

Proceedings from the Biosolids Research Summit

The Water Environment Research Foundation (WERF), organized the Biosolids Research Summit in response to the National Research Council (NRC) of the National Academy of Sciences 2002 report, *Biosolids Applied to Land: Advancing Standards and Practices*, and to address other scientific issues related to land application of biosolids. The NRC report recommends that U.S. EPA update the scientific basis of regulations governing biosolids, improve knowledge of chemicals and pathogens, and evaluate concerns about health effects and exposure. In response to one of the core recommendations of the NRC report, public participation was a key part of the Summit.

The Summit was held July 28-30, 2003, in Alexandria, VA, and brought together a variety of stakeholders to create a multi-year research agenda to address questions about the land application of treated sewage sludge/biosolids.

This report captures the highest-priority research projects regarding land application of Class A and Class B treated sewage sludge/biosolids as determined by participants of the Biosolids Research Summit. See Table 1 for the full list of final research concepts and priority rank (reverse). The report also includes details of the process used at the Summit to facilitate participation and notes from the breakout groups.

Goals of the Summit

The focus of the Summit was to develop a research agenda that addresses research gaps identified by the NRC report, as well as other research needed to ensure protection of public health and the environment. The Summit focused on research needs, as opposed to policy.



The Summit brought together a variety of stakeholders to create a multi-year research agenda to address land application of treated sewage sludge/biosolids.

Participants discussed what they felt was needed to make research credible and legitimate. Through these discussions, four topics emerged: stakeholder involvement, communication, peer review and oversight, and funding. Participants then documented areas of agreement on principles and strategies to achieve research that is credible and legitimate.

Participants were charged with developing and refining research ideas, rank them, and then develop project concept templates for future research. These were grouped into broad categories based on the NRC report. All research topics and ideas generated were able to fit into the following research categories: pathogens; human health; treatment, odor, and management; social, political, and economic impacts (which was not covered by the NRC report, but received interest from the breakout groups nonetheless); fate and transport of organic, inorganic, metals, and nutrients; and risk assessment.

A full transcript of the proceedings can be found at www.werf.org.

RELATED PRODUCTS

Developing Protocols for Measuring Biosolids Stability (99PUM3)

Fate, Transport, and Bioavailability of Metals in Land-Applied Biosolids (D93017)

Evaluating Risks and Benefits of Soil Amendments Used in Agriculture (99PUM1 and 99PUM1RD)

Identifying & Controlling Odor in the Municipal Wastewater Environment (00HHE5A and 00HHE5T)

Assessing Bioavailability of Metals in Biosolids-Treated Soils (97REM5)

Microbial Health Risks Associated with Beneficial Uses of Biosolids (98REM1)

Phosphorus in Biosolids, Commercial Fertilizers, and Animal Manures (99PUM2T1)

RELATED ONGOING RESEARCH

Airborne Biological Contaminants from Land Applied Biosolids (02-PUM-1)

Phosphorus in Biosolids, Commercial Fertilizers, and Manures (99-PUM-2T)

Microbial Health Risks Associated with Beneficial Uses of Biosolids (98-REM-1A)

A Safety Assessment Tool for Land Application of Biosolids (00-PUM-6)

Biosolids: Understanding Public Perception and Participation (00-PUM-5)

Assessing the Fate of Emerging Pathogens in Biosolids (01-HHE-3)

Fecal Coliforms in Anaerobically Digested Biosolids (03-CTS-13T)

Control of Human Parasites in Municipal Biosolids (99-HHE-3)

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Table 1: Priority Research Project Concepts Identified at the Biosolids Research Summit

Rank	Project Concept
1	Rapid incident response study (e.g., outbreak and retrospective case studies, case control study, pilots).
2	Targeted characterization of pathogens in sludge and biosolids (all stages). Variation in treatment: what pathogens are in Class A vs. Class B and ultimate fate in the field.
3	National survey of constituents of concerns in biosolids.
4	Characterization of bioaerosols associated with land applied biosolids.
5	Identify the odor compounds emitted by sludge in the various stages from generation to end use, and specify their sensory potencies and mechanisms of generation and release.
6	Cost-benefit analysis of management options for sludge or biosolids use and disposal.
7	Evaluate the effectiveness of current 503 and other management practices (e.g., BMPs at state and local levels, Manual of Good Practice) of biosolids management and regulatory compliance.
8	Evaluation of the effectiveness of recommended management practices in minimizing pollutant transport from biosolids amended sites.
9	Conduct influent-to-effluent evaluation of treatment processes to reduce or minimize odor generation through process optimization, including investigating additives to control odor.
10	Evaluate emerging and existing treatment technologies (for pathogens, Vector Attraction Reduction, odors, and endocrine disruptor compounds) to achieve desired product quality.
11	Community comparisons (looking at reported health-impacted communities and no impact reported communities: all have land application of biosolids or treated sewage sludge).
12	Origins of differences in perception of risks regarding land application of biosolids or treated sludge.
13	Quality of Life Study: Short-term study to determine the impact of land application of biosolids on surrounding communities and on those who have health concerns that may be associated with this practice.
14	Odor and human health outcome study.
15	Human and ecological risks from long-term land application of chemical contaminants in biosolids and other organic byproducts: changes in bioavailability over time.
16	Evaluation of occurrence of emerging pathogens.
17	Analysis of environmental justice implications of land application of biosolids or treated sludge.
18	Estimating setback needs to protect sensitive areas such as water wells and surface water from intrusion of pathogens.
19	Development of dose-response relationships for pathogens in biosolids and other organic residuals (including via inhalation) to allow for QMRA from land application.
20	Case studies of local, state, and regional government decisions and involvement in land application.
21	Understanding risks of mixtures, multiple stressors, and discontinuous and time-varying exposure.
22	Sampling strategies for field-testing of indicators and pathogens (including bioaerosols).
23	Development of new methods to detect pathogen classes.
24	Evaluate the possibility of using E.coli in place of fecal coliform determination in the 503 regulation.
25	Analysis of past stakeholder input, and development of better methods for broader involvement by stakeholders.
26	New ecological risk assessment methods to evaluate impact of biosolids-treated land development and use.
27	Develop an absolute standard for vector attraction reduction.
28	Protocol for characterizing fate, transport, and toxicity of existing and emerging chemicals of concern in biosolids.
29	Quantification of source exposure factors (including airborne) of chemical and microbial contaminants from land-applied biosolids to allow for risk assessment.
30	White paper to compare land application to other end uses including incineration, landfilling, green energy, and other value-added products. Compare: environmental impacts and risk, sustainability indexes, public perception, cost effectiveness, and lifecycle analysis.
31	Risk perception and development of acceptable risk levels for affected populations.

CONTRACTOR

Lawrence G. Dixon
 Patrick Field
 Consensus Building Institute

CBI Associate Lawrence G. Dixon, in conjunction with the facilitation team (notably CBI Vice President Patrick Field and Juliana Birkhoff of RESOLVE Inc.), prepared this final report with valuable input from Summit participants and the Summit's Program Committee.

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