

# How much do farm ponds contribute to reduced risk of Bathing Water failure?

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## INTRODUCTION

Pollution of coastal bathing waters by microbial pathogens is a subject of intense public health concern. In SW Scotland, much of the risk is associated with dairy livestock (Fig. 1). We would like to know how much the risk is mitigated by on-farm measures such as ponds and wetlands.

## MONITORING WORK ON DAIRY FARM CATCHMENT (Fig. 2)

*E.coli* and faecal streptococci were counted in samples of stream water upstream (position C) and downstream (position D) of a 5000m<sup>3</sup> (0.61 ha) disused reservoir in a dairy catchment in Ayrshire over 6 - 8 storm events in 2005.

Discharge was estimated at C using an ISCO sampler fitted with an acoustic doppler AVFM meter.

## RESULTS AND DATA ANALYSIS (Fig. 3)

- *E.coli* loading-exceedance curves were calculated using interpolated, die-off corrected time series data sets of loading vs discharge.
- Using a "What if everyone did?" scenario for dairy farmers in the catchment we estimated the catchment scale loading which would lead to **mandatory** or **guideline** bathing water failure on the coast at Irvine Beach.

...This allows us to estimate the frequency of failure of bathing waters with and without implementing farm ponds as a mitigation measure in the catchment. (Table 1).

## CONCLUSIONS

- The effect of the disused reservoir on the *E.coli* shows that large reductions in risk of significant pollution of bathing waters can be achieved by the use of ponds
- However the beneficial effect for faecal streptococci is less clear, possibly because the open water area is a roosting and nesting areas for birds.

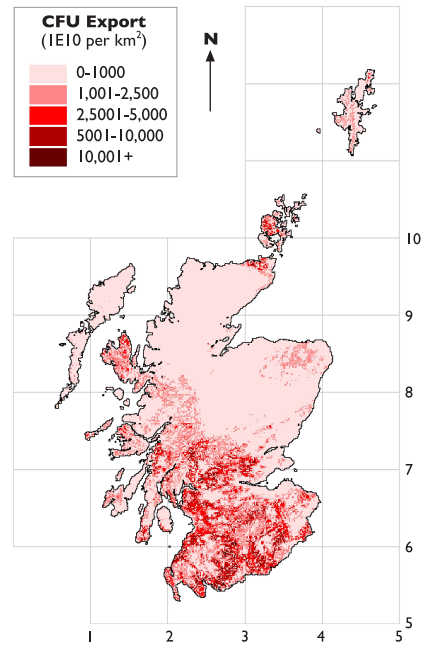


Figure 1. Estimated export *E.coli* from farming sources (x 10<sup>10</sup> per km<sup>2</sup>) (SNIFFER, 2006)

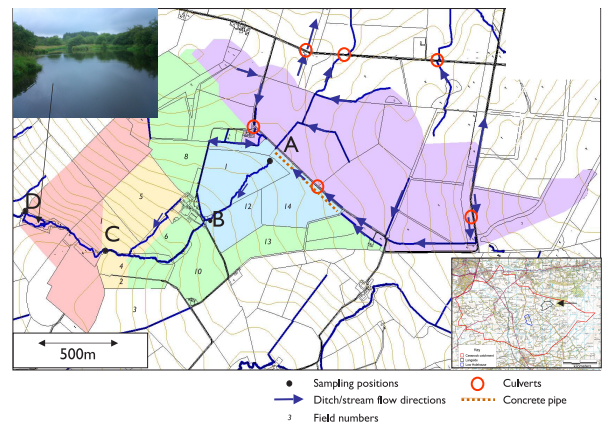


Figure 2. Map of dairy farm, catchment and sampling positions

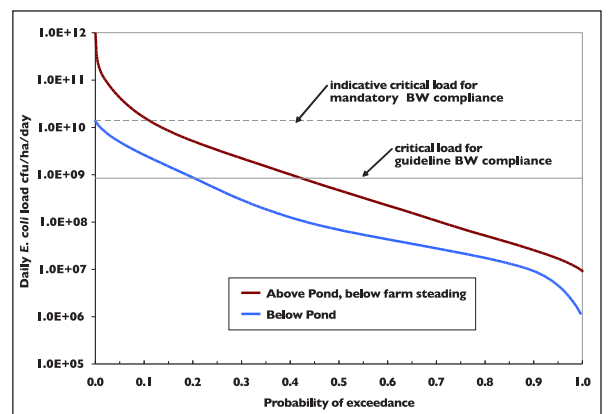


Figure 3. Area loading exceedance curves for *E.coli* at positions C (below farm) and D (below pond)

EEC Directive	Standard FC/100mL	Estimated critical load FC/ha/day	Allowance exceedance frequency	A	B	C	D
1976 Mandatory	2000	1.7.10 <sup>10</sup>	20%	1%	2%	11%	0%
1976 Guideline	100	8.9.10 <sup>8</sup>	50%	15%	27%	42.3%	20%
2006 Sufficient	500	4.4.10 <sup>9</sup>	10%	6%	5%	20%	6%
2006 Good	500	4.4.10 <sup>9</sup>	5%	6.4%	5.8%	20.0%	6%
2006 Excellent	250	2.2.10 <sup>9</sup>	5%	9%	11%	26%	12%

Table 1. estimated frequency of exceedance of FC critical loads for 4 sampling positions