

Title: The Biological Impact of Landfill Leachate on Nearby Surface Waters

Project I.D.: DNR Project No. 83

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Background/Need: Most landfill investigations have focused on the contamination of drinking water supplies. There are also many compounds characteristic of landfill leachates which are of concern to fish and aquatic life communities. It is important to assess the biological impact of leaking landfills.

Objectives: To utilize bioassay techniques to assess the potential for landfill leachates to adversely impact the biologic communities of nearby surface waters. Where the potential for toxicity exists, bioassays were used to chemically characterize and identify the toxic components of leachate-contaminated groundwater.

Methods: Groundwater and surface water samples were collected near five landfills. Aquatic organisms cultured at the State Laboratory were exposed to dilutions of the samples and laboratory control water. Toxicity was determined by lethality or reduced fecundity compared to control groups. Toxic samples were chemically manipulated to isolate and identify the toxic fractions.

Results: Four of five landfills demonstrated chronic toxicity. Surface waters at two sites were acutely toxic to aquatic organisms. Toxicity identification procedures of the surface waters indicated zinc toxicity at one site and possibly a surfactant at the other site. Identification procedures of the chronically toxic sites are pending.

Conclusions: Landfill leachates pose a potential risk to fish and aquatic life once contamination of the groundwater resource has occurred. Bioassays are a useful tool in evaluating the ecological impact and identifying toxic components of groundwater contaminated with landfill leachate.

**Implications/
Recommendations:** Surface waters may be impacted by past or present leaking landfills. Future study is recommended to identify chronically toxic groundwater components and to investigate their mobility and interaction with soil particles.

Key Words: Bioassay, Landfill, Leachate, Toxicity

Funding: DNR

Final Report: A final report containing more detailed information on this project is available for loan from Wisconsin's Water Library, University of Wisconsin - Madison, 1975 Willow Drive, Madison, Wisconsin 53706 (608) 262-3069.