Gene-Trac® MST

Microbial Source Tracking for Surface Water, Stormwater, and Groundwater

Fecal contamination in water can originate from multiple human and animal sources, which can complicate projects involving mitigation and regulatory compliance.

SiREM's Gene-Trac® microbial source tracking (Gene-Trac MST) uses microbial genetic markers associated with specific microbial hosts (often humans, animals, or agricultural sources) to help our clients better understand and manage fecal pollution in surface water, groundwater, wastewater, and stormwater systems.

Gene-Trac MST is a powerful tool to support the pinpointing of likely sources, assessing risk, planning remediation, and supporting regulatory decision-making.

Gene-Trac MST Testing Provides Actionable Data for Risk Assessment, Source Identification, and Remedial Action Assessment

SiREM's quantitative PCR (qPCR) assays target host-associated microbial genetic markers and general microbial populations as follows:

- **HF183, Human Associated *Bacteroides*:** Detects human sewage impacts according the US EPA method
- **Ruminant Associated *Bacteroidales*:** Identifies agricultural and livestock fecal contributions
- **Canine-Associated *Bacteroides*:** Detects urban dog waste sources
- **Wild Bird Associated *Helicobacter*:** Quantifies fecal contamination associated with wild birds
- **Universal Microbial Profiles:** Comprehensive microbial population profiles for pathogen screening and high-resolution source identification using Gene-Trac next generation sequencing (NGS)

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Gene-Trac MST supports multiple stages of source identification and remediation:

- Identify contamination from agricultural, urban, and wildlife sources
- Differentiate between human and animal fecal contamination
- Prioritize remediation actions and infrastructure improvements
- Make watershed management decisions (e.g., Total Maximum Daily Load calculations)
- Support regulatory compliance
- Track changes in contamination sources over time and following corrective actions

Accreditation and Data Quality Assurance

Gene-Trac MST standard operating procedures adhere to the highest quality standards to provide data suitable for regulatory and compliance applications:

- SiREM's qPCR testing is accredited to the ISO/IEC 17025:2017 quality system standard, including documented training and competency programs, method verification and validation protocols, and regular intra- and inter-laboratory proficiency testing.
- All tests include robust data quality assurance procedures (including positive, negative, and inhibition controls), with full and transparent data reporting for all controls.
- Full traceability for test procedures with Level IV reporting are available upon request.

Custom Target Development and Regional Adaptation

As veterans in qPCR assay development and implementation, SiREM offers custom MST assay development and adaptation to support site-specific and regulatory needs:

- Develop custom host-associated markers for specific regions or species.
- Optimize assays for matrix-specific performance and sensitivity requirements.
- Perform assays for direct detection of viral or microbial pathogens.

Reach out to our technical team to learn how we can address your specific source tracking needs. Please contact us for more information on Gene-Trac MST or to obtain a cost quotation.

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