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# RELEASE OF NITRATE-NITROGEN AND HEAVY METALS FROM LAND-APPLIED BIOSOLIDS IN NORTHERN AREAS

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## **RELEASE OF NITRATE-NITROGEN AND HEAVY METALS FROM LAND-APPLIED BIOSOLIDS IN NORTHERN AREAS**

*Principal Investigators: Dr. George O. Estes, Jianguang Zhao, and Dr. Thomas P. Ballestero, University of New Hampshire*

*Descriptors: Soil water relationships, nitrogen, land disposal, soil contamination, sludge, agriculture, soil profile*

### *Research Objectives:*

Field studies at two New Hampshire sites were conducted from 1993-1995 to evaluate the effects of various rates of broadcast, soil-incorporated wastewater treatment facility (WWTF) biosolids and dairy manure on water, crops and soils. The principal focus was on N release and its impact on NO<sub>3</sub>-N concentrations in soil and water.

### *Principal Findings and Significance:*

Chemical composition of lime- stabilized, dewatered biosolids from the Concord, NH Waste Water Treatment Facility (WWTF) was highly variable ranging from 0.6-5.2% total N over a four-year period. The N content of anaerobically digested biosolids from the Hanover, NH WWTF ranged from 5.0-5.4% over the 1993-95 period; the N range in manure was 0.8-3.4%. Nitrate-N measurements made on soil with the pre-sidedress N test (PSNT) and in water collected via suction lysimeters and from monitoring wells show a slower N release from biosolids. Elevated NO<sub>3</sub>-N concentrations suggest the need for improved management of both manure and biosolids. Acceptance of higher values for mineralizable N would justify lower application rates of soil amendments rich in organic-N. Copper and zinc were the principal metals in biosolids; quantities applied were low compared to naturally occurring levels in soil.