National View of Water Quality Outcomes Achieved using EPA's Patented MST Technology

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Region	Outcomes Achieved	Results	Project	Motivation
Region 1 	• Identified stream reaches affected by human and cow fecal pollution • Held targeted stakeholder meetings to discuss BMPs to address the sources of fecal pollution	3 sites + for human 2 sites + for cow 0 sites + for horse	• 4 in-stream samples • 2 storm events	Supporting Coginchaug River Watershed-based Plan development CT River Coastal Conservation District
Region 2 	• Demonstrated absence of leaks in abandoned sewage system • Documented persistent contribution from birds	72% samples + for bird 0% samples + for human	• Near shore surface water samples • Winter and summer events	Suggestion that abandoned sewage system was contributing fecal bacteria
Region 3 	• Allocated limited funds to further sewer investigations and repairs along more appropriate sections • Designed and implemented non-structural BMPs to reduce pollution from gulls	100% samples + for gull 8% samples + for human 4% samples + for dog Inter-laboratory agreement	• Surf zone sampled • Summer • Composite samples • Estuarine beach	Tower Road Bayside Beach affected by high levels of enterococcus
Region 4 	• Prioritized areas of sanitary sewer in need of further investigation and repair • Targeted public education campaign to registered pet owners	High human in 2 tributaries High dog in 1 tributary	• 5 tributaries • In stream sampling • Wet/dry weather • 9 sampling locations	Aging sewer infrastructure and elevated fecal coliform in Stewart Creek Watershed
Region 5 	• Cliff swallows under bridge determined to be most consistent source • Identified some areas with potential human source, follow up sampling planned	64% + for bird 20% + for human & goose 0% + for beaver, cow, ruminant, & EPA-human	• 5 sampling events • 4 months of sampling • 6 sources tested	High levels of E. coli at long-term stream monitoring stations *Red Lake Watershed District*
Region 6 	• Located & repaired sanitary pipe • Abatement of human bacteria in dry weather • Located wet weather source of sanitary leak • $700k repair project underway	Outfall samples + for human After repair – for human After rain event + for human	• Sampled outfall • Sampled pipe network to find physical source	High levels of E. coli at wastewater permittee's outfall ncasi National Council for Air and Stream Improvement
Region 7 	• Identified stream reaches and swim beaches affected by human fecal pollution • Identified MS4 drain segments needing further investigation to locate source of human bacteria	Multiple samples + for human, pet and livestock	• Urban and rural sampling locations • Analyses target pollution from local land-use	Elevated FIB measured during compliance monitoring in wet and dry weather
Region 8 	• Determined human is a consistent source at downstream of tributary • Prioritized stream reaches to conduct targeted sampling to locate sources of human fecal pollution	66% samples + for human Frequency of detection elevated downstream 100% samples + for dog	• Single event 4 sites • 3 events 5 sites • Multiple human markers	MT DEQ and MSU Extension reported elevated E. coli in urban reaches of Bozeman Creek Gallatin Local Water Quality District
Region 9 	• Cost effectively demonstrated absence of illicit connections and leaking sewer in extensive urban MS4 • Notified local authorities of direct fecal contributions from homeless encampments	Limited source search to outfalls with: 1. Dry weather flows & 2. Detection of human	MS4 Microbial Source ID Investigation Approach 	San Diego River TMDL compliance goals targeting human fecal sources in dry weather flows
Region 10 	• Resource managers eliminated leaking sewers as a source of high fecal coliform levels • Park staff increased enforcement of dog restrictions at beach	100% samples – for human 100% samples + for dog 100% samples + for goose	• 5 sampling locations • Collected along beach • Freshwater beach	High fecal coliform counts at popular swim beach King County Department of Natural Resources and Parks

Source Molecular

Leader in Microbial Source Tracking

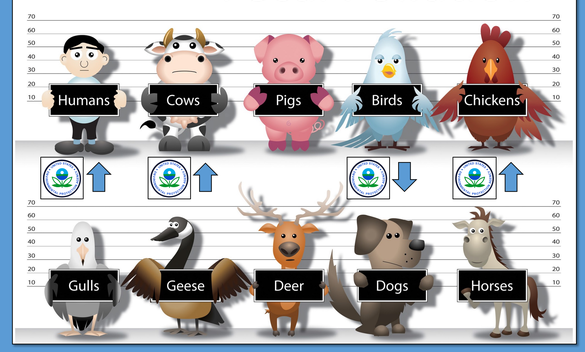
Poster Child for Success of Federal Technology Transfer Act

In 2013, US EPA National Risk Management Research Laboratory issued license for commercial use of patented MST technology.

Since first offering patented assays

EPA's MST technology has been implemented to achieve water quality outcomes in diverse watersheds across all 10 regions,
324% increase in use of patented assays,
162% increase in number of MST projects &
324% increase in size of MST projects

Identify Sources of Fecal Pollution



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