Chapter II - Background and Biosolids in New England

2.1 Some History

Human wastes have been recycled to soils throughout history. Wastewater sewage solids have been recycled since the first wastewater treatment facilities were constructed in the 19th century. Today, the term "biosolids" describes those wastewater solids that have been treated and tested and are safely and beneficially used to fertilize plants and build healthy soils.

A recent steady growth in the recycling of biosolids in the United States (U.S.) grew out of early 1970s regulations to clean up the nation's waterways, which had become polluted by decades of raw sewage dumping. The Clean Water Act of 1972 set uniform technology-based effluent standards and a national discharge permit system to control the quality of wastewater entering natural waterways. Grants were made to municipalities to assist in constructing the wastewater treatment facilities needed to meet the new discharge standards.

In the mid-late 1900s, wastewater solids separated out through the treatment system generally were disposed of at sea, incinerated, or landfilled. However, in some locations, these sewage sludges were used in agriculture. For instance, Milwaukee, Wisconsin began creating and selling dried sewage sludge fertilizer– Milorganite®–in 1926.

In the late 1970s and early 1980s, federal source control and industrial wastewater pre-treatment programs were initiated to ensure that industrial wastes discharged to municipal sewers would not be toxic, pass through treatment systems, or negatively impact the quality of biosolids. Because of these controls, municipal wastewater and the resulting biosolids today contain very low levels of trace contaminants.

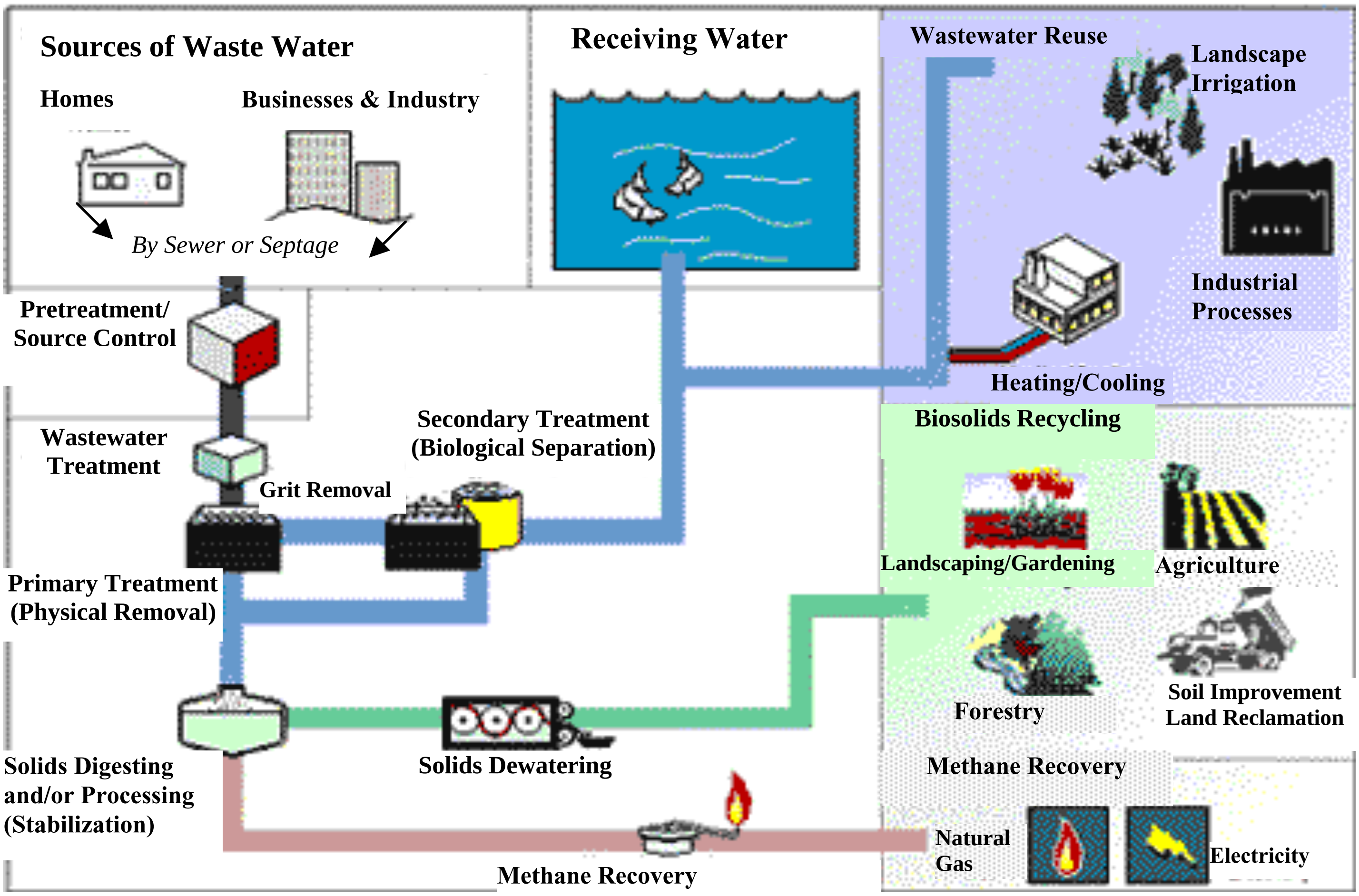
biosolid n. (1990) 'bI-O-"sä-lîd: solid organic matter recovered from a sewage treatment process and used esp. as fertilizer -- usu. used in pl. --*Merriam-Webster's Collegiate Dictionary, Tenth Edition*

biosolids: plural noun: organic matter recycled from sewage , especially for use in agriculture. --*New Oxford Dictionary of English, 1998*

Biosolids means any sludge derived from a sewage wastewater treatment facility that meets the standards for beneficial reuse specified by the department. --*New Hampshire law, Senate Bill 307, adopted 2000.*

When Congress banned the ocean disposal of sewage sludge in the late 1980s, coastal cities, such as Boston, were required to seek alternative sewage sludge management practices. This factor, along with new, more stringent air quality regulations of the 1990s (which impacted incineration), limited landfill space, and an interest in developing sustainable systems, further encouraged biosolids recycling.

Chart 2.1: Typical Wastewater Treatment Process



Source: Northwest Biosolids Management Association

2.2. How Are Biosolids Created?

Biosolids are a byproduct of municipal wastewater systems (illustrated in Chart 2.1) that manage and treat much of the organic waste people produce every day. In urban areas, human waste, food scraps, and used water flows from homes, offices, and factories into sewers.

In more rural areas, septage removed from septic tanks is stored in lagoons, recycled on farm fields, or trucked to wastewater treatment facilities for treatment. Wastewater treatment facilities separate organic matter and other solid materials from the wastewater. The water is treated and discharged to a river, groundwater, or

Wastewater treatment facilities are often called ***POTWs***--Publicly-Owned Treatment Works.
Sewage sludge is the federal legal term for the solids removed from wastewater at wastewater treatment facilities; also called "sludge," although "sludge" can refer to many other things as well.
Wastewater solids is another way of describing sewage sludge.
Septage is what is pumped out of septic tanks.
Water quality professionals, or ***operators***, who work at wastewater treatment facilities use the terms "sludge" or "solids" to refer to the liquid or semi-solid materials removed from wastewater that have not been treated or tested.

the ocean. The wastewater solids, removed from the wastewater, are also called *sewage sludge*. They are treated so that they can be landfilled or incinerated, or they are treated more extensively and converted into a useful fertilizer or soil amendment product. Wastewater solids that are processed for safe land application are called *biosolids*, and they come in several forms including liquid, cake, compost, and heat-dried granules.

2.3. What Can Be Done with Sewage Sludge and Biosolids?
Sewage sludge can be managed through means of disposal or recycling. Disposal of sewage sludge involves either landfilling–with other municipal solid waste or separately–or incineration. Recycling, or "beneficial use," of treated sewage sludge–biosolids–includes land application on farm land and general use as a gardening or landscaping fertilizer and soil amendment after composting, heat drying, or another advanced treatment.

2.4. What is Biosolids Recycling?
Biosolids recycling recognizes that organic wastes should cycle back through the biosphere, through soils, as happens in nature. As illustrated in Chart 2.2, plants animals and humans all depend on the same basic nutrients for a healthy life. Fueled by sun and water, agricultural crops grow by using carbon and other nutrients such as nitrogen, potassium, phosphorous, zinc, and molybdenum that they extract from the soil. Humans, and all animals, require the same essential nutrients, which we

Sewage Sludge Management Practices

<u>Beneficial Use of Biosolids</u>
- ***Land Application***: the practice of applying treated biosolids to permitted farm fields or forests to fertilize crops or trees or reclamation sites to restore vegetation.
- ***Advanced Treatment***: processing biosolids for general garden and landscape use through technologies such as *composting, heat drying, or advanced lime stabilization*.

<u>Disposal of Sewage Sludge or Biosolids</u>
- ***Landfill***: all forms of surface disposal including landfilling with municipal solid waste and monofilling.
- ***Incineration***: burning in sewage sludge/biosolids-only (or other) incinerators.

gain, along with carbohydrates, fats and proteins, by eating plants and animals. In fact, nearly all of the naturally occurring elements, including most trace metals, are needed in small quantities for healthy life functions.

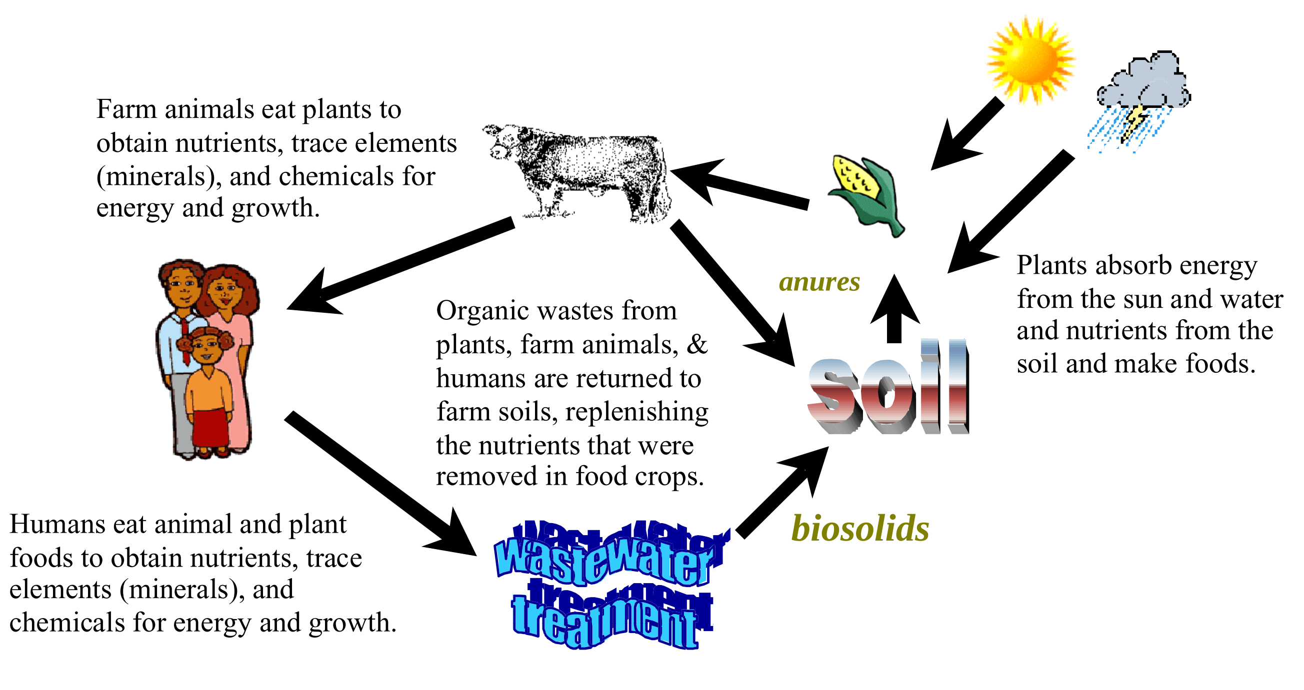
The human wastes and table scraps that enter our wastewater systems contain the same essential nutrients that are found in the food we consume. Biosolids, in turn, become a rich source of essential plant nutrients and organic matter when recycled into the living soil environment.

Humans have recycled organic matter for centuries to improve soil fertility and productivity. Before chemical fertilizers became widely utilized in the mid-1900s, the most common way to fertilize farmland was to mix organic material – such as manure, human wastes, crop residues, and food wastes – into soil. When properly applied and managed, today's biosolids serve the same purpose as manures and provide essential plant nutrients, improve soil structure and health, add organic matter, enhance moisture retention, and reduce soil erosion.

2.5. Recycled Biosolids Classifications

There are two types or “classes” of biosolids identified and regulated by federal law: Class A and Class B. The biosolids’ class is determined by how

Chart 2.2: Biosolids Recycling is Part of the Natural Cycling of Nutrients



extensively the biosolids are processed to control for disease-causing organisms – or "pathogens."

Class A biosolids undergo an advanced treatment process such as composting, heat drying, or advanced lime stabilization, to ensure that the product meets the highest regulatory standards. Class A biosolids have very low levels of pathogens–levels similar to those found in the environment (and lower than many commonly recycled animal manures).

Class A biosolids that also meet regulatory limits on trace metals and chemicals can be applied safely and without limitation on residential lawns and gardens, sports fields, or public parks.

Class B biosolids are extensively treated to control pathogens, but do not undergo the advanced treatments applied to Class A biosolids. Class B products have pathogen levels similar to manures and can be safely used on specifically permitted agricultural sites where the biosolids application is carefully monitored and public access is limited.

While the pathogen levels set for Class A and Class B biosolids differ, *the regulated management of all biosolids ensures protection of public health and the environment*.

Biosolids products can also be differentiated as either *bulk* or *bagged*. Bulk biosolids are typically Class B products which are land applied in mass, and sometimes in liquid form, in a manner similar to the application of animal manures. Bagged products are Class A biosolids that are distributed in bags or other containers for use on smaller landscaping, gardening, or mulching projects. Typical bagged products are composted biosolids or heat dried biosolids fertilizer pellets. Compost products may include sawdust or other organic residue, such as short paper fiber waste from paper mills. This produces a finished compost product that is more similar to topsoil and better suited to the needs of landscapers, contractors, and gardeners than the more nitrogen-rich, manure-like "bulk" biosolids preferred by many farmers.

2.6. Regulatory Overview

In the United States, biosolids are regulated by both the federal and state governments. The U.S. Environmental Protection Agency (EPA) administers the federal biosolids regulation, *Standards for the Use or Disposal of Sewage Sludge*, Title 40 of the Code of Federal Regulations [CFR], Part 503. Part 503 sets forth the minimum requirements for the quality and management of beneficially used biosolids. These include specific pollutant limits and requirements for management practices. In addition, Part 503 establishes operational standards, such as pathogen and vector attraction reduction, monitoring, record-keeping and reporting. The Part 503 rule addresses sewage sludge land application, surface disposal, and incineration.

Pathogens are germs--microorganisms that cause disease in humans.
Vectors are animals that can carry germs from one place to another, such as flies or rodents.
Vector attraction reduction refers to management methods that are required for biosolids; these management methods ensure that animals are not attracted to the biosolids because of decay or odor, thus reducing any chance of spreading pathogens.

The federal regulations are based on more than three decades of continuous operational experience and extensive evaluation of the benefits and risks of using and disposing of biosolids. Some have questioned the federal regulatory program (e.g. Cornell Waste Management Institute, 1999: *The Case for Caution*). However, a large majority of agricultural, soil science, and waste management experts find the federal regulations entirely appropriate. Nonetheless, to further ensure the quality of the federal regulatory standards, a second National Academy of Sciences review is currently underway. (More information, including responses to critics, is available from NEBRA.)

Individual states and localities may set stricter quality standards than the federal standards for beneficial use of biosolids processed and/or utilized within their borders. All six New England states have stricter regulations than the federal Part 503 regulations. All have staffed sewage sludge / biosolids regulatory programs within their environmental agencies (see Chart 2.3).

The federal Part 503 rule is designed to protect public health and the environment from any reasonably anticipated adverse effects of pollutants (contaminants) that may be present in biosolids. In addition to the limits on pathogens discussed in Section 2.5, the federal rule sets strict limits on the concentration of some trace metals and chemicals present in biosolids products.

Nine metals are regulated under Part 503: arsenic, cadmium, copper, mercury, molybdenum, nickel, lead, selenium, and zinc. Several New England states also regulate at least one additional metal not currently included in Part 503: chromium. New England biosolids facilities generally test for all ten metals, as their products may be used in states with different standards. State- and federally-regulated chemicals

Chart 2.3:
State Biosolids, Sewage Sludge, and Septage Management Regulatory Staff in New England

Connecticut	1
Maine	4
Massachusetts	1
New Hampshire	4
Rhode Island	1
Vermont	3

The number of full-time equivalent staff dedicated to regulatory oversight of septage, sewage sludge, and biosolids use or disposal. In the states with high rates of biosolids recycling, there are more regulatory staff.

occasionally found in biosolids in trace amounts include volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), dioxins, and polychlorinated biphenyls (PCBs).

Under the Part 503 rule, biosolids that meet the cleanest (lowest trace metals) standards are classified as "Exceptional Quality" (EQ) biosolids. If they also meet Class A standards, EQ biosolids can be applied in bulk or from bags without restriction--for example, in private or public gardening and landscaping projects. Biosolids that meet the same low-metals EQ concentrations, but meet only Class B pathogen reduction standards can be applied in bulk only on permitted agricultural or other lands.

Almost all biosolids being recycled in New England meet the cleanest (low-metals or EQ) standards and all are processed to meet either Class A or Class B regulatory standards.

2.7. The State of New England Biosolids Recycling

There are about 600 publicly owned wastewater treatment facilities throughout New England that created and managed approximately 425,000 dry tons of sewage sludge in the year 2000.

About one-fifth of this regional total - 93,000 dry tons - are recycled each year in the form of biosolids fertilizer and soil amendment products. Biosolids products are being successfully used to build soil health and fertility on farmland; at sites disturbed by sand and gravel mining; and at nurseries, golf courses, parks, lawns, and gardens throughout New England and the U.S.

As shown in Chart 2.4, the remaining four-fifths of sewage sludge produced in New England in 2000 were managed through disposal. A table of biosolids use and disposal methods for each state is included in the appendix.

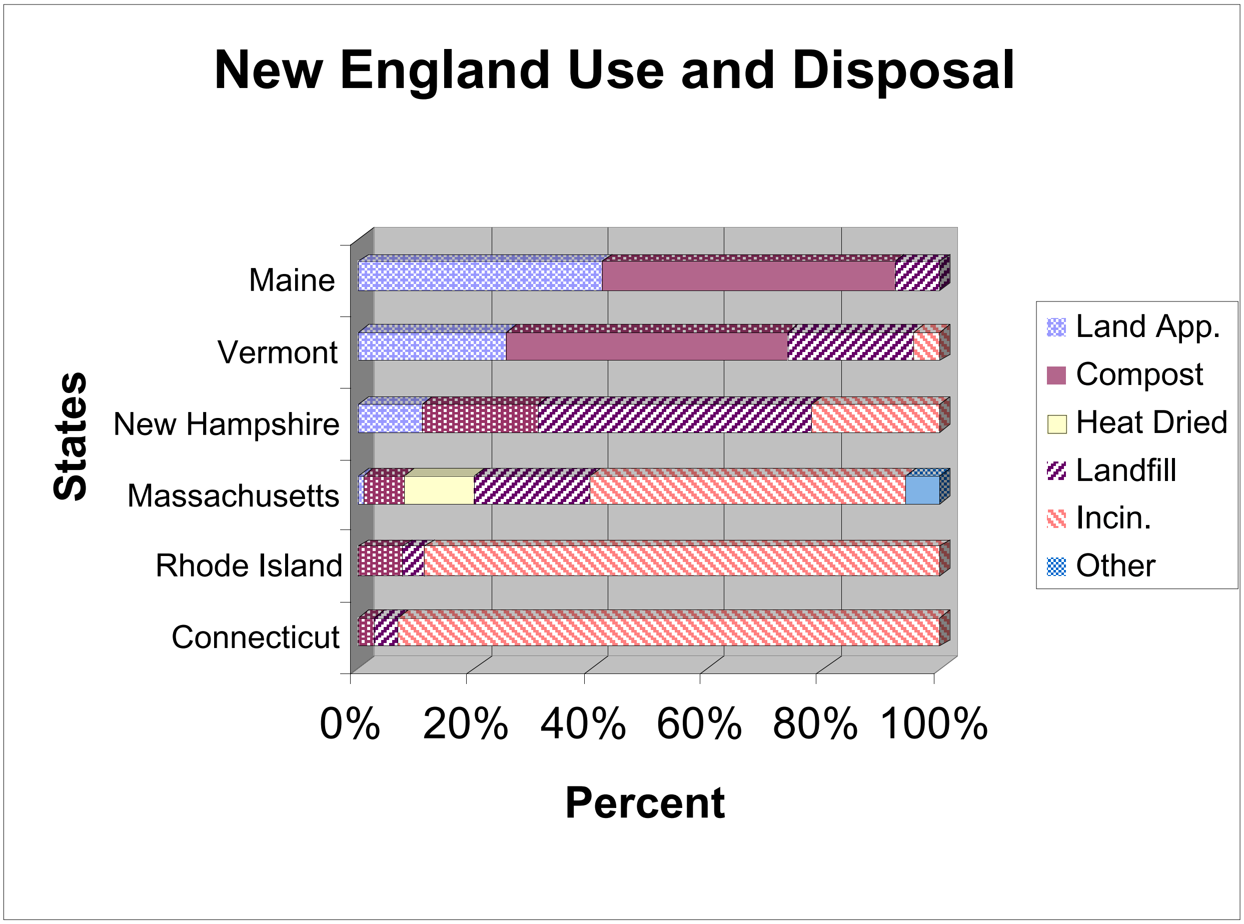
Managing sewage sludge is one of the largest operational expenses at wastewater treatment facilities. This is especially true in New England, where landfill and incineration–the only disposal options–are relatively expensive in comparison to other regions of the country.

Likewise, recycling options in New England also tend to be relatively expensive because of the diversity of state and local regulations and because of the relatively small amount of farmland available for the application of

Saving Soil–and LANDFILL SPACE!

If they had been thrown away, the New England biosolids recycled in 2000 would have required an estimated 350,000 cubic yards of landfill space. That's 6 landfills, each the size of a football field and 33 feet deep! Unfortunately, New England states do not include biosolids in their recycling statistics, so the impact of this recycling program is often unrecognized. If biosolids were not recycled, where would New England site the landfills required to dispose of them, and what would be the social and environmental impacts?

Chart 2.4: New England Biosolids Use & Disposal (2000)*



** See table in appendix for specific state data.*

Class B biosolids. Where suitable land is available, Class B land application generally has been the lowest-cost option for managing biosolids in many parts of the country, including New England.

Incineration

Incineration is the most common wastewater solids management option in use in New England, with nearly 60 percent – or over 248,000 dry tons - of the region's sewage sludge disposed of in this manner. Most of this incineration occurs at large municipal or regional sewage sludge incinerators in Connecticut (e.g. Hartford, Naugatuck, New Haven, Waterbury, West Haven), Rhode Island (Cranston, Providence, Woonsocket), and, to a lesser extent, in Massachusetts (Fitchburg, Worcester's Upper Blackstone facility), New Hampshire (Manchester), and New York (Glens Falls, which incinerates some Vermont sewage sludge). Many incinerators burn both locally-produced sewage sludge and other sewage sludges trucked in for disposal from other communities. The cost for contracted incineration range from $55 to$90 per wet ton tipping fee at the incinerator (the cost of transporting sewage sludge to the incinerator can add an additional $20 or more per wet ton).

For the more densely-populated areas of New England, incineration was chosen for sewage sludge management because it:

- ensures full destruction of pathogens,
- reduces by about 4/5ths the volume of material (ash) to be disposed of in landfills, and
- does not require much land area for storage or end-use of biosolids products.

The disadvantages of incineration include the fact that incineration requires the input of energy for the burning process, as well as the need for treatment and monitoring of air emissions. In addition, incineration does not take advantage of the recyclable nutrients and organic matter that are beneficial in biosolids products.

Southern New England invested in incineration facilities in the 1980s and 1990s and now relies predominantly on these facilities. These incinerators are generally publicly owned and operated; however, some are private facilities that contract with wastewater treatment facilities. Some wastewater treatment facilities in the northern New England states rely on the incineration facilities in southern New England for sewage sludge management. For instance, the town of Winchester, in the southwest corner of New Hampshire, trucks liquid sewage sludge to Rhode Island for incineration.

Saving Soil–and FERTILIZER COSTS!
The 93,000 dry tons of New England biosolids recycled in 2000 provided an estimated 3.7 million pounds of nitrogen (assuming an average of 2% nitrogen). Based on a typical 2001 commercial rate for ureaform nitrogen fertilizer of $319/ton, an equivalent amount of chemical fertilizer nitrogen would have cost $1.3 million. Other macro- and micro-nutrients and the organic matter in biosolids also provide significant monetary value.

Landfilling

The least common sewage sludge management practice in New England is landfilling - about 70,000 dry tons (17%) of the region's sewage sludge was landfilled in 2000. Disposal at landfills of untreated sewage sludge or treated biosolids is a simple process: generally, in New England, the wastewater facility de-waters the sewage sludge to make a semi-solid material that can be easily transported by truck. The semi-solid material is brought to landfills where a tipping fee is charged for each wet ton or cubic yard of sewage sludge dumped. In New England, the sewage sludge tipping fee at landfills ranges from $50 to $80 per wet ton (as with incineration, to cost of trucking to the landfill can add $20 or more per wet ton).

Environmental leaders recognize that landfill space is limited and the siting of new landfills is difficult. Thus, landfilling is not encouraged by state and federal regulatory agencies, but it is the easiest and most common "back-up" option for disposal of biosolids, which, for whatever reason, are not recycled. Just as with incineration, the disposal of biosolids in landfills makes no use of the nutrients and organic matter available in the biosolids.

May, 2001: Governor Angus King of Maine applies biosolids compost to the lawn of the Governor's official residence in Augusta.

Three weeks later, greener grass marks the strip of lawn where the Governor applied the biosolids compost at the Blaine House.

Biosolids Recycling in New England

New England beneficially used one-fifth of the biosolids produced in the region in 2000. Of the more than 93,000 dry tons of biosolids recycled in 2000, over 17,000 dry tons were treated for bulk use on agricultural land. The remaining 75,800 dry tons of New England's recycled biosolids were processed for general landscape and gardening use through advanced treatment methods such as composting and heat drying.

Beneficial use rates vary among the New England states, with Maine and Vermont achieving the highest recycling rates in the region - with two-thirds or more of their biosolids recycled in 2000.

Biosolids Recycling in Maine

In several recent years, Maine has recycled more than 90% of its sewage sludge through land application programs of lime-stabilized or anaerobically-digested bulk Class B biosolids and through composting programs.

The majority of Maine's bulk Class B land application programs are conducted under contract by New England Organics (NEO), a subsidiary of Casella Waste Management. NEO also operates New England's largest composting operation, the Unity, Maine Hawk Ridge facility, which treats sewage sludge from more than 20 Maine communities.

Several Maine wastewater treatment facilities operate their own land application programs (e.g. Ogunquit) or composting facilities (e.g. Lewiston-Auburn, Old Orchard Beach). Other private companies that manage biosolids operations in Maine include Synagro (which currently manages Portland and South Portland biosolids), and Soil Preparation, Inc.

Maine's high rate of biosolids recycling may be attributed to…

- more than a decade of dedicated efforts to recycle biosolids, especially on the part of several wastewater facilities and a few private biosolids management firms;
- wastewater facility staff willing to work with the public on local issues;
- an active state wastewater operators' and engineers' organization (Maine Waste Water Control Association) that has supported biosolids recycling;
- a dedicated effort on the part of the state regulatory agency to create a safe, thorough, and effective regulatory program;
- progressive regulations that integrate biosolids management into agricultural practices and nutrient management, including a statewide nutrient management law; and
- research and educational efforts from the University of Maine and Cooperative Extension.

However, during the past few years, there have been concerns expressed from some local citizens and communities regarding the use of Class B bulk biosolids on local farms. Odors, the presence of trace contaminants in biosolids, and nuisances such as increased truck traffic have been the major concerns expressed. Several towns have adopted local ordinances, in spite of a state preemption regarding biosolids regulation. In 2001, a bill challenging the state preemption was defeated, and the state Department of Environmental Protection was directed to create guidance to towns as to how they can be involved in regulating and overseeing biosolids management within their borders.

See the Appendix case studies of the Lewiston-Auburn and Ogunquit biosolids recycling programs.

Biosolids Recycling in Vermont

In Vermont, as in other parts of northern New England, about half of the population is linked to sewer systems; the other half depend on septic systems. In 1999, 70% of the state's septage was processed at wastewater treatment facilities; most of the remainder was directly land applied.

About three-quarters of the 8,200 dry tons of Vermont sewage sludge is recycled, mostly by composting (48%), but also by bulk Class B land application (26%). Composting is done in Bennington, Johnson, Springfield, and Wilmington, as well as at facilities in New York and Quebec. Bulk Class B

Wastewater solids slide from the Middlebury, VT belt filter press, ready to be treated to make biosolids.

land application is managed mostly by the local public facilities (e.g. St. Johnsbury and Hartford/White River Junction), although some Class B land application is performed by private company under contract (e.g. Brattleboro).

Bulk biosolids land application to Vermont farms has declined over the past decade (almost all was land applied in 1987), partly due to public concerns and increased regulatory requirements. The 1998 decision by Chittenden County--the Burlington area--to truck sewage sludge to southern Quebec to be composted added to the decline of bulk land application.

This feed corn field adjacent to the local WWTF is fertilized with Richmond, VT

In 1999, the Vermont Public Interest Research Group released a report condemning biosolids recycling and encouraging landfilling of biosolids. However, their campaign to limit biosolids recycling had minimal effect on actual practice, in part because biosolids management experts refuted many of the inaccurate claims made in the report. Meanwhile, the siting of a regional biosolids compost facility in East Montpelier met with local resistance, and even though all permits were obtained, construction of this facility remains unlikely. Most recently, there has been an increase in exportation of sewage sludges from Vermont to New York and Quebec. In 1999, 48% of Vermont sewage sludge was managed out of state.

Biosolids Recycling in New Hampshire

From 1996 to the present, New Hampshire's rate of recycling has diminished from more than 50% to less than 30%, due mostly to public scrutiny and stricter state and local regulations discouraging land application of bulk Class B biosolids. White Mountain Resource Management is currently the only private company land applying bulk Class B biosolids and does so under contract for the cities of Concord, Franklin, and Nashua. Composting of biosolids is undertaken by public facilities, such as Merrimack, Milford and Plymouth, or under contract with private operations (e.g. Claremont and Hanover).

Since 1995, New Hampshire has seen some public debate regarding biosolids recycling. Concerns grew when the lack of any state regulations in 1994-95 allowed poor local field management of biosolids, resulting in some odor problems and nuisance concerns. Emergency regulations were imposed in November, 1995 and permanent regulations followed. Nonetheless, public pressure continued, strengthened by local environmental groups and concern on the part of the Legislature (where more than 20 biosolids/sewage sludge-related bills were considered in 1998-2001). In 1999, final New Hampshire regulations were passed that are the most stringent in the region with respect to trace metal and chemical quality and testing requirements.

Concord, NH biosolids are applied to a local field where corn for dairy cow feed is grown.

The Nashua "egg," an anaerobic digester, which produces Class B biosolids for land application, was dedicated in May, 2001. It also produces methane for energy.

Many working in the field of biosolids management in New Hampshire expect a continuation of the trend toward more advanced treatment of sewage sludges and the production of Class A products. For example, the capital city of Concord has plans to create an advanced-lime-treated Class A biosolids that will still be used on farm fields. However, the start-up of the new Nashua digester in 2001 represented a new commitment to traditional Class B land application.

See the Appendix case study "Merrimack Biosolids: Nourishing Greener Parks and Fairways."

Biosolids Recycling in Massachusetts

Massachusetts recycles about 20% of the sewage sludge produced in the state--almost all of it as Class A material. The largest recycler is the Boston area Massachusetts Water Resources Authority (MWRA), which produces the only Class A heat dried pellet fertilizer biosolids product in the region. MWRA recycles 100% of its biosolids and accounts for 12% of the state's sewage sludge. Successful compost operations, which treat about 7% of the state's sewage sludge, are found in Amesbury, Billerica, Dartmouth, Holyoke, Mansfield, Marlborough, the Otis Air National Guard Base in Sandwich, Pepperell, Southbridge, and Williamstown. There is virtually no land application of Class B biosolids.

Mixing sewage sludge and sawdust for static pile composting at the Hoosac Water Quality facility in Williamstown, MA.

Massachusetts has strong policy commitments to increasing biosolids recycling rates and reducing the toxicity of the waste-stream to further encourage biosolids recycling. However, investments in infrastructure made during the 1980s have committed many of the Commonwealth's communities (e.g. Worcester) to incineration or landfilling of sewage sludge. In addition, Massachusetts has a dense population and a low percentage of farm land suitable for Class B biosolids land application.

Greater sewage sludge recycling may be possible in Massachusetts with composting and other advanced treatment programs, especially if state regulations can be further adapted to stimulate the development of such programs. New regulations are being considered by the Department of Environmental Protection, but rule-making is a long process and has been delayed. The successful start-up in 2000 of the Marlborough mixed solid waste and biosolids co-composting facility is an encouraging biosolids recycling development.

See the Appendix case study "Massachusetts Water Resources Authority - National Demand for Fertilizer Pellets."

Massachusetts Secretary of Environmental Affairs Robert Durand shows biosolids compost to a photographer at a public event touting the benefits of biosolids recycling for lawn-care at the Harvard Medical

Connecticut and Rhode Island
Connecticut and Rhode Island have biosolids recycling rates below 10%.

Connecticut continues to have a regulatory structure that does not encourage biosolids recycling and 97% of the state's sewage sludge is disposed of. In addition, significant troubles have befallen the Nutmeg State's biosolids recycling efforts. During the 1990s, Hartford Metropolitan District Commission invested millions of dollars in a biosolids composting facility. Odor control at the facility was a problem for several years, but had finally had been addressed at the time of a tragic fire that destroyed the facility in November, 1999. The malodors and smoke from that fire left a strong negative public impression that may make it difficult in the near future to gain support for new biosolids composting programs.

Currently, biosolids recycling accounts for only 3% of sewage sludge management in Connecticut and occurs only at composting operations in a few towns such as Fairfield and Farmington.

In 1998, Rhode Island adopted new regulations that facilitate biosolids composting - including the same trace metals standards as the federal Part 503 regulations. Biosolids recycling accounts for only 8% of sewage sludge management in Rhode Island and occurs only at the biosolids composting operations in Bristol and West Warwick.

2.8. Looking Forward
Biosolids recycling in New England has recently experienced a challenging time, with public concern and stricter regulation. Despite the expressed support for biosolids recycling by state environmental leaders, there have been declines in recycling rates in some states. Even the region's biosolids recycling leader, Maine, has begun to show a small decline in the rate of biosolids recycling. Strong public

recognition and support for the benefits of recycling will be required in the near future if this decline is to be reversed.

No one questions the agronomic benefits of recycling biosolids–and demand for biosolids products has been increasing steadily. But, recently, in New England, there have been questions and concerns about biosolids recycling regarding:

- trace chemicals,
- trace metals,
- pathogens,
- odors,
- nuisances such as truck traffic, and
- the level of oversight and enforcement.

There have also been various events that have added to public interest, including:

- a lawsuit alleging harm from biosolids in Greenland, NH;
- claims of harm to farm animals;
- claims of groundwater or well contamination from biosolids (e.g. in Pelham and Sandown, NH);

Such events have been investigated by state experts and biosolids have not been found to be a cause of harm. Nonetheless, these claims have had negative impacts on public perceptions of biosolids, and one result has been bans or severe restrictions on biosolids use adopted by some local communities, especially in New Hampshire.

At the same time, within the agricultural and regulatory communities, biosolids recycling, along with similar practices such as manure management, continually faces technical issues that are being researched and may be addressed with further regulation, including…

- the fact that Class B biosolids that are lime-stabilized can add to calcium saturation of agricultural soils;
- the fact that biosolids recycling, like the recycling of manures, can add phosphorus to soils in amounts that may be of concern in phosphorus-sensitive watersheds;
- the fact that many septage and wastewater solids lagoons in rural parts of the region are filling up with solids that need to be managed, requiring additional biosolids management capacity; and
- the fact that septage processing relies ever more heavily on wastewater treatment facility capacity, thus linking rural septic owners to urban wastewater facilities.

Clearly, biosolids management will continue to be challenging into the future. However, the overall environmental benefits obtained are worth the effort:

- reduced demand for landfill space,
- reduced demand for native soil,
- reduced demand for fertilizer,
- local or regional recycling of nutrients and organic matter,
- soils improved by biosolids organic matter and nutrients.

NEBRA and other professional organizations working in the water quality field are tracking current issues, supporting critical research, and assisting in the development of sound policy based on the best currently available scientific understanding. The rest of this report should provide answers to many of the questions people have about biosolids quality. For detailed information on any of the events or topics noted above, please contact NEBRA or see www.nebiosolids.org.

A notable significant positive development that supports increased biosolids recycling in this region–and will likely continue to do so in the future– is the development of biosolids compost markets. Companies such as Agresource, New England Organics and others are selling biosolids compost into some of the highest quality topsoil and soil amendment markets. Because of its consistency, ease of use, high organic-matter content, and availability, biosolids compost is in increasing demand for golf course, sports field, and park soil-building applications. In addition, several New England states' Departments of Transportation are beginning to include biosolids compost in specifications for restoration of construction sites and for use in highway corridors. This increasing demand for biosolids creates strong economic incentives for improved biosolids product quality and consistency.

In general, the region's biosolids experts note the trend away from Class B bulk biosolids use toward more production of Class A biosolids products, especially compost and heat-dried products. For instance, Middlebury, VT, Keene, NH, and several other smaller wastewater facilities that used to land apply Class B biosolids are now trucking their sewage sludge to composting facilities in New York or Quebec. In Massachusetts, Lowell is developing an advanced lime-stabilized Class A biosolids product for topsoil blending and the Greater Lawrence Sanitary District is planning to build a biosolids heat drying fertilizer facility at its North Andover location. The benefit of Class A products is that, due to reduced regulatory requirements and increased ease of handling, they can be more widely distributed and require little or no special management when used.

An additional development that is likely to further improve the quality of New England biosolids programs is the development of the National Biosolids Partnership (NBP) Environmental Management System (EMS) for biosolids. Currently, three New England facilities that recycle biosolids are part of the trial phase of this new federally-funded program: Brattleboro, VT; Lewiston-Auburn, ME; and Merrimack, NH. The EMS program helps biosolids managers ensure continual improvement in biosolids management. By adopting an EMS, biosolids programs commit to regulatory compliance and to going beyond - ensuring constant improvement with respect to environmental impacts and public communication and participation in biosolids programs.

In summary, the lack of growth, the improvements, and the investments in biosolids recycling that have occurred in New England over the past decade may or may not continue, depending on several factors:

- public acceptance;

- demand for biosolids products;
- results of new research;
- odor management concerns and how well they are further addressed; and
- the states' regulatory response to all of these factors.

As one environmental engineer expert in biosolids management points out (Jager, 2000): "New Englanders receive benefits every day from our wastewater treatment facilities. The quality of our surface and ground water has significantly improved as a result of the investment made in clean water infrastructure. Responsible biosolids management is a logical extension, an integral part, of that clean water system.