



The limitations of traditional methods has spawned a field of study termed microbial source tracking (MST) which employs culture-independent methods for more accurate water quality assessment and identification of sources of fecal contamination. Quantitative polymerase chain reaction (qPCR) is a culture-independent or molecular method for detection and quantification of a specific target DNA marker even in a complex mixture of non-target DNA sequences. Briefly, total DNA (or RNA) is extracted directly from an environmental sample, thus culturing the indicator organisms is not required. Following DNA extraction, qPCR assays are performed to quantify source-associated (e.g. human, cow) genetic markers to identify sources of fecal pollution present in the sample.



Target	Code	Environmental Relevance / Data Interpretation
Total <i>Bacteroides</i>	qTBAC	One of the prominent bacterial groups inhabiting the intestinal tracts of warm blooded animals including humans, cattle, swine, horses, and dogs. Quantification of total <i>Bacteroides</i> provides a general indicator of fecal contamination.
Total <i>Enterococcus</i>	qTENT	Enterococci, a subset of fecal streptococci, are found in the feces of all warm blooded animals and are believed to have higher survival rates in water than fecal coliforms. As with total <i>Bacteroides</i> , the total <i>Enterococcus</i> assay provides a general indicator of fecal contamination.
Total <i>E. Coli</i>	qTECOLI	The total <i>E. coli</i> assay also provides a general indicator of fecal contamination.
Human <i>Bacteroides</i>	qHBAC	Quantification of three genetic markers of fecal <i>Bacteroides</i> from humans.
Cattle <i>Bacteroides</i>	qCBAC	Quantification of two genetic markers of fecal <i>Bacteroides</i> from cattle.
Canada Goose <i>Bacteroides</i>	qCGB	Quantification of two genetic markers of fecal <i>Bacteroides</i> from Canada Geese
Dog <i>Bacteroides</i>	qDBAC	Quantification of a genetic marker of fecal <i>Bacteroides</i> from dogs.
Seagull <i>Catelllicoccus</i>	qGULL	Quantification of a genetic marker of <i>Catelllicoccus marimammalium</i> shown to be an indicator of gull fecal contamination.
Human Polyomavirus	qHPyVs	Evidence indicates that more than 70% of humans harbor and shed polyomaviruses in their urine.