

### **Storm USGS Stream Flow**

During storm event sampling efforts, gauge height and discharge (flow) data are downloaded from the U.S. Geological Survey (USGS) web site for three USGS gauging stations in the McKenzie River Watershed. This data is used to determine the rivers response to a precipitation event and for calculating pollution loadings in the McKenzie River and Cedar Creek.

### **Storm LRAPA Rainfall**

The Lane Regional Air Pollution Authority (LRAPA) maintains a meteorological station at City Hall in Springfield. The amount and intensity of rainfall associated with a storm event is downloaded from this Met station and used with flow data (USGS Stream Flow and EWEB Stream Flow) to better understand how the watershed responds to various precipitation events during storm event sampling efforts.

### **Storm EWEB Stream Flow**

EWEB uses automated samplers equipped with flow meters for storm event monitoring. These flow meters record level, velocity, and flow (@ five minute intervals) at each monitoring station. This data is used with sample history information to determine when samples were collected along the hydrograph and to calculate pollution loadings.

### **Storm EWEB WQ Sondes**

EWEB deploys water quality sondes (or probes) during storm event sampling efforts at each monitoring location. These WQ sondes record temperature, pH, dissolved oxygen, conductivity, and turbidity at five-minute intervals. This data is used to determine the magnitude of pollution loads (i.e., turbidity peaks), general water quality of storm runoff, and evaluate if samples were collected to capture high turbidity peaks.

### **Storm Analytical Lab Storm Runoff**

EWEB uses automated samplers to collect runoff samples during storm events. The samplers are programmed to collect flow-weighted aliquots (e.g., 300ml every 25,000 gallons of flow) into sample bottles. Bottles that represent storm runoff collected over the rise in the hydrograph are composited into laboratory containers and shipped to a commercial lab for analysis. Lab analysis includes total and dissolved metals, nutrients, bacteria, semi-volatile organics, petroleum hydrocarbons, total organic carbon, chemical oxygen demand, and total suspended solids. This data is used to calculate pollution loads into receiving water bodies.

### **Storm USGS Pesticide Analytical Lab**

EWEB uses automated samplers to collect runoff samples during storm events. The samplers are programmed to collect flow-weighted aliquots (e.g., 300ml every 25,000 gallons of flow) into sample bottles. Bottles that represent storm runoff collected over the rise in the hydrograph are composited into laboratory containers and shipped to the USGS lab in Denver, Colorado for pesticides analysis. This data is used to calculate pollution loads into receiving water bodies.

### **Storm EWEB WQ Measurements**

At times, EWEB will take samples collected during a storm event to the Hayden Bridge treatment plant and analyze water samples for total organic carbon, dissolved oxygen, and turbidity. EWEB's Hayden Bridge plant has a small laboratory that can do some limited analysis.

### **Storm EWEB Intake WQ Sensor Data**

EWEB's Hayden Bridge filtration plant pumps water from the McKenzie River via intakes and has a number of water quality sensors that evaluate turbidity, conductivity, temperature, pH, dissolved oxygen, and river level of the raw water coming into the plant. During storm event sampling efforts this data will be pulled from our SCADA system to be used similar to the Storm EWEB WQ Sondes data.

### **BL Analytical Lab QA Splits**

Thurston High School students collect water samples once a month from Cedar Creek, Camp Creek, and stormwater outfalls. EWEB assists the students by splitting samples with them at four locations. EWEB sends these samples to a commercial laboratory for analysis so the students can compare these results with what they are getting in their lab. The samples are analyzed for total and dissolved metals and nutrients. This data is used for quality assurance purposes as well as evaluating baseline conditions of these creeks and stormwater channels.

### **BL Spfld Schools WQ Measurements**

Thurston High School students collect water samples once a month from Cedar Creek, Camp Creek, and stormwater outfalls. These samples are analyzed for temperature, pH, conductivity, dissolved oxygen, turbidity, metals, nutrients, and bacteria. This data is used to evaluate baseline conditions of these creeks and stormwater channels for comparison with storm event conditions.

### **BL Analytical Lab EWEB Intake/Keizer Slough**

Once a month, EWEB's Hayden Bridge folks collect water samples from the raw water coming into the intake as well as from Keizer Slough. These samples are sent to a commercial lab for analysis. Analysis includes metals, nutrients, bacteria, semi-volatile organics, volatile organics, pesticides, pH, dissolved oxygen, total organic carbon, and other general water quality parameters. This data is used to evaluate baseline conditions of the McKenzie River and Keizer Slough for comparison with storm event conditions.

### **BL DEQ Analytical Lab**

Approximately 9 times a year the Oregon Department of Environmental Quality will collect water samples from 7 locations in the McKenzie River watershed. These samples are analyzed at DEQ's laboratory in Portland for metals, nutrients, and other general water quality parameters. This data is used to evaluate baseline conditions of the McKenzie River for comparison with storm event conditions.

### **BL Benchmark Data – Human Health (EPA)**

The U.S. EPA has developed health-based levels below which it is safe for human consumption of water. This data is used to compare with baseline and storm event data to highlight areas that pose a threat to human health.

### **BL Benchmark Data – Aquatic Toxicity (DEQ)**

The Oregon DEQ has developed aquatic health levels below which it is safe for aquatic organisms to live in the water. This data is presented as two categories, acute toxicity which indicates short term (less than 4 hours) health effects and chronic toxicity for long-term effects to aquatic organisms. This data is used to compare with baseline and storm event data to highlight areas that pose a threat to aquatic organisms.

### **BL Analytical Lab Other**

EWEB will be collecting other data that comes available as we learn about it. For example, the analytical data recently collected by the Army Corps of Engineers associated with the Cougar Dam Temperature Tower construction project will be obtained and loaded into the database.

### **BIO Spfld Schools Streamside Bio-Assessment**

EWEB is working with the Springfield School District and McKenzie Watershed Council to setup a program where students conduct streamside bio-assessments of Creeks and stormwater channels that they are currently collecting water quality samples from. Streamside bio-assessments include mapping and photographing the area and collecting information of various stream functions (riparian health, bank stability, stream bed material, and other conditions). This data is used to evaluate biological health of the stream and compare with chemical data to determine if there are pollution impacts to the stream.

### **BIO EWEB/Consultant Streamside Bio-Assessment**

EWEB plans to conduct streamside bio-assessments of areas not covered by the Springfield School students and where we have chemical data results. Streamside bio-assessments include mapping and photographing the area and collecting information of various stream functions (riparian health, bank stability, stream bed material, and other conditions). This data is used to evaluate biological health of the stream and compare with chemical data to determine if there are pollution impacts to the stream.

### **BIO Spfld Schools Macroinvertebrates**

The McKenzie Watershed Council and Springfield school students currently collect macroinvertebrate data from the same creeks and stormwater channels they collect water quality samples from. This data is collected approximately 1-2 times per year. This data is used to evaluate biological health of the stream and compare with chemical data to determine if there are pollution impacts to the stream.

### **BIO McKenzie Watershed Council Macroinvertebrates**

The McKenzie Watershed Council coordinates a large effort each year to collect macroinvertebrate data at approximately 50 different locations throughout the watershed.

This data is used to evaluate biological health of the stream and compare with chemical data (if available) to determine if there are pollution impacts to the stream.

**BIO Analytical Lab Sediment Quality**

EWEB plans to use the baseline and storm event data to target basins or sub-basins with high pollution loads for further evaluation. In these targeted basins, EWEB plans on collecting sediment samples and sending these samples to a commercial lab for analysis. Lab analysis will likely include: metals, nutrients, bacteria, semi-volatile organics, petroleum hydrocarbons, total organic carbon, grain size, PCBs, and pesticides.