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STORMWATER ANTIMICROBIAL TREATMENT UNIT INSTALLATION AND MONITORING PROJECT REPORT

Task 12: Installation and Monitoring of a Storm water Antimicrobial Unit at Bay View, Washington

The goals of this project are: 1) to install a Storm water Antimicrobial Treatment System (SWAT) unit to treat storm water drainage for bacterial loading coming from the Bay View community, 2) to monitor influent and effluent water quality in terms of bacterial attenuation, and 3) to eventually improve water quality in South Padilla Bay such that swimming and recreational harvests of shellfish are once again deemed safe at Bay View State Park and surrounding areas. According to the manufacturer, SWAT units use AbTech's Smart Sponge® technology's unique molecular structure, which is based on innovative polymer technologies that are chemically selective to hydrocarbons and can destroy bacteria. While Smart Sponge® was originally developed to remove oil products from water, AbTech has also developed an antimicrobial technology synergistic with the Smart Sponge® technology. This effort produced Smart Sponge® Plus, which features an antimicrobial agent chemically and permanently bound in a proprietary process to the Smart Sponge® polymer surface.

This was originally designed to be a joint project with Skagit County Public Works, Skagit County Health Department, Padilla Bay Reserve, Rozema Boat Works, Skagit Beach Watchers and/or the Padilla Bay Reserve Stream/Storm Teams. Construction and installation of the SWAT unit and the purchase of Smart Sponge® Plus media has been accomplished with MRC funds from the NWSC, and with labor/machinery assistance from Skagit County Public Works. We are now working with the Padilla Bay Research Reserve and their Storm Team to monitor the newly installed SWAT unit.

SWAT Installation

The original concept of installing a fairly large experimental SWAT unit at the boat ramp next to Rozema Boat Works was negated once the project engineers investigated the site in mid 2010 because of excessive seawater intrusion into the site during very high tides. This resulted in relocation of a smaller SWAT unit approximately two blocks east and uphill of the original site.

The new uphill site was especially interesting because it was in a roadside ditch that had been converted to a bioswale structure to "treat" a small portion of the overall storm water flow being carried inside an underground pipe. A plan evolved to install a much smaller experimental unit to test the smaller amount of diverted storm water at this location. The plan was initiated by providing Skagit County Public Works (SCPW) personnel with conceptual drawings of the proposed experimental unit. SCPW then constructed the unit and installed it at the specified location. The unit consists of a plywood flow through trough measuring 8' long x 14" wide x 18" deep with a sediment settling sump (30" length x 24" wide x 32" deep) installed inline prior to the experimental trough (Figures 1-3). The inflow line to the trough is 2" PVC and the outflow is 4" PVC. A 2" PVC valve was installed between the sediment sump and the experimental trough to control the flows. "Horse hair" air conditioning filter material

was inserted into the sediment sump to assist with removal of sediments that might clog the Smart Sponge® media.

Progress as of January 2011 includes: 1) several conversations with Terry Stevens and staff of the Padilla Bay Research Reserve regarding funding and timing of the Reserve boat ramp/outfall project with which the SWAT unit construction will by synchronized (but, as noted above, will not happen), 2) conversations with Skagit County Public Health and the Padilla Bay Reserve staff about processing samples collected for bacterial counts, 3) conversations with Skagit Beach Watchers and the Padilla Bay Reserve about use of volunteers to collect routine water samples before and after SWAT treatment, 4) purchase of the Smart Sponge matrix to be tested, 5) construction and installation of the SWAT unit by Skagit County Public Works, 6) training of Storm Team volunteers in collection of samples from the SWAT unit and processing of samples for bacterial counts and turbidity at the Padilla Bay Reserve, 7) completion of experiment number 1 using Smart Sponge® Paks and 8) initiation of experiment number 2 using straw to help reduce sedimentation of the Smart Sponge® media (Figure 4).

Figure 1. Location of the Smart Sponge SWAT unit in Bay View.

Figure 2. Detail of the SWAT experimental unit installed at Bay View. The sediment retention sump (with filter material) is in the foreground. In the middle is the well holding the 2" PVC flow control valve and the SWAT experimental trough is in the background.

Figure 3. The SWAT experiment trough with the Smart Sponge® Paks installed. The design allows the water to flow through up to 12 Paks. If the leading Paks clog due to sedimentation, then the storm water will flow over the clogged Paks to the next sets.

Figure 4. Following clogging of the Smart Sponge® Paks with sediment during a heavy rainfall, a second experiment was set up to test the ability of straw to act as a pre-filter for the Smart Sponge® media.