EXECUTIVE SUMMARY

The aggregate industry is of critical importance to Ontario's economy. Although the extraction of aggregates, including sand, gravel, and in some cases bedrock, has historically been considered a low risk land use from the perspective of groundwater contamination, there is growing concern about the possible impact of aggregate extraction on the long term vulnerability of underlying aquifers to contamination, which is based on the perception that the removal of the aggregate and its associated contaminant filtration capacity poses a significant threat to groundwater quality.

Since aggregate operations themselves are unlikely to constitute a significant threat to groundwater quality, a better understanding on the potential impacts of aggregate extraction must consider the uses to which former aggregate sites are returned after closure, the potential contaminants associated with those land uses, and the actual attenuation mechanisms for those contaminants most likely to be of concern. In Ontario, the overwhelming majority of aggregate sites will be returned to either a naturalized condition, an unlikely source of groundwater contamination, or agricultural production. Numerous studies of rural groundwater quality, including a major survey of water quality in rural south-western Ontario, consistently demonstrate that agricultural production is the source of widespread adverse impacts to rural groundwater quality by nitrate and pathogens as a result of the land application of animal wastes and chemical fertilizers, with pesticides considered a potential concern. Nitrate is relatively stable in groundwater and is unlikely to degrade to a significant extent above the water table, regardless of the extent of aggregate removal. Pesticides rapidly degrade and do not pose a significant threat to groundwater quality. Although there is limited scientific data describing the attenuation of pathogens above the water table, it appears likely that aggregate extraction decreases the attenuation capacity of the remaining overburden material to some extent; however, aggregate extraction has no impact on pathogen attenuation below the water table where significant attenuation occurs through filtration and pathogen inactivation.

These findings suggest that former aggregate sites will only be associated with a very limited range of groundwater quality impacts that are typical of rural settings where the predominant land use is agricultural. At former aggregate sites returned to intensive agricultural or other land uses associated with significant potential for groundwater impacts (e.g., industrial), site-specific studies may be necessary to ensure that adverse groundwater quality impacts are avoided. Agricultural management practices that minimize the use of animal wastes and chemical fertilizers will be an effective means of ensuring that post-extraction use of former aggregate sites do not result in adverse impacts to groundwater quality.