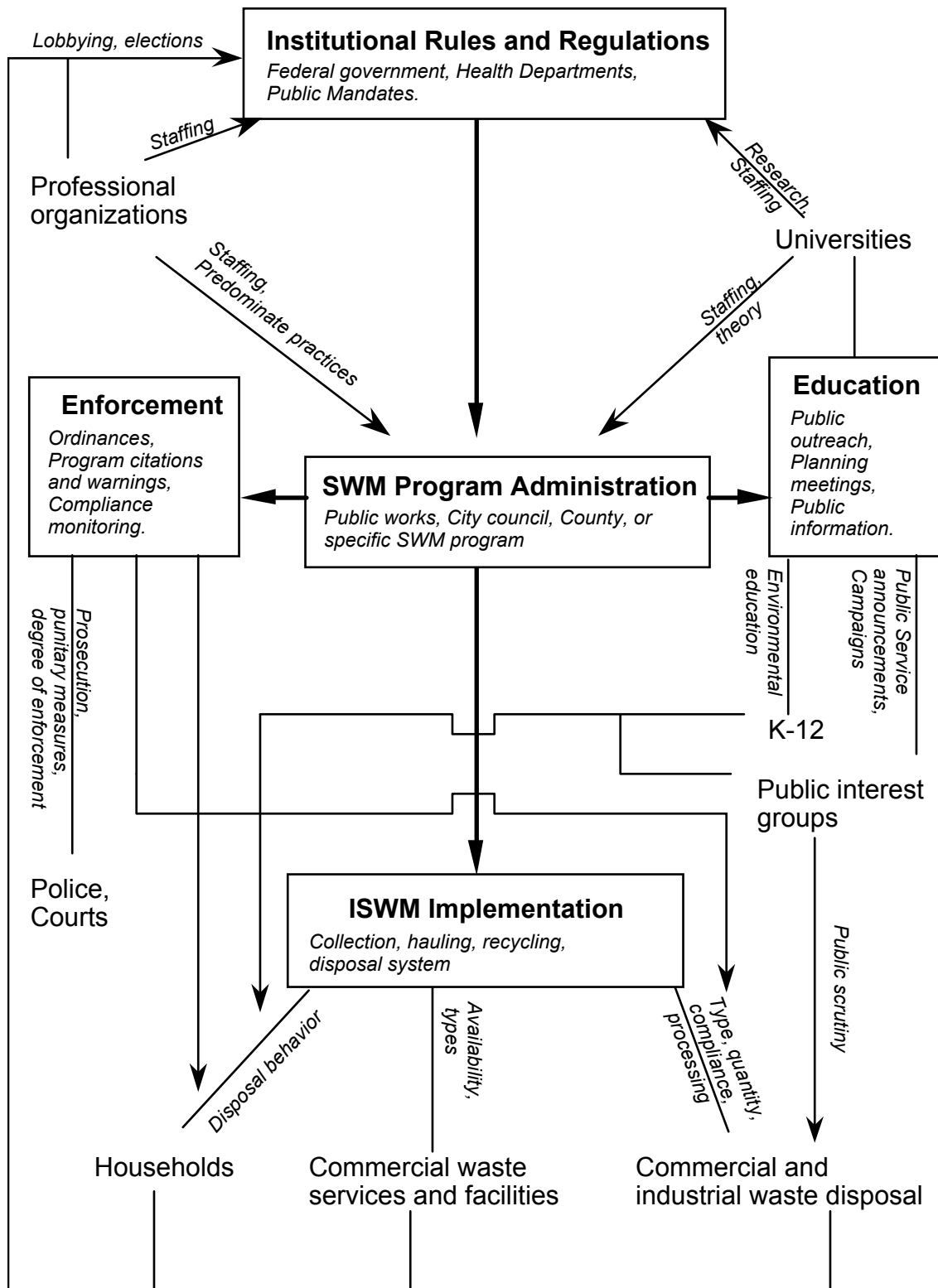


Figure 2-1  
Conventional community solid waste management.

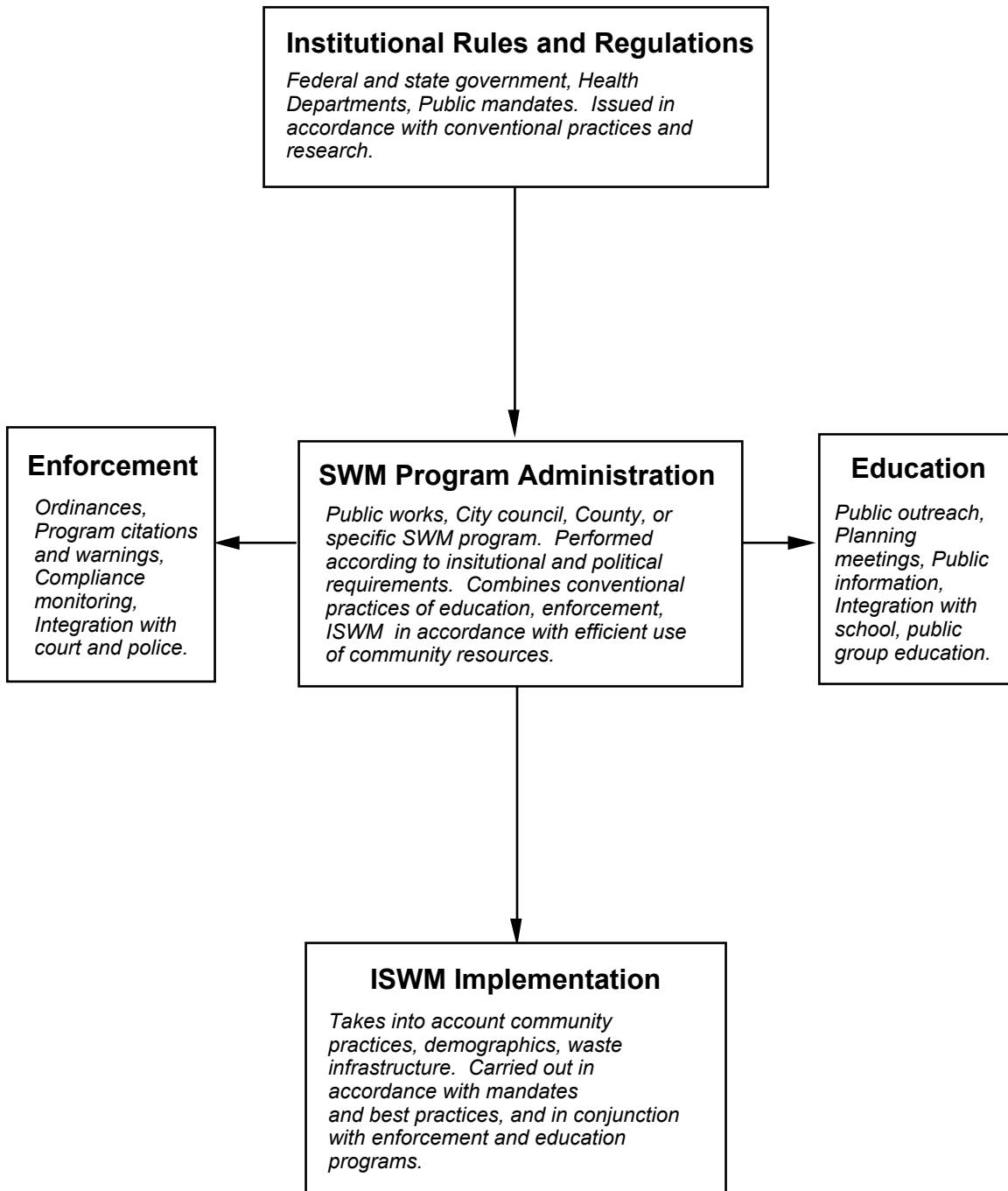


Figure 2.2  
Conceptual framework for a conventional solid waste management program.

## Context

The importance of context in the waste situation being handled is made clear in Chapter 4. What should be recognized is that conventional SWM lacks context; it is assumed to fit each community it is applied to<sup>15</sup>, an idea termed “universalistic”<sup>16</sup>. For example, while the use of ISWM may result in the choice of an incinerator for one community and a transfer station for another, the objective and procedure is the same, to minimize costs with respect to meeting institutional objectives. Wastestream characteristics are taken into account, but not intrinsic community characteristics.

## Nature of Waste Management

As detailed in Chapter 4, an important premise of ISWM is the linear and "specific" nature of how SWM is carried out and planned<sup>17</sup>. For each situation, an objective, usually cost minimization or waste reduction, is designated and tradeoffs are identified. A limited number of alternatives are evaluated, based only on concerns directly related to waste, such as waste quantities and costs. Once the information is gathered, how decisions are made is relatively fixed. One optimal choice, the least cost, or the most waste diverted, exists.

The nature of the program itself is also hierarchical, with specific positions for specific duties<sup>18</sup>. For example, a collection vehicle is designated for recyclables. The driver is designated for the vehicle and a particular route. A particular time and day is set for the particular route. The driver reports to a manager, the manager reports to the City Manager, the City Manager to the City Council. City SWM ordinances incorporate county SWM policies, which incorporate state rules, which incorporate federal guidelines.

## SWM Authority

Another premise of conventional SWM is that the SWM program has authority over the community and land for which it is responsible, and that it has the resource capacity to exercise that authority<sup>19</sup>. Such authority is automatic through the federal-state-county-city hierarchy. Where local authority is not capable, the higher level authority is responsible<sup>20</sup>. Further, community members must respond to the program authority through either the mechanisms of enforcement or education. Otherwise, control of the community waste situation is problematic.

## Assumption of a Conventional Community

The above general premises are attributes present in a conventional, "western-industrialized", community<sup>21</sup>. So, perhaps not surprisingly, CSWM assumes conventional community characteristics inherently. Indian Reservations differ substantially from conventional communities in a variety of ways associated with the above premises. The importance of a conventional community assumption when applying CSWM becomes apparent in subsequent chapters. Because tribes face different SWM circumstances from conventional communities, CSWM engineering to be inappropriate in many reservation situations.

## 2.4 CONCLUSIONS

The majority of communities in the U.S. practice CSWM engineering to handle their waste problems. While the community is inherently involved in waste management, the SWM program ensures a sound and workable waste plan is implemented. From the perspective of the program, the basic components involved are institutional and societal regulations and the agencies that set them, the local administration of the SWM program, and the functional program components of ISWM, enforcement, and education. While quite general, a conceptual model of CSWM is based nevertheless on several premises. A lack of situation context, hierarchical decision making, and full and capable authority over the community are assumed. These assumptions are characteristic of conventional ("western-industrial") communities. The focus of the remainder of this study is on tribal communities -- how they differ from conventional communities in regards to SWM, and how these differences prevent CSWM from working properly and contribute to the present state of SWM on reservations.

---

<sup>1</sup> From DeLillo, D., *Underworld*, Simon & Schuster, New York, 1997.

<sup>2</sup> Tchobanoglous, G., H. Theisen, S. Vigil, *Integrated solid waste management: Engineering principles and management issues*, McGraw-Hill Inc, 1993.

<sup>3</sup> Ibid. Accumulated wastes thrown into city streets and stored in homes fed and housed a flea-infested rat population, ultimately causing the dramatic spread of the Bubonic Plague that wracked Europe's cities in the 14th Century.

<sup>4</sup> 40 CFR § 256.02.

<sup>5</sup> Environmental Protection Agency, *Decision-makers guide to solid waste management*, Solid Waste and Emergency Response (OS 305) EPA/530-SW-89-072, 1989.

<sup>6</sup> California Integrated Waste Management Board, Waste Prevention and Market Development Division, <http://www.ciwmb.ca.gov>

<sup>7</sup> Environmental Protection Agency, *Decision-Makers Guide To Solid Waste Management*, *supra* note 5.

<sup>8</sup> Tchobanoglous, G., H. Theisen, S. Vigil, *Integrated Solid Waste Management*, *supra* note 2.

<sup>9</sup> Ibid.

<sup>10</sup> 40 CFR Parts 241, 243, 256.

<sup>11</sup> Tchobanoglous, G., H. Theisen, S. Vigil, *Integrated solid waste management*, *supra* note 2.

<sup>12</sup> Biocycle Nationwide Survey, "The state of garbage in America", *Biocycle*, 54- 61, April 1996.

<sup>13</sup> Solid Waste Association of North America, *Introduction to managing integrated municipal solid waste systems*, Course Manual, Pub # GR-G 002.7, June 1995.

- <sup>14</sup> See CFR 40 Part 256, California Integrated Waste Management Board Program Description, [http://: www.ciwmb.ca.gov](http://www.ciwmb.ca.gov), Environmental Protection Agency, *Decision-makers guide to solid waste management*, *supra* note 5.
- <sup>15</sup> See for example, CFR 40 Part 256; Solid Waste Association of North America, *Introduction to managing integrated municipal solid waste systems*, *supra* note 13, and USEPA, *Characteristics of municipal solid waste in the United States: 1990, 1992, 1995 updates*, Office of Solid Waste and Emergency Response.
- <sup>16</sup> Parsons, T., *The social system*, Free Press, Glencoe, IL, 1951.
- <sup>17</sup> See for example, Solid Waste Association of North America, *Introduction to managing integrated municipal solid waste systems*, *supra* note 13; Environmental Protection Agency, *Decision-makers guide to solid waste management*, *supra* note 5; Tchobanoglous, G., H. Theisen, S. Vigil, *Integrated solid waste management*, *supra* note 2.
- <sup>18</sup> Solid Waste Association of North America, *Introduction to managing integrated municipal solid waste systems*, *supra* note 13.
- <sup>19</sup> See 40 CFR § 256.20 - § 256.22.
- <sup>20</sup> See 40 CFR § 256.10-§ 256.11.
- <sup>21</sup> See for example, Huntington, S.P., "The west: Unique, not universal", *Foreign Affairs*, 28 - 46, Nov/Dec 1996. Note the terms western and industrial in describing communities can be confusing. Western-industrialized here refers to typical communities within countries possessing westernized industrial sectors, including some highly developed Asian countries, such as Singapore and Japan. Further distinction is provided in Chapters 4 and 6.