

Saving Soil



Biosolids Recycling in New England

New England Biosolids and Residuals Association
September 2001

Saving Soil

Biosolids Recycling in New England

September 2001

Ned Beecher and Jennifer Ostermiller

NEBRA

Tamworth, NH

Andrew Brydges, Kristen Kruger, and Sarah Woodhouse

EFI

Boston, MA



A report of the
New England Biosolids and Residuals Association

Publication support provided by:

Camp, Dresser & McKee, Inc.
Massachusetts Water Resources Authority
New England Organics
Synagro
White Mountain Resource Management, Inc.

...and the membership of NEBRA

© Copyright 2001
New England Biosolids and Residuals Association (NEBRA)
All Rights Reserved.

COPYING NOTICE

Permission to copy all or part of this report, without alteration, for individual use, and not for sale, is hereby granted, as long as every copy includes the following information, which is printed on most pages: "From *Saving Soil: Biosolids Recycling in New England*, © NEBRA, 2001. Available at www.nebiosolids.org or 603-323-7654. Copying, without alteration, for individual use, and not for sale, is allowed, as long as every copy includes this note in its entirety."

New England Biosolids and Residuals Association (NEBRA)
P. O. Box 422 • Tamworth, NH • 03886
phone 603-323-7654 • fax 603-323-7666
www.nebiosolids.org

Acknowledgements

The authors thank the following for their assistance with this report:

Earle M. Chesley, Roger Descoteaux, Larry Spencer and Jim Taylor, Merrimack Public Works Wastewater Division, New Hampshire

Charley Hanson, White Mountain Resource Management, Inc.

Cathy Jamieson and Ernie Kelley, Vermont Department of Environmental Conservation

Geoff Kuter, Agresource Inc., Amesbury, Massachusetts

Robert Norwood, Connecticut Department of Environmental Protection

Kristen A. Patneau and Richard Mills, Massachusetts Water Resources Authority,
Boston, Massachusetts

Philip Pickering, Ogunquit Sewer District, Maine

Alex Pinto, Rhode Island Department of Environmental Protection

Larry Polese, Massachusetts Department of Environmental Protection

Michael Rainey, New Hampshire Department of Environmental Services

Mac Richardson, Lewiston-Auburn Water Pollution Control Authority, Lewiston, Maine

Robert Wells, Middlebury Waste Water Treatment Facility, Vermont

David Wright, Maine Department of Environmental Protection

And the following reviewers: Andrew Carpenter (White Mountain Resource Management, Inc.), Patrick Cloutier (South Portland WWT), Shelagh Connelly (White Mountain Resource Management, Inc.), John Donovan (Camp, Dresser & McKee), Cathy Jamieson (Vermont DEC), James Jutras (Essex Junction, VT WWTF), Kristen Patneau (Massachusetts Water Resources Authority), Alex Pinto (RI DEP), and Clayton (Mac) Richardson (Lewiston-Auburn Water Pollution Control Authority).



Paper copies from NEBRA are printed on recycled paper with a minimum of 30% post-consumer content.

CONTENTS

Chapter I: Executive Summary	i-ii
Chapter II: Background and Biosolids in New England	1
2.1 Some History	1
2.2 How Are Biosolids Created?.....	2
2.3 What Can Be Done With Biosolids?.....	3
2.4 What is Biosolids Recycling?.....	3
2.5 Recycled Biosolids Classifications.....	4
2.6 Regulatory Overview	5
2.7 The State of New England Biosolids Recycling	7
Chart 2.4: New England Biosolids Use and Disposal	8
Incineration, Landfilling, Biosolids Recycling in New England, ...Maine, ...Vermont, ...New Hampshire, ...Massachusetts, ...Connecticut & Rhode Island	
2.8 Looking Forward	15
Chapter III: The Quality of New England Biosolids	19
3.1 Biosolids Quality	19
3.2 Biosolids Agronomic Quality	19
3.3 Assuring Biosolids Quality with Respect to Trace Contaminants	20
Pretreatment, Wastewater Treatment, Biosolids Treatment, Agricultural Application	
3.4 Biosolids Quality Questions	23
What About the Pathogens?, What About the Chemicals?, What About the Heavy Metals?	
3.5 Trace Metals in New England Biosolids	28
Chart 3.3 Trace Metal Concentrations in New England Biosolids	30
Charts: Average Concentrations of Trace Metals in States' Biosolids.....	31
3.6 More About the Trace Metals Data	37
Chapter IV: Conclusions	37
Appendix	39
A.1 Trace Chemical Data for New England Biosolids	39
A.2 Trace Metal Data Sources	44
A.3 Trace Metal Data Quality Control	45
A.4 Trace Metal Detection Limits.....	46
A.5 Variability of Trace Metal Levels	47
A.6 Accumulation of Trace Metals in Agricultural Soils	48
References and Resources.....	49
Additional Charts	50-58
Case Studies	
• Putting Biosolids To Use: Spectacle Island, Boston Harbor	
• Ogunquit: Biosolids Growing Great Hay!	
• Massachusetts Water Resources Authority: National Demand for Fertilizer Pellets	
• Lewiston-Auburn Water Pollution Control: Being a Good Neighbor	
• Merrimack Biosolids: Nourishing Greener Parks and Fairways	

Chapter I – Executive Summary

Over the past several years, public interest in the recycling of biosolids has grown in New England and in several other regions of the United States. In particular, concerns have been raised about the potential impacts of biosolids recycling on public health and the environment. This has led to a demand for accurate information and data regarding current biosolids recycling practices and the quality of biosolids products. In an effort to meet this demand, the New England Biosolids and Residuals Association (NEBRA) has created this report, *Saving Soil: Biosolids Recycling in New England*.

This report provides background information about biosolids recycling, applicable regulations, and state-by-state summaries of recent developments in biosolids management in the region. Included are definitions of common terms, explanatory charts, tables, and graphs, and five specific case studies of representative New England biosolids recycling operations.

Saving Soil provides the best current estimates of how biosolids are managed in each of the New England states, including the percentages of biosolids landfilled, incinerated, and recycled through heat drying, composting, or land application.

There are about 600 publicly owned wastewater treatment facilities throughout New England that managed approximately 425,000 dry tons of sewage sludge in 2000. Just over one-fifth of the regional sewage sludge total was recycled as biosolids and soil amendment products. Of the more than 93,000 dry tons of biosolids recycled in 2000, 18.5% were treated to Class B standards for bulk use on agricultural land and 81.5% were treated to Class A standards for general landscape and gardening use through composting or heat drying.

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 (i.e. 6 landfills, each the size of a football field and 33 feet deep). In addition, New England biosolids recycled in 2000 provided an estimated 3.7 million pounds of nitrogen (assuming a conservative average biosolids content of 2% nitrogen). NEBRA estimates that an equivalent amount of chemical fertilizer nitrogen would have cost \$1.3 million.

Individual biosolids recycling rates and systems vary within New England. In recent years, Maine has had the highest recycling rate in the region, with more than 90% of its sewage sludge treated for beneficial use in agricultural and general landscaping applications. Vermont recycles about 75% of its sewage sludge, primarily through composting. New Hampshire's rate of recycling has declined from 50% in 1996 to 30% in 2000, due primarily to public scrutiny and stricter state and local biosolids land application regulations. Massachusetts recycles about 20% of the sewage sludge produced in the state, almost all of it as Class A material, including a large proportion of

Boston's Massachusetts Water Resources Authority (MWRA) heat dried "Bay State Fertilizer." Connecticut and Rhode Island each have recycling rates below 10%.

Much of the *Saving Soil* report focuses on the quality of New England's recycled biosolids, including chemical and trace metals data. Analysis of seven years of data for 37 New England biosolids products shows that average concentrations of the ten metals for which testing is typically required are remarkably consistent across the region.

NEBRA found that state averages of trace metals in biosolids from recent testing data are uniformly well within the federal Exceptional Quality ("EQ:" Part 503, Table 3) standards and individual states' strictest standards. Further analysis of the trace metals data shows a downward trend in trace metals levels over recent years as improved industrial pretreatment, pollution prevention, and other programs continue to reduce the concentration of trace metals in wastewater. The data also shows that, from 1994 to 2000, the average concentrations of the trace metals of greatest concern to the public (mercury, cadmium, arsenic, and lead) are also very low.

Saving Soil notes that some decline in biosolids recycling rates has occurred in most New England states in the past few years, despite significant improvements and investments in biosolids recycling programs. The future of biosolids recycling in New England will depend on further public acceptance, continuing growth in demand for biosolids products, and other factors.