Burnt Bridge Creek Multiparameter TMDL

2008 Technical Study

STUDY PARAMETERS

Instream Temperature

Fecal Coliform Bacteria

Dissolved Oxygen

Project Manager: Stephanie Brock

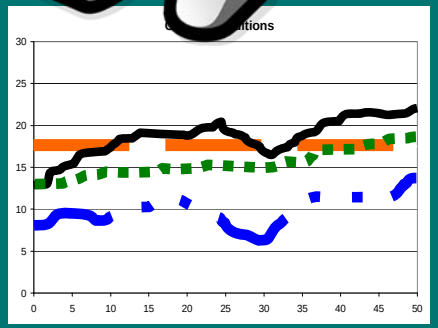
Field Investigator: James Kardouni

Purpose

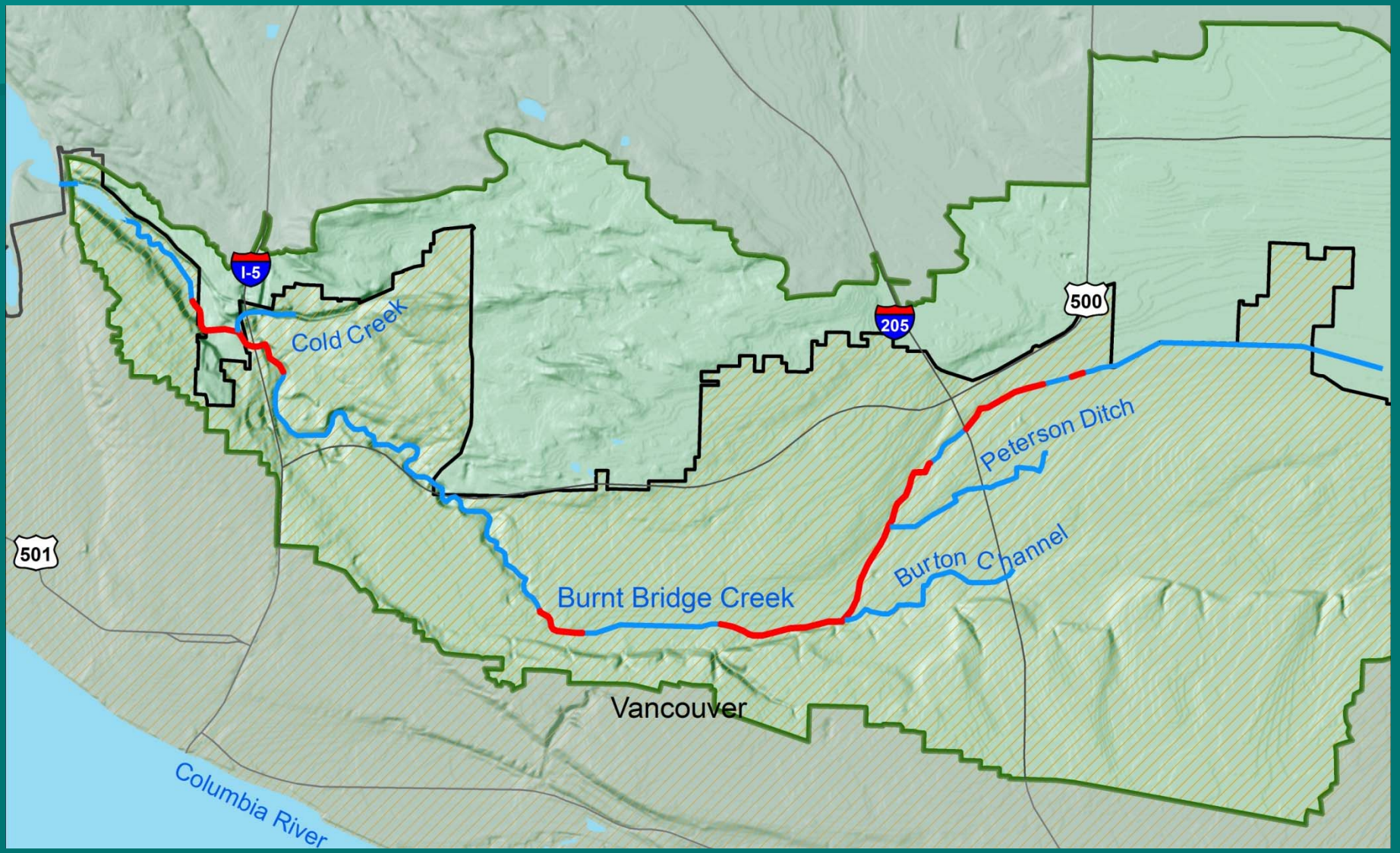
- Burnt Bridge Creek Basin Characteristics
- Historical Data Review
- Sampling Plan

- Temperature, Dissolved Oxygen and Fecal Coliform Analysis Methods

- Possible Management Strategies and Recommendations



Burnt Bridge Creek Subbasin



Study Area Characteristics

- Drainage area: 27.6 square miles
- River flows westward for approximately 12.7 miles
- Highly urbanized basin
- Majority of the basin within the City of Vancouver boundary
- Creek Elevation Range: 200 to 30 feet
- Precipitation: approximately 40 inches/year

Wildlife

- supports fish species
  - salmon (coho, chinook, steelhead)
  - trout
  - sculpin
  - red-sided shiners
  - sticklebacks
  - leopard dace
  - lamprey larvae

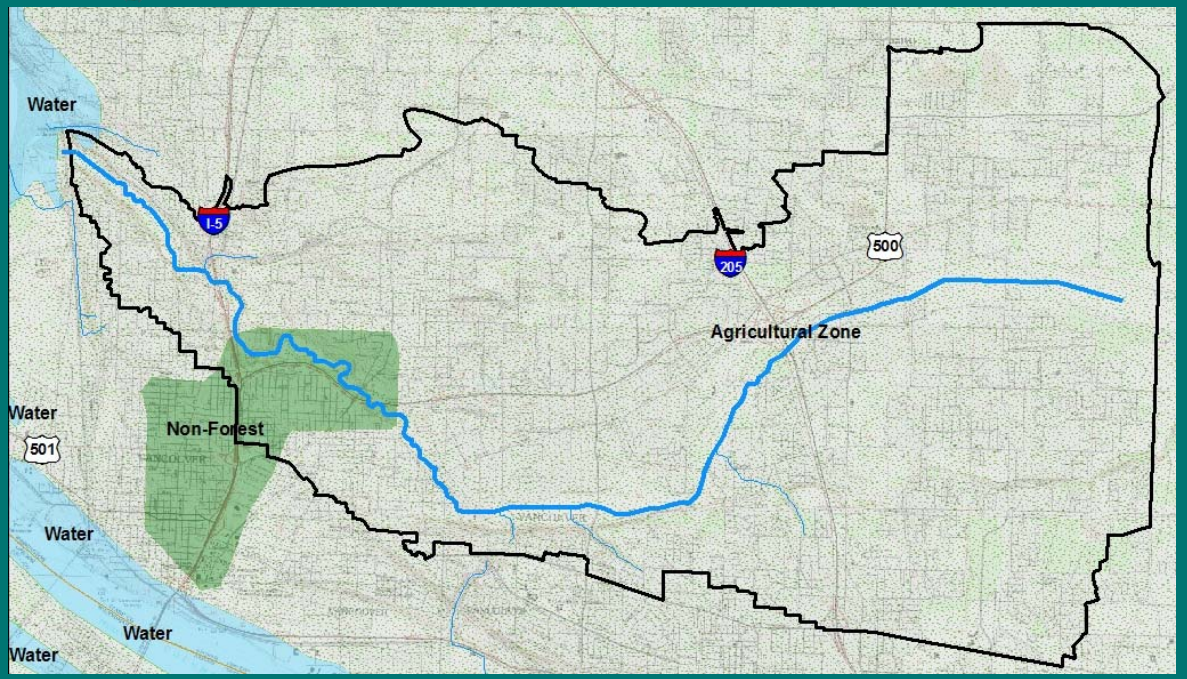
- other species
  - resident and migratory birds
  - mammals
  - amphibians
  - reptiles

Vegetation

- Historically
  - hardwood species (alder, cottonwood, maple, and willow)
  - western hemlock, Douglas fir, and western red cedar
  - Native understory (vine maple, huckleberry, salal, ferns)

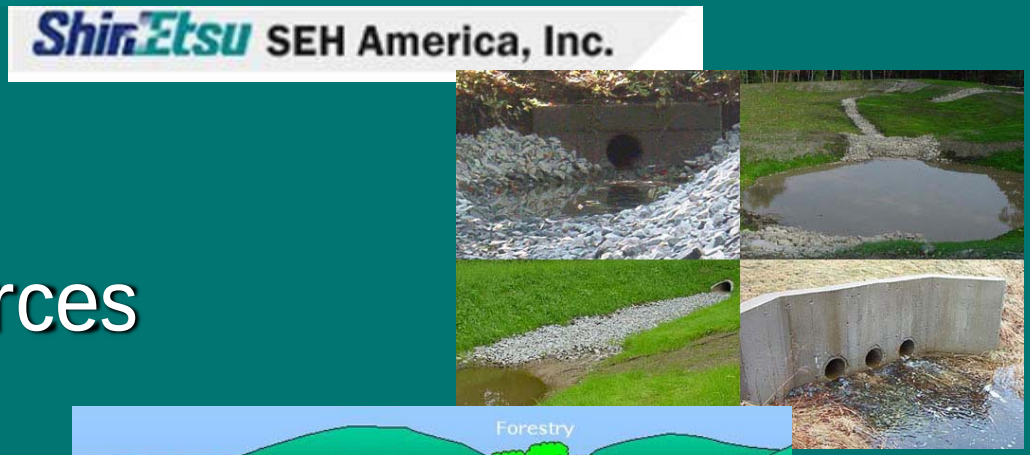
Vegetation, cont.

- Human influence
  - Exotic species common (black berries and reed canary grass)
  - By 1936 most of basin classified as an Agriculture Zone (ICBEMP data)

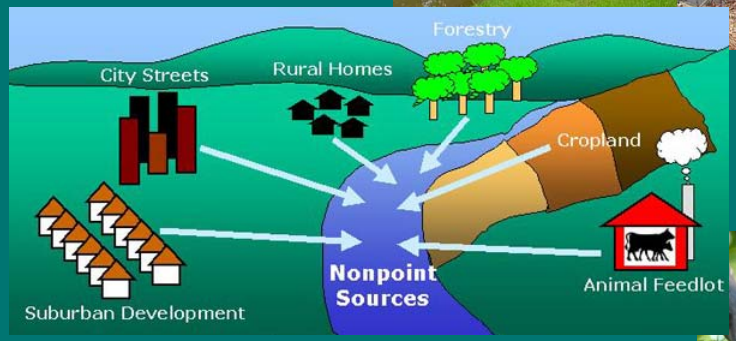


Potential Sources of Pollution

- Point Sources



- Stormwater Sources



- Nonpoint Sources
- Wildlife and background sources

Historical Data Review

- City of Vancouver
- USGS
- Clark County
- Department of Ecology

Temperature Data Collection Parameters

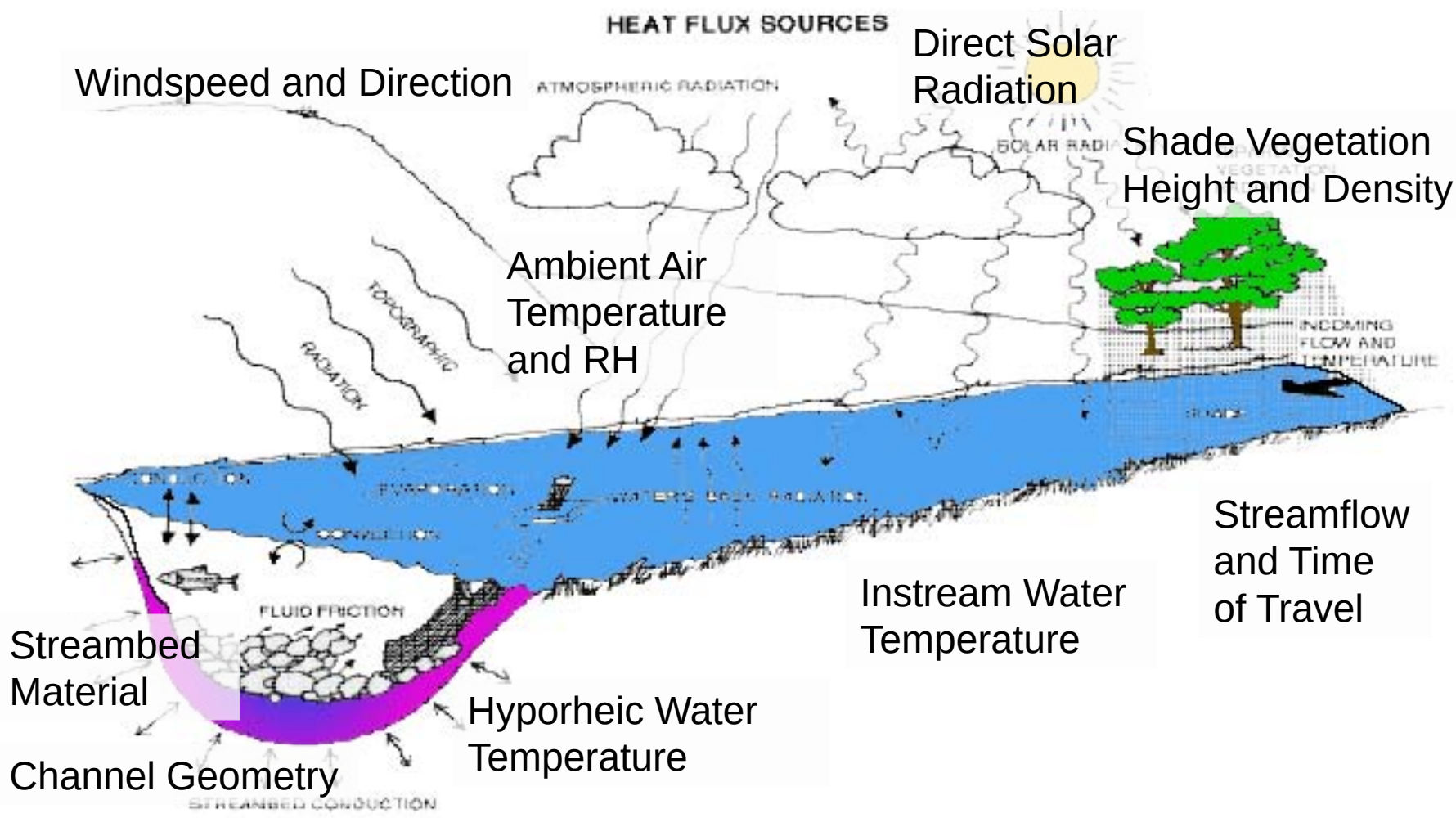
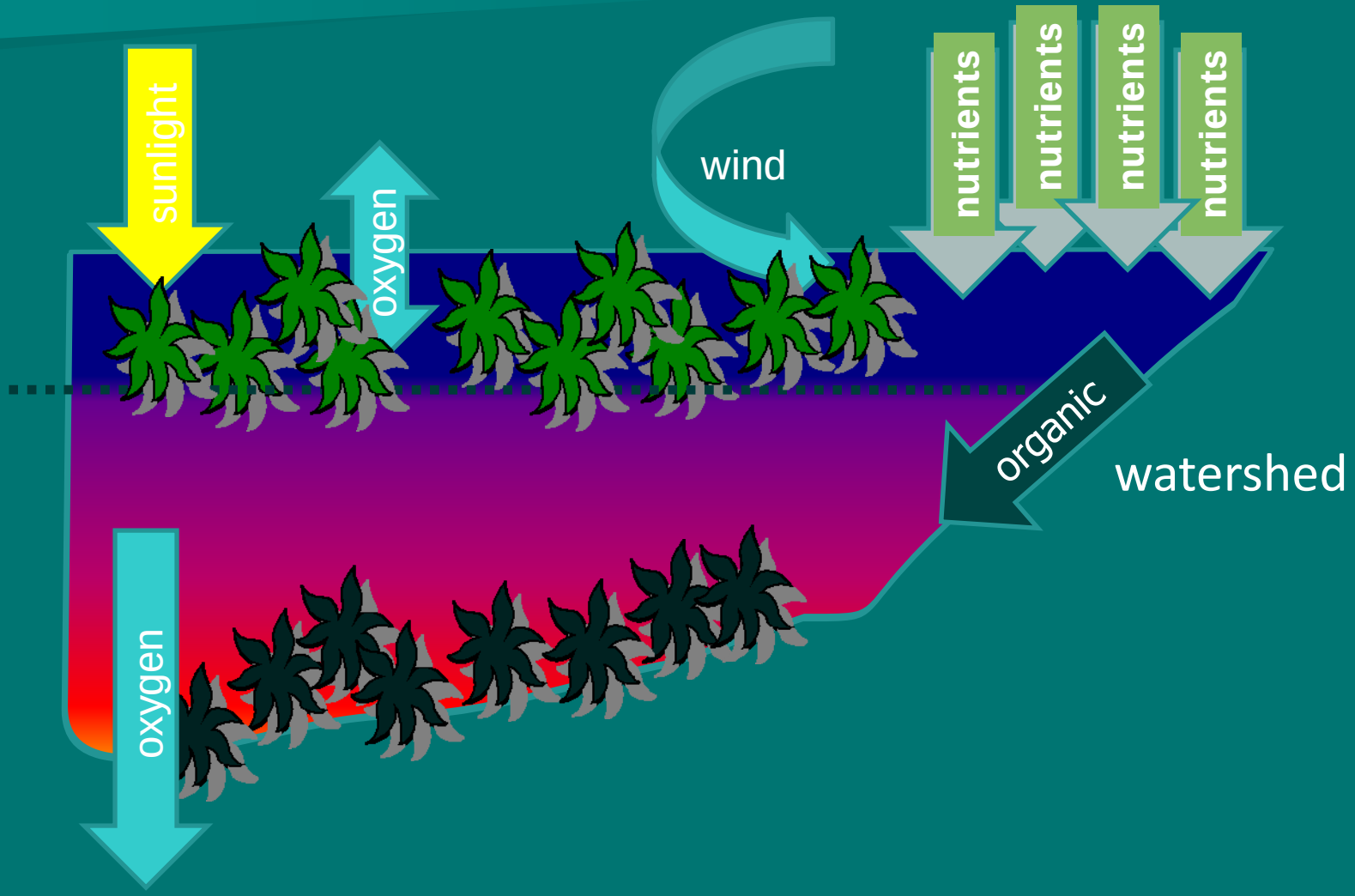


Image taken from “The Stream Segment and Stream Network Temperature Models: A Self-Study Course.” Bartholow, 2000.

Dissolved Oxygen Data Collection Parameters

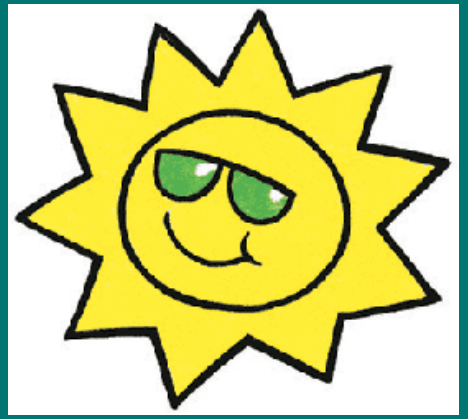


Bacteria Data Collection

- Land Use Influences

- Spatial Variability

- Temporal Variability
  - Wet Season
  - Dry Season



Sampling Plan

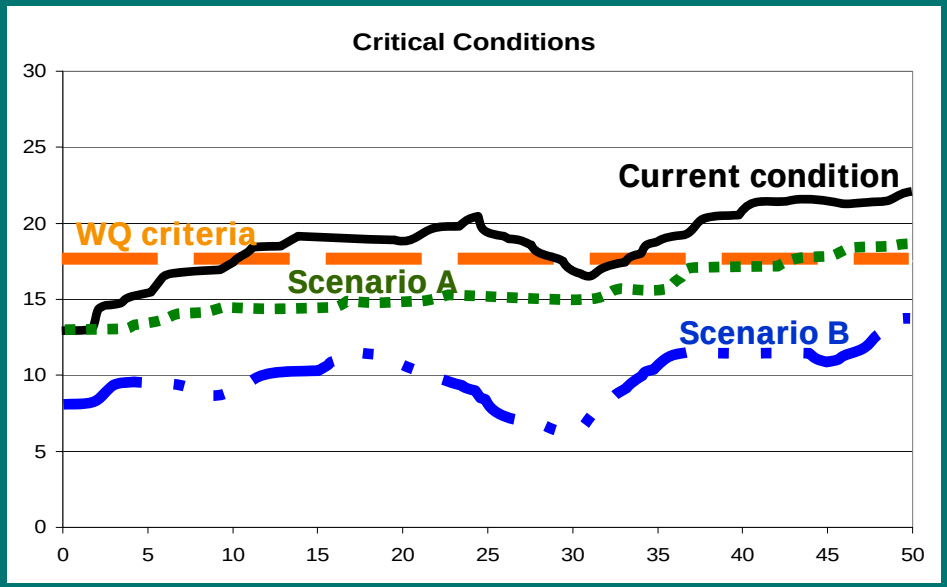
- Fixed-Network Sampling Stations
  - Fecal Coliform
  - Synoptic Survey/Seepage Survey
  - Temperature
  - Groundwater

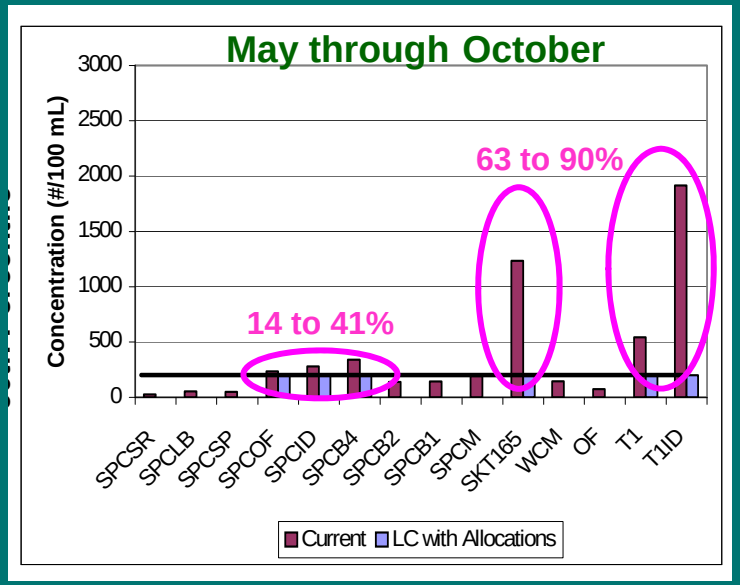
Sampling Plan, cont.

- Time of Travel
- Continuous Flow Monitoring
- Riparian and Channel Surveys
- Periphyton Sampling
- Stormwater Sampling

Temperature, Dissolved Oxygen and Fecal Coliform Analysis Methods

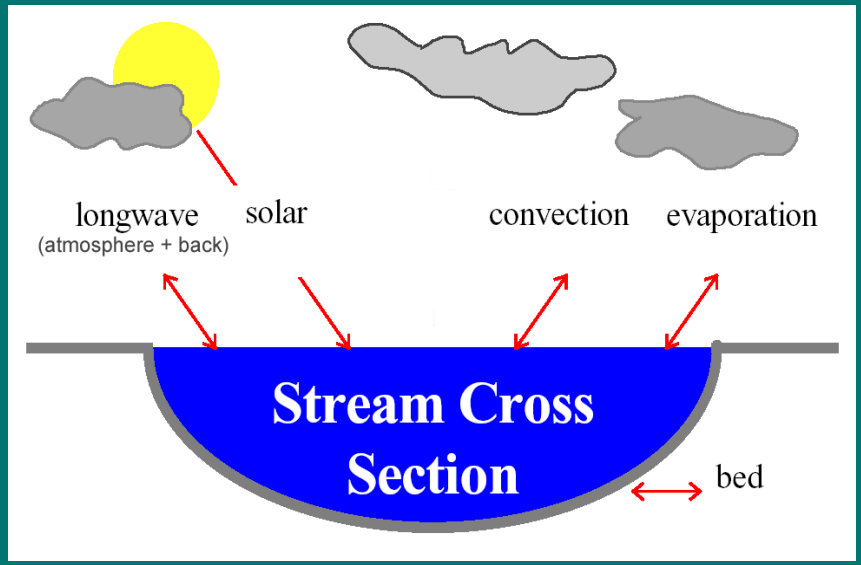
- Instream Temperature and Dissolved Oxygen
  - Mathematical Excel model
- Fecal Coliform
  - Statistical and mathematical methods





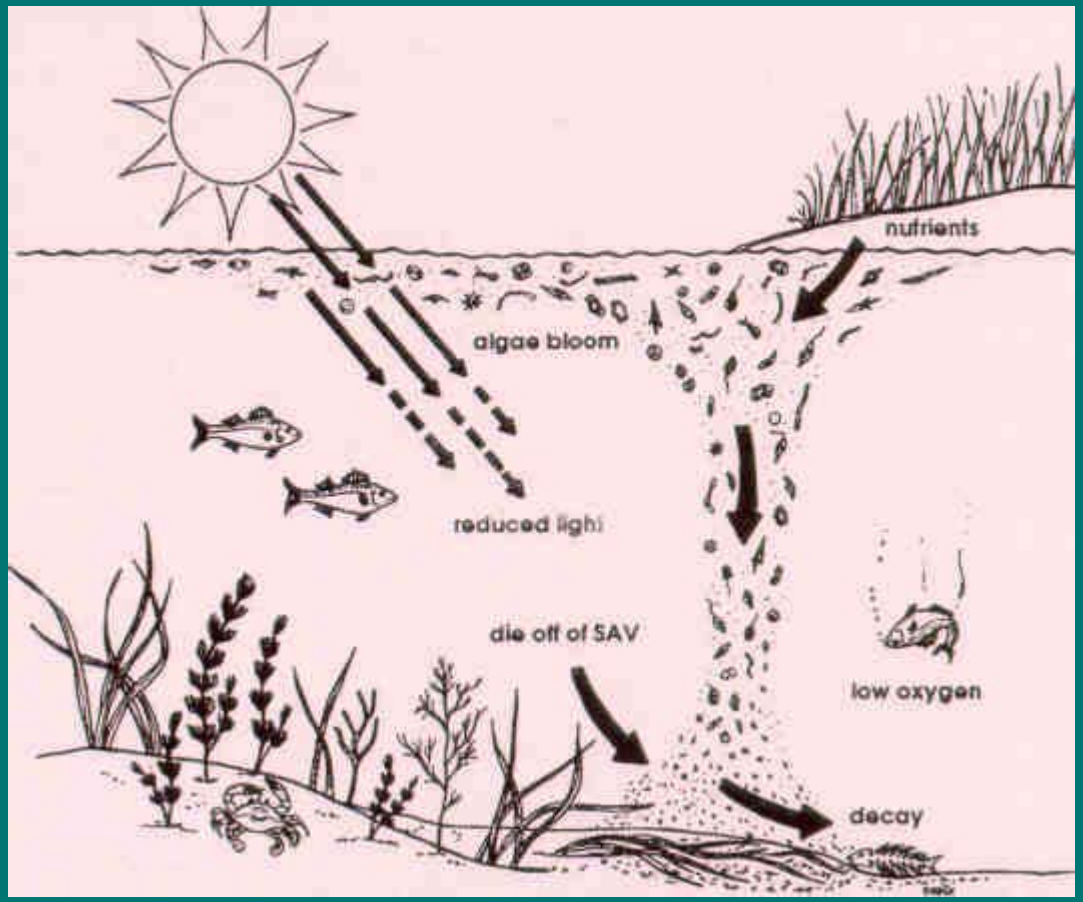
Most Sensitive Input Parameters - Temperature

- Effective Shade
- Groundwater inputs/outputs
- Air Temperature
- Wind speed
- Relative Humidity
- Width/Depth

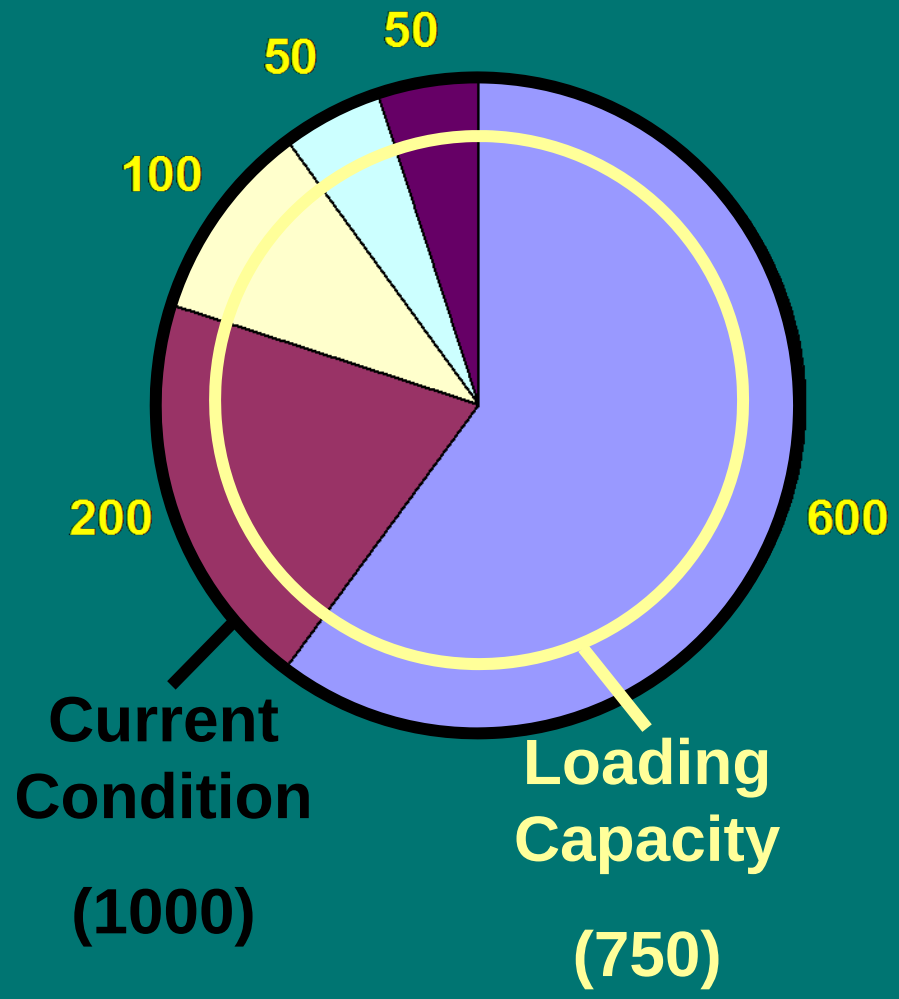


Factors Limiting Productivity – Dissolved Oxygen

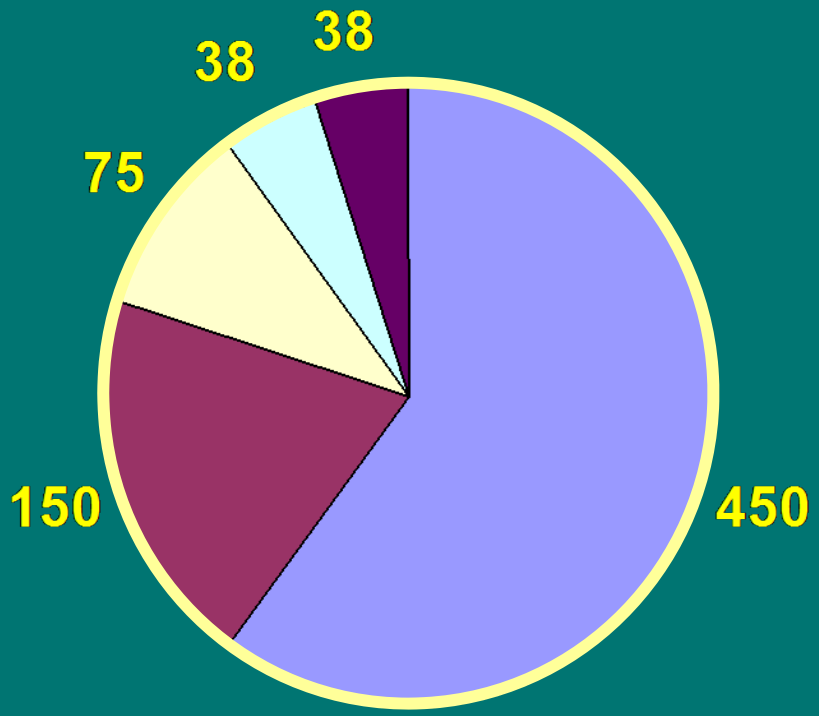
- Temperature
- Nutrients
- Light

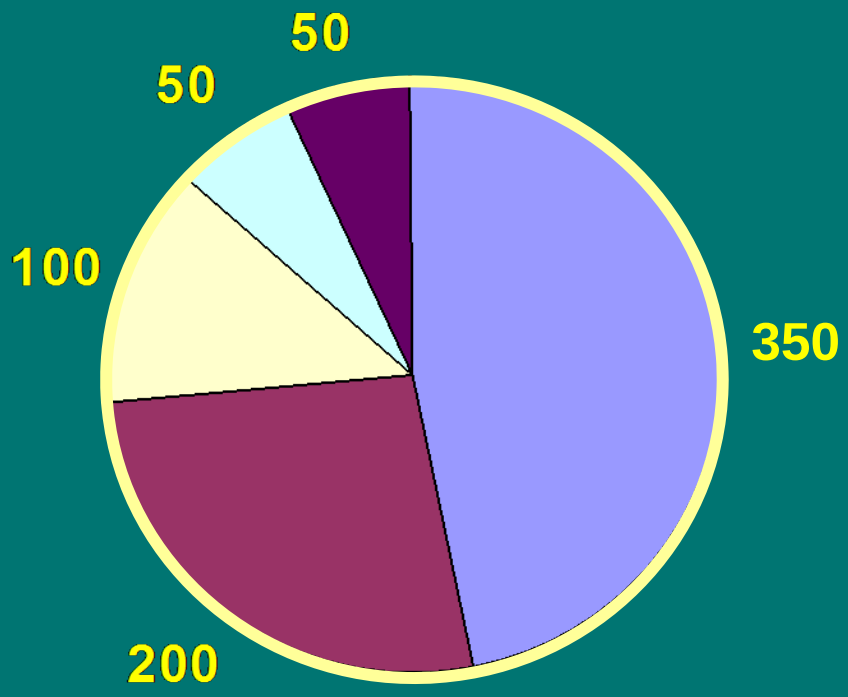


What a TMDL looks like –
Loading Capacity



What a TMDL looks like –
Allocations



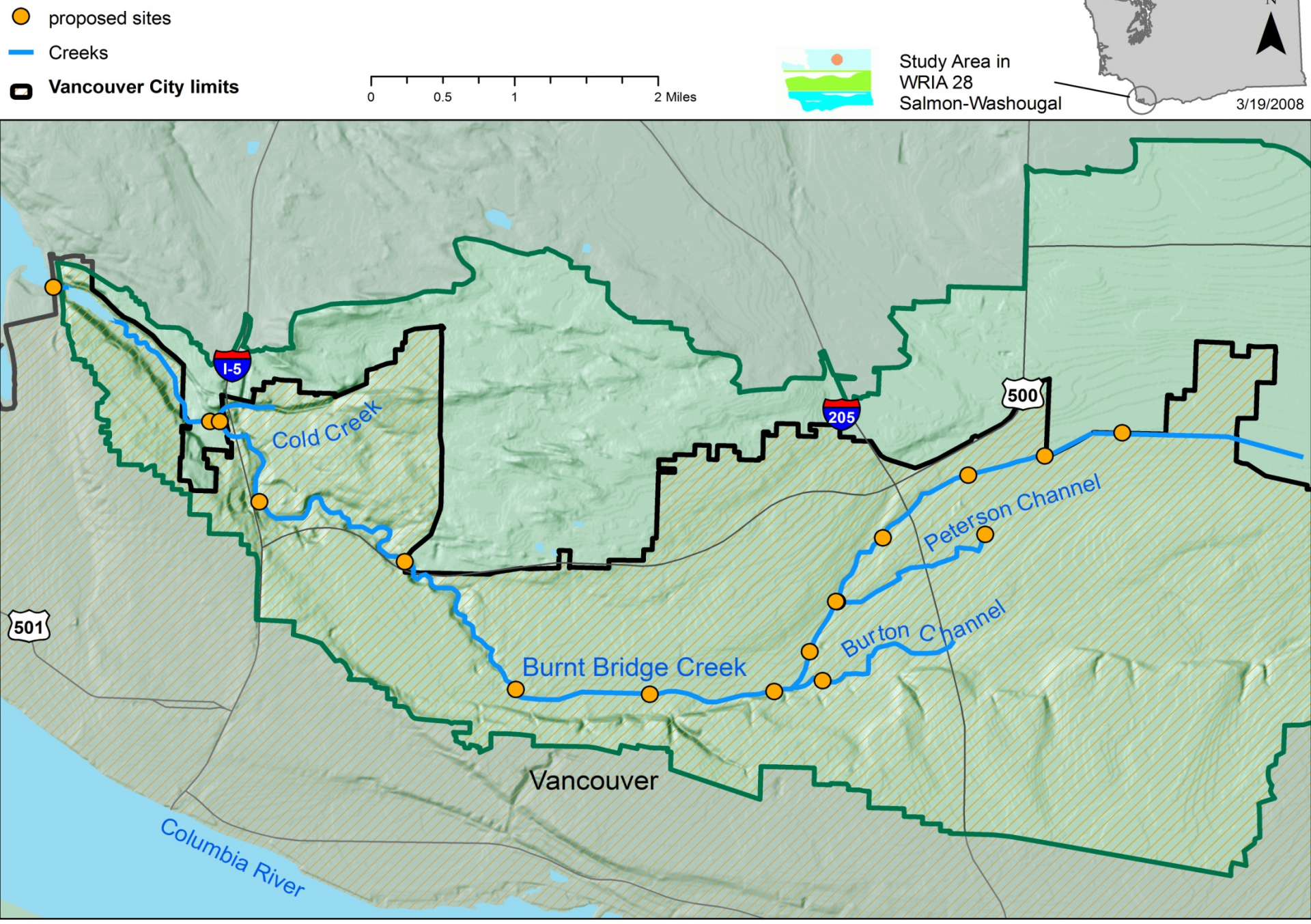


Possible Management Strategies and Recommendations

- Activities to increase shade along channels
- Activities to reduce sediment loading to surface waters
- Voluntary water conservation measures
- Exclude livestock from waterways and wet areas year-round
- Stormwater pollution controls through BMPs and Low Impact Development (LID)

- Other strategies to be determined….

Burnt Bridge Creek TMDL Proposed Fixed-Network Monitoring Sites



		NAD 83	
Site ID	Description	Latitude	Longitude
28BBC00.0	Burnt Bridge Ck downstream of Fruit Valley Rd	45.67520	-122.69253
28BBC01.2	Burnt Bridge Ck at 2nd Ave near Alki Rd	45.66169	-122.66942
28COL00.0	Cold Creek at Hazel Dell Ave BBC RM 1.3	45.66172	-122.66796
28BBC02.2	Burnt Bridge Ck at Leverich Park	45.65348	-122.66194
28BBC03.8	Burnt Bridge Ck upstream of Saint Johns Blvd	45.64763	-122.64080
28BBC05.7	Burnt Bridge Ck at NE 18th St	45.63467	-122.62428
28BBC06.8	Burnt Bridge Ck at NE 65th Ave	45.63453	-122.60496
28BBC07.7	Burnt Bridge Ck NE 86th Ave, dwn/strm of Burton Ch.	45.63515	-122.58706
28BUR00.0	Burton Channel at BBC RM 7.8 19th Cr & 92nd Ave	45.63641	-122.58017
28BBC08.3	Burnt Bridge Ck at NE Burton Rd, blw Peterson Ditch	45.63939	-122.58214
28PET00.0	Peterson Ditch confluence at 93rd Ave, BBC RM 8.6	45.64464	-122.57835
28PET01.3	Peterson Ditch at SEH outfall 001	45.65207	-122.55736
28BBC08.6	Burnt Bridge Ck above Peterson Ditch at NE 93rd Ave	45.64468	-122.57857
28BBC09.3	Burnt Bridge Ck at 98th, up/strm of Royal Oaks Dr	45.65141	-122.57205
28BBC10.2	Burnt Bridge Ck at NE 110th Ave	45.65817	-122.55999
28BBC10.6	Burnt Bridge Ck at NE 121st Ave	45.66036	-122.54909
28BBC11.5	Burnt Bridge Ck at 131st, or 135th Ave	45.66298	-122.53799

Burnt Bridge Creek Field Schedule 2008-2009

2008

- May 19 – 22, Install piezometers, thermistors, and relative humidity sensors.
- June 2, Begin bacteria sampling every other week.
- June, Begin stream surveys.
- June, Install continuous streamflow stations.
- July, Begin canopy photos.
- July 28 – 30, • Sample periphyton
  - Time of travel dye study
  - Synoptic survey for surface water and groundwater
- August, Continue collecting parameters related to temperature and bacteria.
- September 22 – 24, • Time of travel dye study
  - Synoptic survey for surface water and groundwater
- October, Complete all remaining stream surveys if necessary.

2009

- August, • End bacteria sampling
  - Remove piezometers
  - Remove continuous streamflow stations

Volunteers are welcome, specifically during synoptic sampling times on:

- July 29, or September 23, 2008.

Thanks!

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