

Description of New Proportional Water Sampling System

Historically beginning in 1968, stream water samples on small watersheds at the H.J. Andrews Experimental Forest are taken proportionally to streamflow by a battery powered, in-house constructed sampler designed by Richard Fredriksen, the study originator. With the failure of certain obsolete logic components in the circuit board component of this Fredriksen proportional sampler, it has become necessary to develop another sampling system. A new sampling system is employed on WS1 and Lookout Creek from their establishment in 2003 and 2005, respectively. Additionally, the Fredriksen sampler has been replaced at WS2 (2004) and Mack Creek (2007). The other Fredriksen samplers in use will be replaced in time at WS6, WS7, WS8, WS9, and WS10.

The new system consists of a Sigma Model 900 standard portable sampler and a Campbell Scientific CR-10X datalogger. The Sigma sampler is a commercially available portable sampler that has a peristaltic pump, and a programmable control unit. The sampler is powered by a 12 volt battery. The controller can be programmed for time-based, flow-based, composite and multiple bottle sampling setups, and to produce outputs for samples or events that can be captured by a datalogger. The controller can be programmed to produce repeatable and accurate sample volumes. It also will provide purging and rinsing of the intake line before sampling, and sample retries if the intake line is plugged. A record of the program sample history is stored in the controller, and can be reviewed by the operator. The sample storage container is located in the insulated base housing of the Sigma. The CR-10X in the sampling system is the existing one used to measure and record stream stage height at the gauging station.

The new proportional sampling system is configured with the Sigma sampler set in the flow-based composite mode, and set to output an electrical pulse when a sample is taken. The Sigma is connected to the CR10X. The CR-10X controls the stage based sample rate, sends a signal to the Sigma to initiate sampling, and records the output signal from the Sigma when a sample is taken. A data array is output by the CR10X with each sample. The array contains the date and time of the sample, the stream stage when the sample was taken, and a sample number.

The CR10X program developed to determine the sample rate based on stage height uses the same proportionality method and sampling rates as the Fredriksen sampler. The individual sample size (300ml) of the new system is also comparable to the Fredriksen sampler.