

NATIONAL WATER QUALITY SURVEILLANCE STUDY FOR WATERBOURNE PATHOGENS AND ASSOCIATED INDICATORS IN AGRICULTURAL WATERSHEDS IN CANADA

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ABSTRACT

The National Agri-Environmental Standards Initiative (NAESI) began in 2004 to develop, field-test and recommend science-based non-regulatory environmental performance standards for Canadian agriculture management practices. NAESI standards themes include, biodiversity, pesticides, air and water quality. Under water quality, standards are currently being developed for nutrients, sediments, instream flow needs and waterborne pathogens.

At the outset, an analysis was undertaken of current indicators used in determining occurrence, quantity, source, and relative risks of waterborne pathogens to human and non-human receptors. With that information in hand the national team then embarked on Canada's first national waterborne pathogen surveillance program, focussing on detecting and quantifying a broad suite of relevant agriculturally-derived protozoan and bacterial pathogens along with various water quality indicators; microbial, chemical, and physical.

A network of Canadian experimental agricultural watersheds posing high pathogen risk to water quality and water uses were selected as research study areas. These watersheds have areas of Intensive Livestock Operations (ILO's) specifically intensive dairy, beef, fowl, and pork. Surveillance data from 2005-06 and 2006-07 suggests some challenges in expressing pathogen potential based on existing standard indicators such as E.Coli. For, as ILO' s and pathogen sources vary, so too do predictive indicators or combinations thereof.

Final recommendations of relevant standards (indicator suites) will be made in 2008 for further testing and application as national water quality performance benchmarks in agricultural waters. This paper will outline some of the preliminary surveillance results as well as some of the key factors in the development and testing of promising indicators for agricultural waterborne pathogens.

KEYWORDS

Waterborne pathogens, agriculture, environmental standards, microbial indicators, relative risk.