

ABSTRACT

**TOTTEN AND ELD CLEAN WATER PROJECTS: MEASURING
EFFECTIVENESS OF BMPS ON A WATERSHED SCALE**

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Ten years of water quality monitoring and analysis for fecal coliform (FC) bacteria levels and loading were completed in six sub-basins discharging to Totten and Eld Inlets in Puget Sound in Washington. The US Environmental Protection Agency (EPA) section 319 funded monitoring program goal was to determine the effectiveness of watershed-scale nonpoint source pollution management programs at improving water quality. The sub-basins are McLane and Perry in Eld Inlet, and Burns, Pierre, Schneider, and Kennedy in Totten Inlet. Study design was single-site before/after for all streams except for Schneider (test) and Kennedy (control) paired watershed analysis.

For the ten-year monitoring period, the FC trend was up significantly ($\alpha = 0.05$) at McLane, and down at all other streams, but significantly only at Pierre. The FC loading trend was up significantly at McLane, and up but not significantly at Schneider and Kennedy. The trend was down, but not significantly, at the other streams. Incorporating historical data back to 1983, the FC trend was up significantly at McLane, and down at all other streams, but significantly only at Perry.

Post pollution-control FC levels – both concentrations and loadings – have fluctuated considerably from year to year. In all cases where significant ($\alpha = 0.05$) improvement occurred for at least one two-year averaged period, the average of the last monitoring period (2000 to 2002) is higher than the prior low value. All streams violated state water quality standards for FC at some time during the study after Best Management Practice (BMP) implementation; Burns and Pierre violated the standards every year of the study.

A number of factors, including re-prioritization, reorganization, and staff turnover, combined with complex interagency relationships, reduced agencies' abilities to meet original pollution-control goals, including improving land-management and water quality. These factors also affected ability to monitor land-use and land management practices. Overall, there was an impaired ability to link water quality changes to land-management programs.