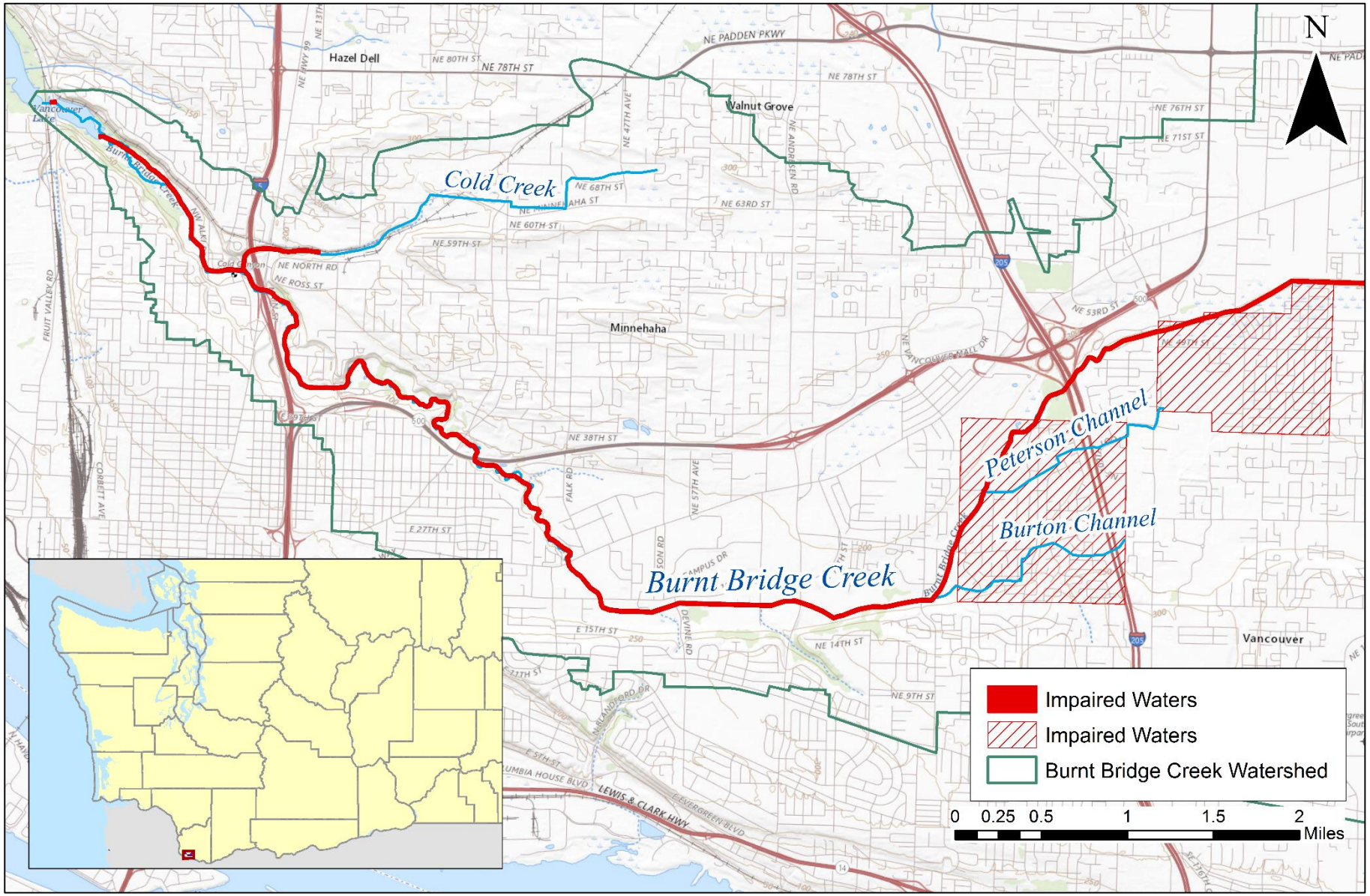
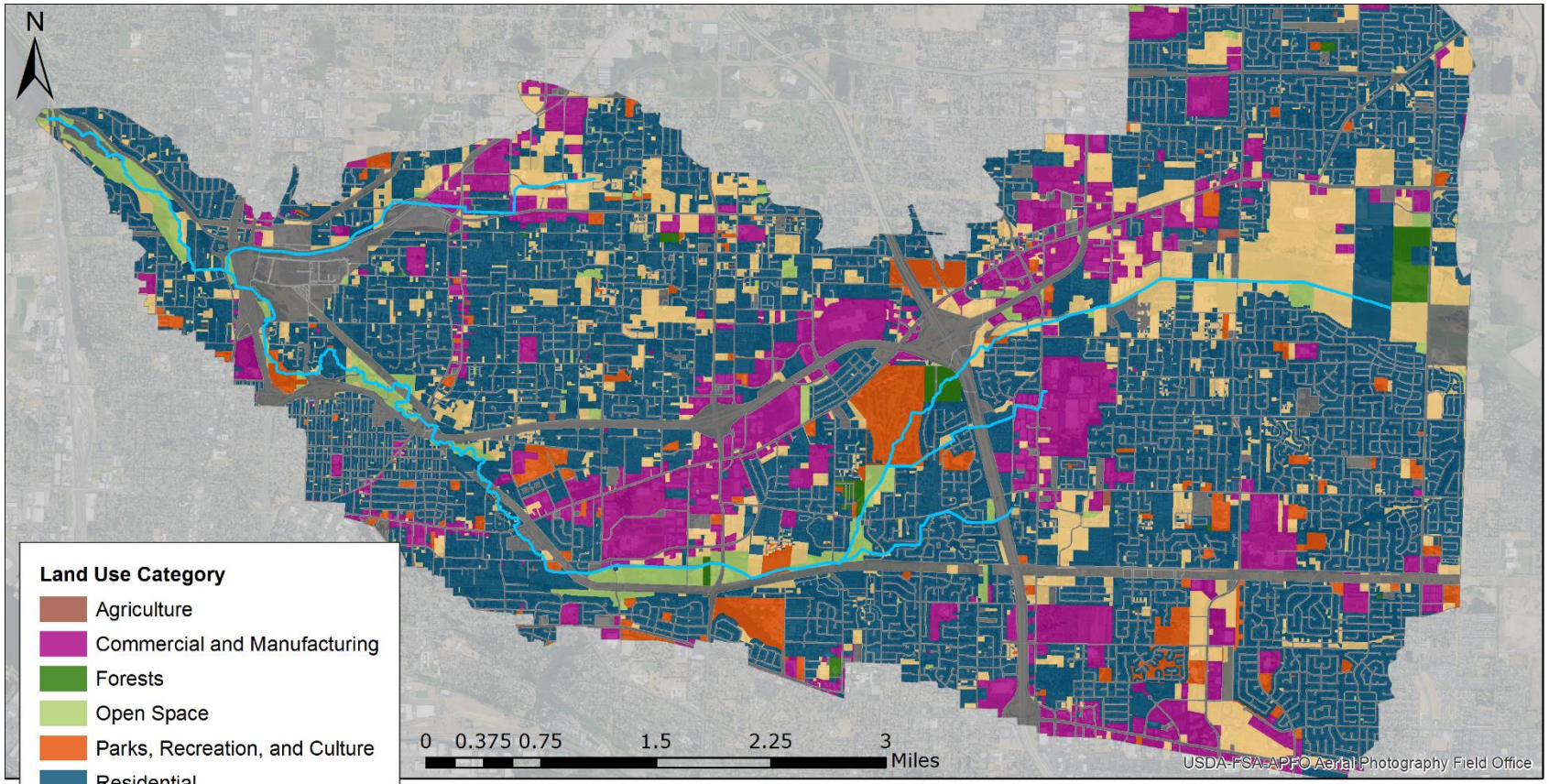
Burnt Bridge Creek

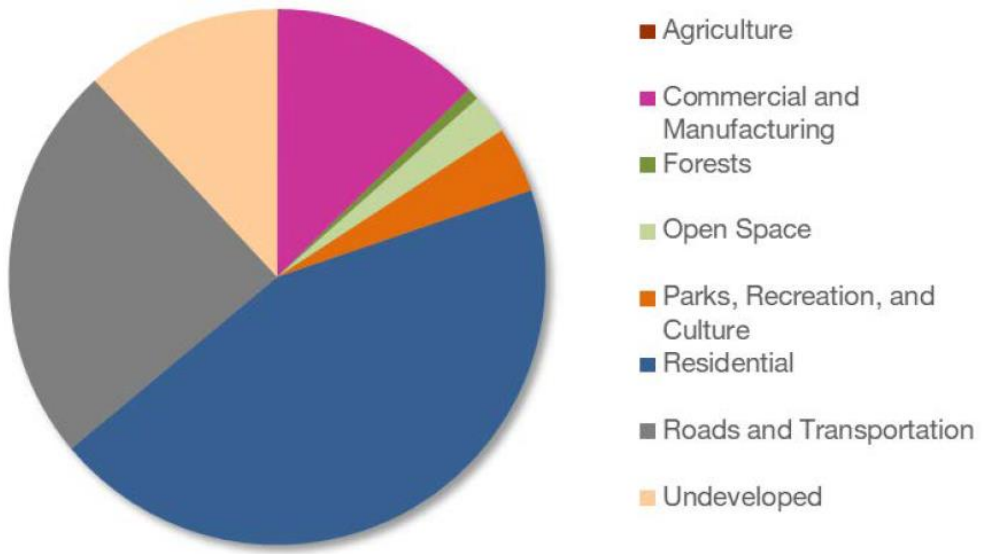
Source Assessment Report Presentation

Ecology & City of Vancouver Meeting

February 2021


N
Cold Creek
Burnt Bridge Creek
Peterson Channel
Burton Channel
Hazel Dell
Valnut Grove
Minnehaha
Vancouver
Impaired Waters
Impaired Waters
Burnt Bridge Creek Watershed
0 0.25 0.5 1 1.5 2
Miles


N
Land Use Category
Agriculture
Commercial and Manufacturing
Forests
Open Space
Parks, Recreation, and Culture
Residential
Roads and Transportation
Undeveloped
0 0.375 0.75 1.5 2.25 3
Miles
USDA-FSA-APFO Aerial Photography Field Office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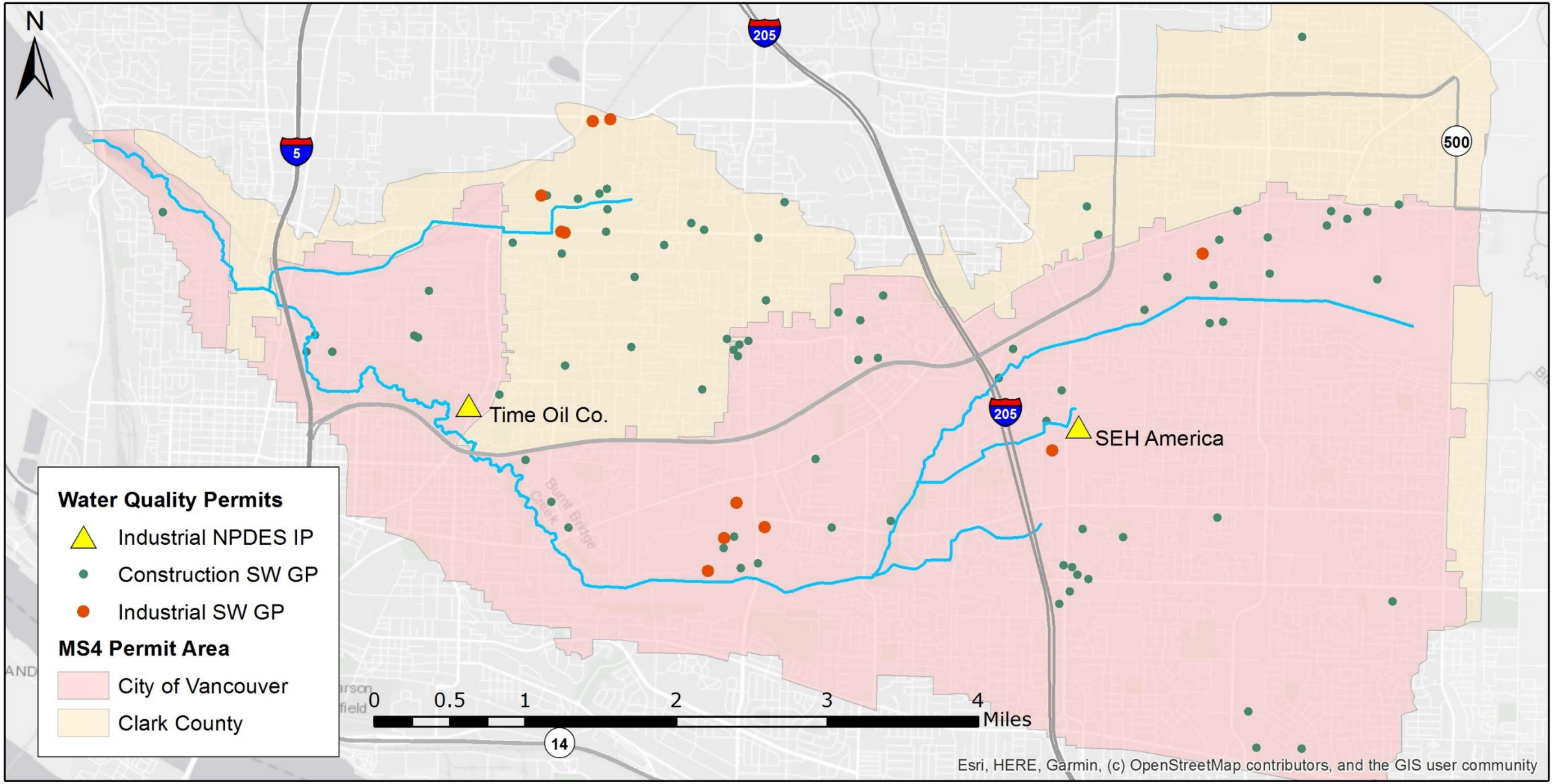

N
205
5
500
Time Oil Co.
SEH America
205
Water Quality Permits
Industrial NPDES IP
Construction SW GP
Industrial SW GP
MS4 Permit Area
City of Vancouver
Clark County
0
0.5
1
2
3
4
Miles
14
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

2008 Burnt Bridge Creek selected for TMDL

Water Quality Study Design (QAPP) (Kardouni and Brock)

Field work

2010 ***Streamflow Summary for Burnt Bridge Creek*** (Myers)

Surface Water/Groundwater Interactions and Near-Stream Groundwater Quality (Sinclair and Kardouni)

2012 Beginning of technical analysis of 2009-2010 results

2014 Project on hold for Ecology

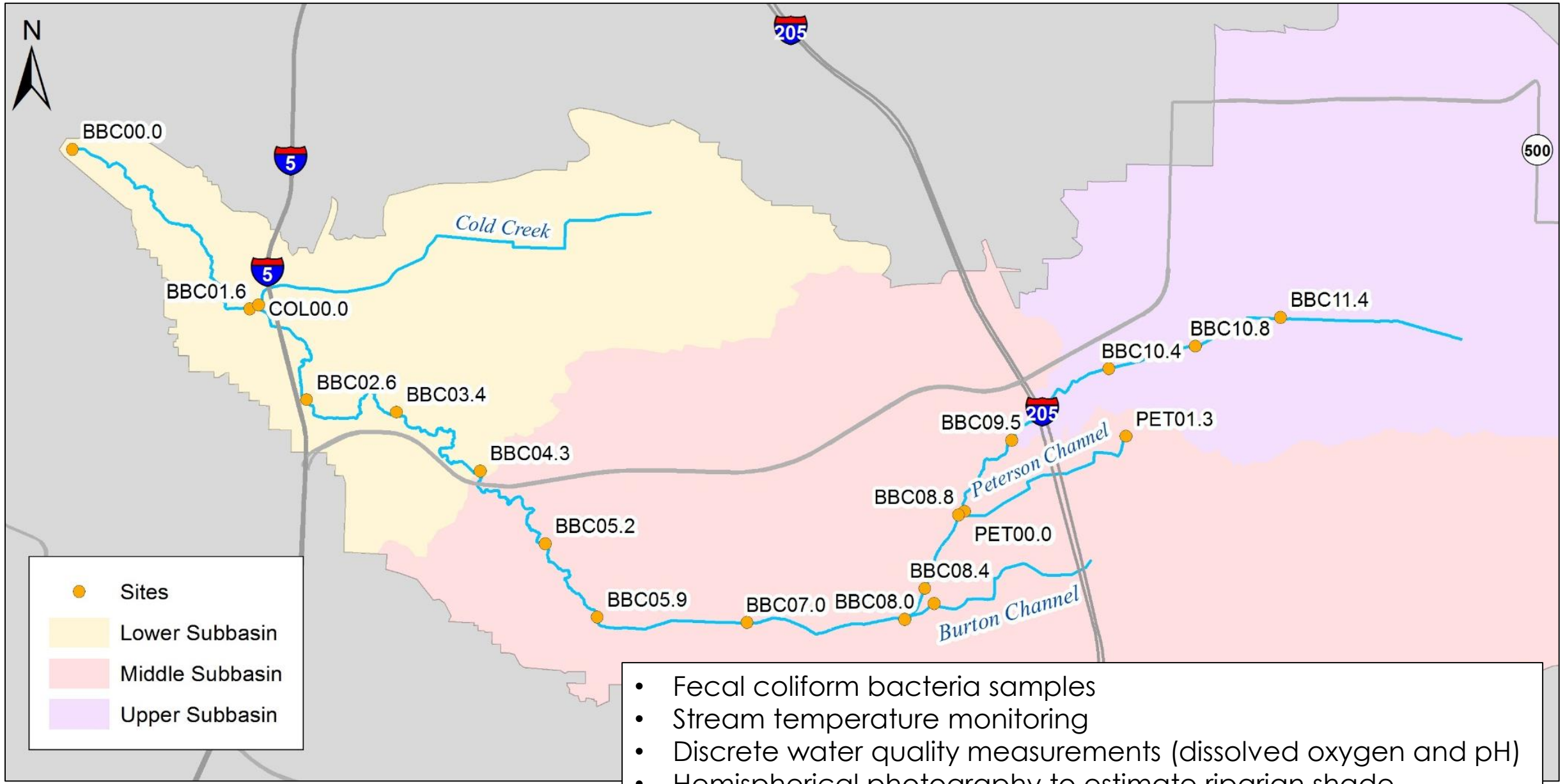
Water quality monitoring by City of Vancouver

2016

2018 Burnt Bridge Creek selected for Source Assessment (TMDL-alternative)

Complete technical analysis of 2009-2010 results

2020 ***Burnt Bridge Creek Source Assessment Report*** (McCarthy)



- Fecal coliform bacteria samples
- Stream temperature monitoring
- Discrete water quality measurements (dissolved oxygen and pH)
- Hemispherical photography to estimate riparian shade
- Instantaneous streamflow measurements

Water Quality Standards

Parameter	Use Classification	Criteria
Fecal Coliform Bacteria (Expired in 2020)	Primary Contact Recreation	• Geomean: 100 cfu/100 mL • 10% not to exceed: 200 cfu/ 100 mL
E. Coli Bacteria (Adopted in 2019)	Primary Contact Recreation	• Geomean: 100 cfu/100 mL • 10% not to exceed: 320 cfu/ 100 mL
Temperature	Salmonid Spawning, Rearing, and Migration	17.5°C
Dissolved Oxygen	Salmonid Spawning, Rearing, and Migration	8.0 mg/L
pH	Salmonid Spawning, Rearing, and Migration	6.5 – 8.5 units

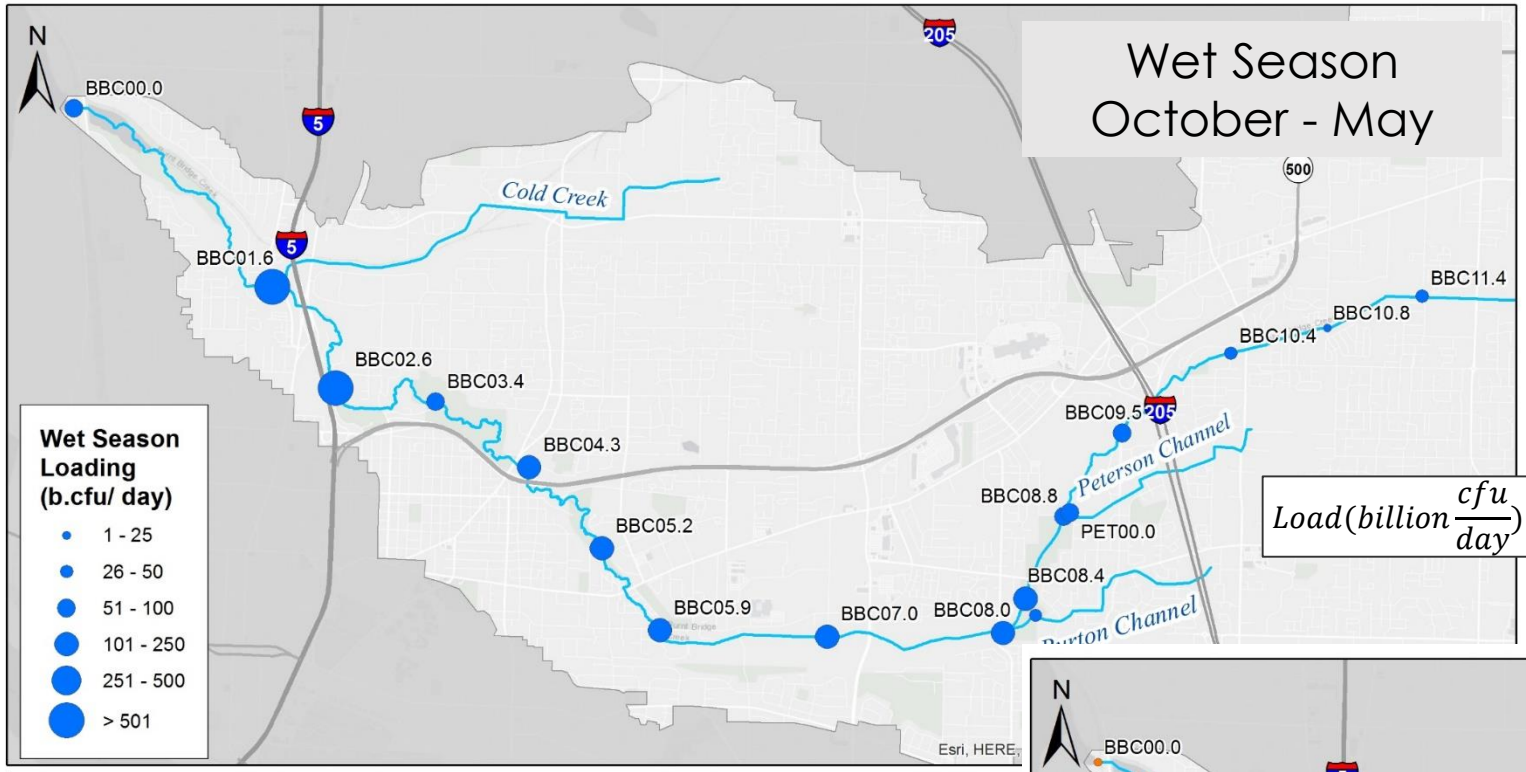
Fecal Coliform Bacteria Results

Summary of Fecal Coliform Bacteria Results (2009-2010) & Comparison with Water Quality Criteria

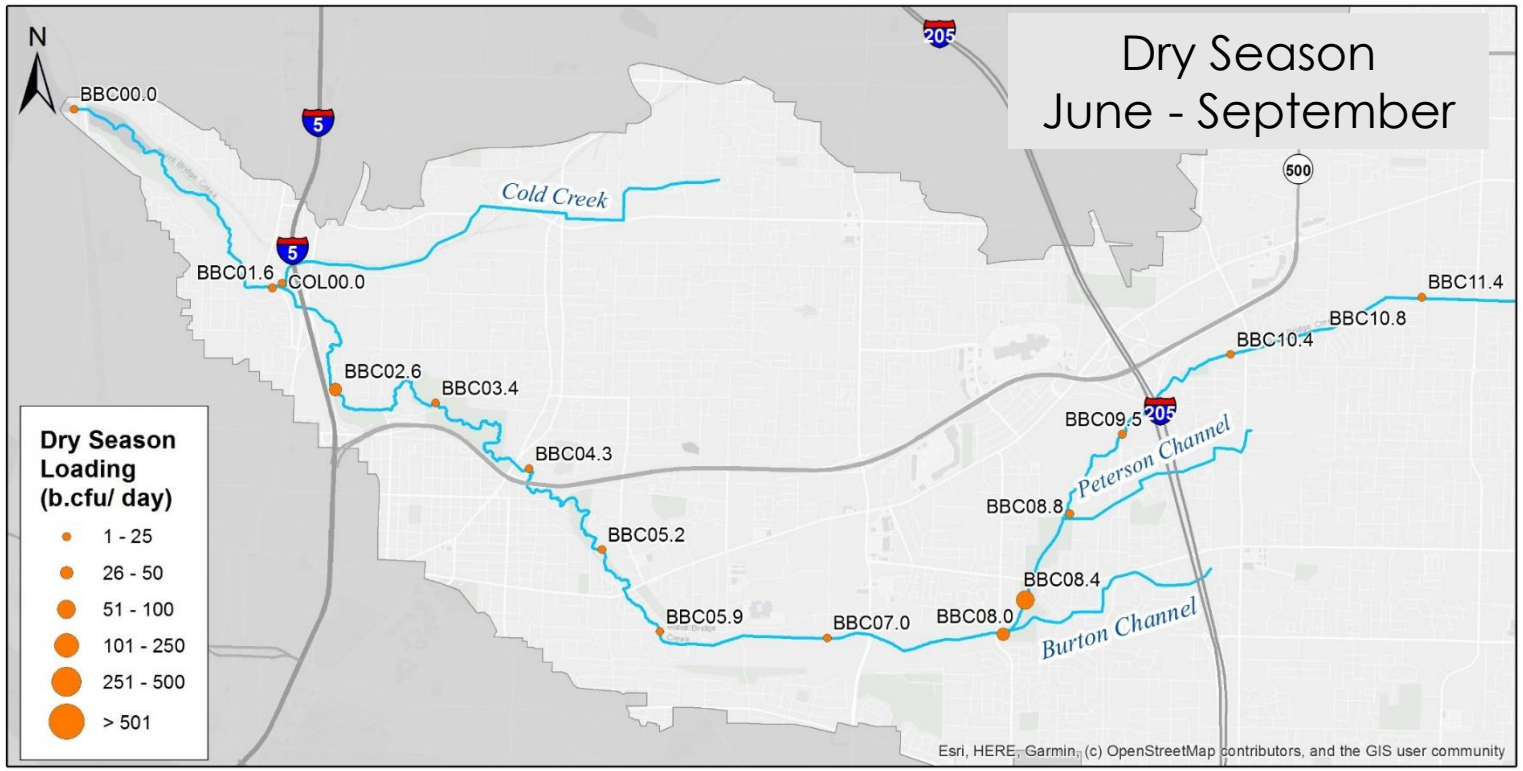
Site	Dry Season Count (n)	Dry Season GeoMean	Dry Season %excd	Wet Season Count (n)	Wet Season GeoMean	Wet Season %excd
BBC11.4	15	63	0%	18	23	**11%**
BBC10.8	15	63	0%	18	24	**11%**
BBC10.4	15	**130**	**27%**	18	47	**22%**
BBC09.5	15	75	7%	18	36	**22%**
BBC08.8	15	76	7%	18	34	**11%**
PET01.3	14	9	7%	18	6	**11%**
PET00.0	15	**310**	**87%**	18	**219**	**50%**
BBC08.4	15	**215**	**47%**	18	90	**17%**
BUR00.0	15	**260**	**40%**	18	**183**	**39%**
BBC08.0	15	**162**	**40%**	18	**107**	**22%**
BBC07.0	14	98	**21%**	18	87	**39%**
BBC05.9	15	**107**	**13%**	18	74	**28%**
BBC05.2	15	**132**	**20%**	18	**129**	**50%**
BBC04.3	15	**164**	**27%**	18	**122**	**39%**
BBC03.4	15	**138**	**20%**	18	**126**	**39%**
BBC02.6	15	**236**	**60%**	18	**118**	**39%**
COL00.0	15	**484**	**87%**	18	**150**	**44%**
BBC01.6	15	**215**	**60%**	18	**128**	**44%**
BBC00.0	13	19	0%	17	49	**24%**

Geometric Mean < 100 cfu/00 mL

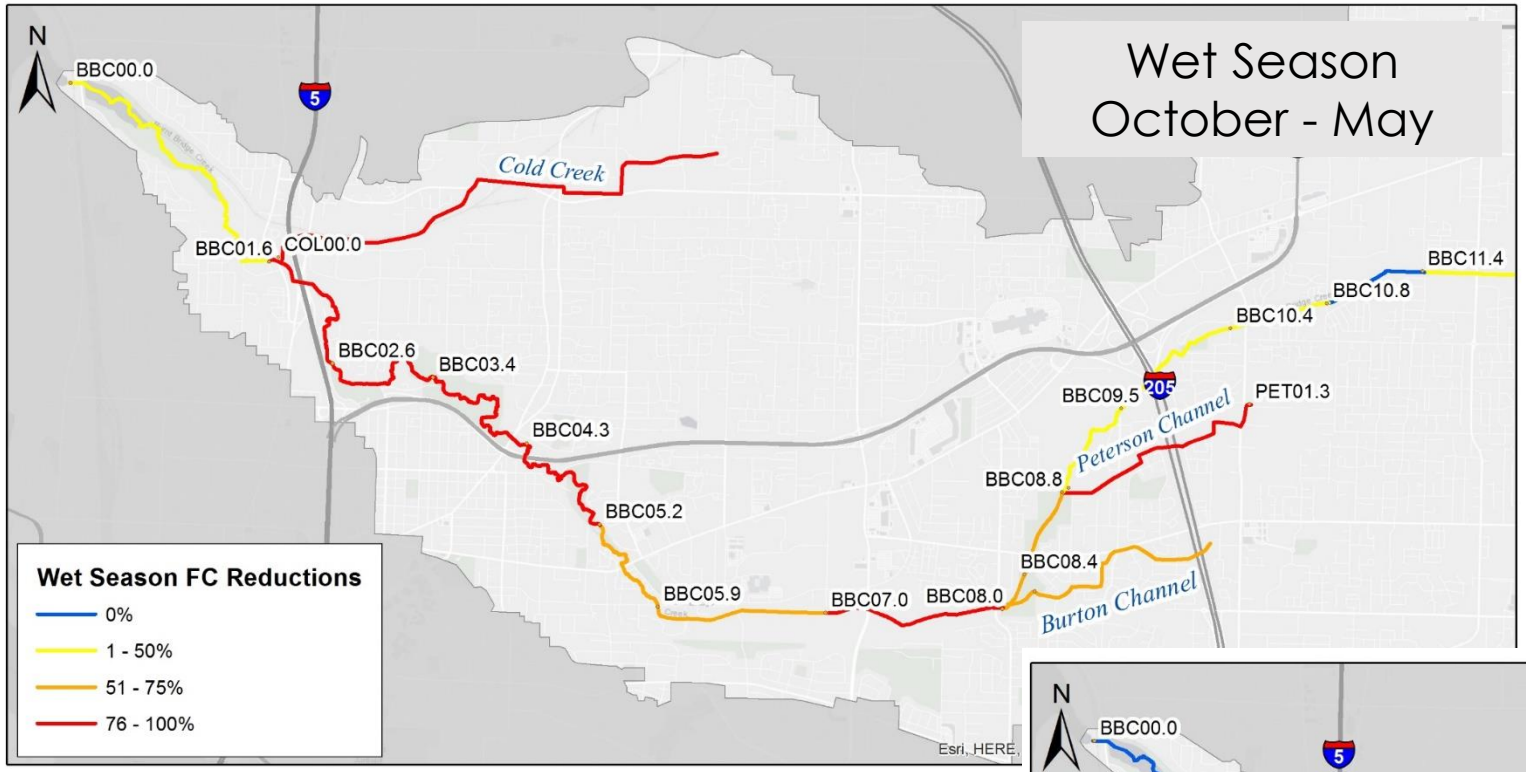
10% not to exceed 200 cfu/100 mL

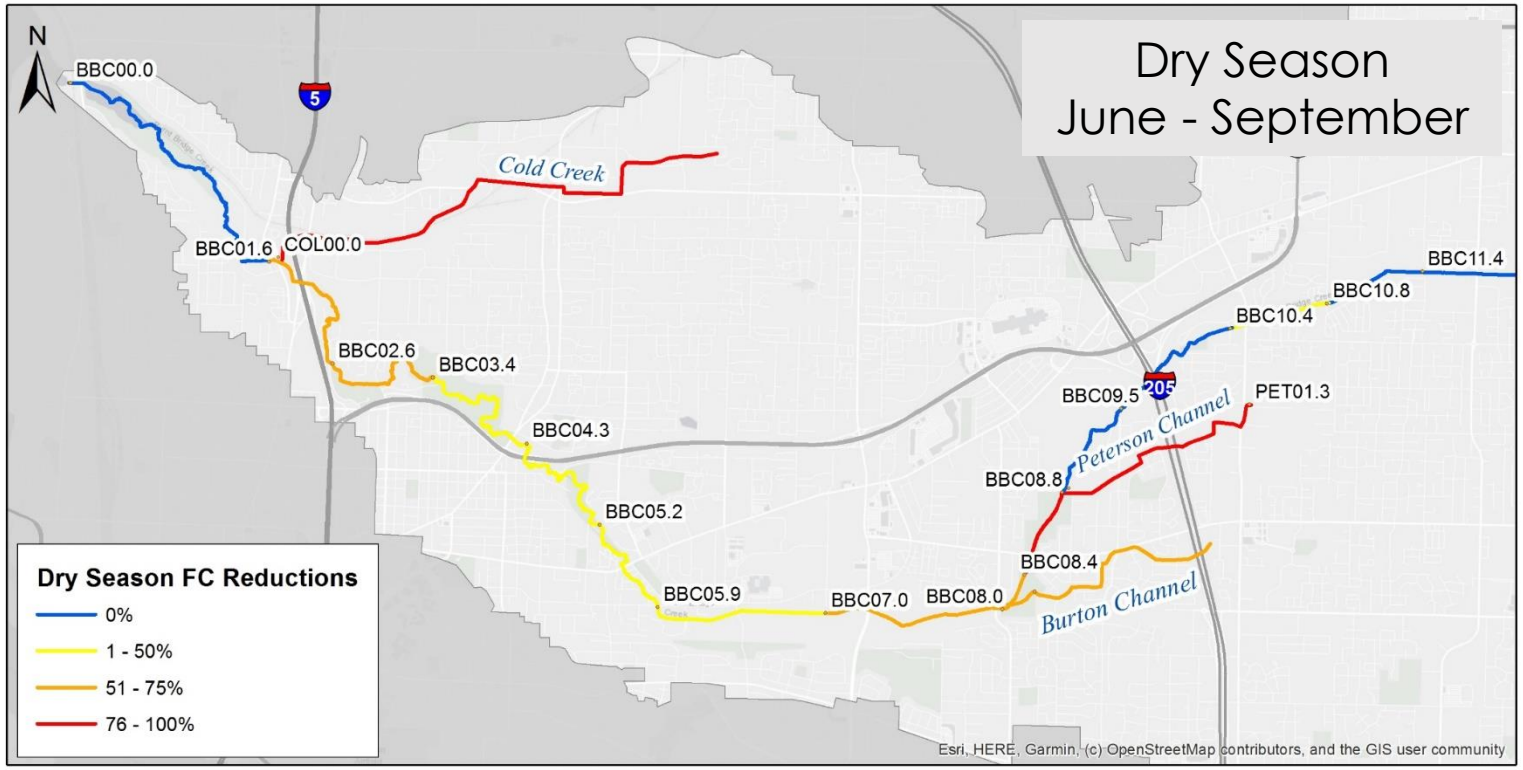


$$Load(billion\frac{cfu}{day}) = Bacteria\ Concentration\ (\frac{cfu}{100mL}) * Flow\ (cfs) * Conversion\ Factor$$



Average Seasonal Fecal Coliform Bacteria Loading (2009-2010)



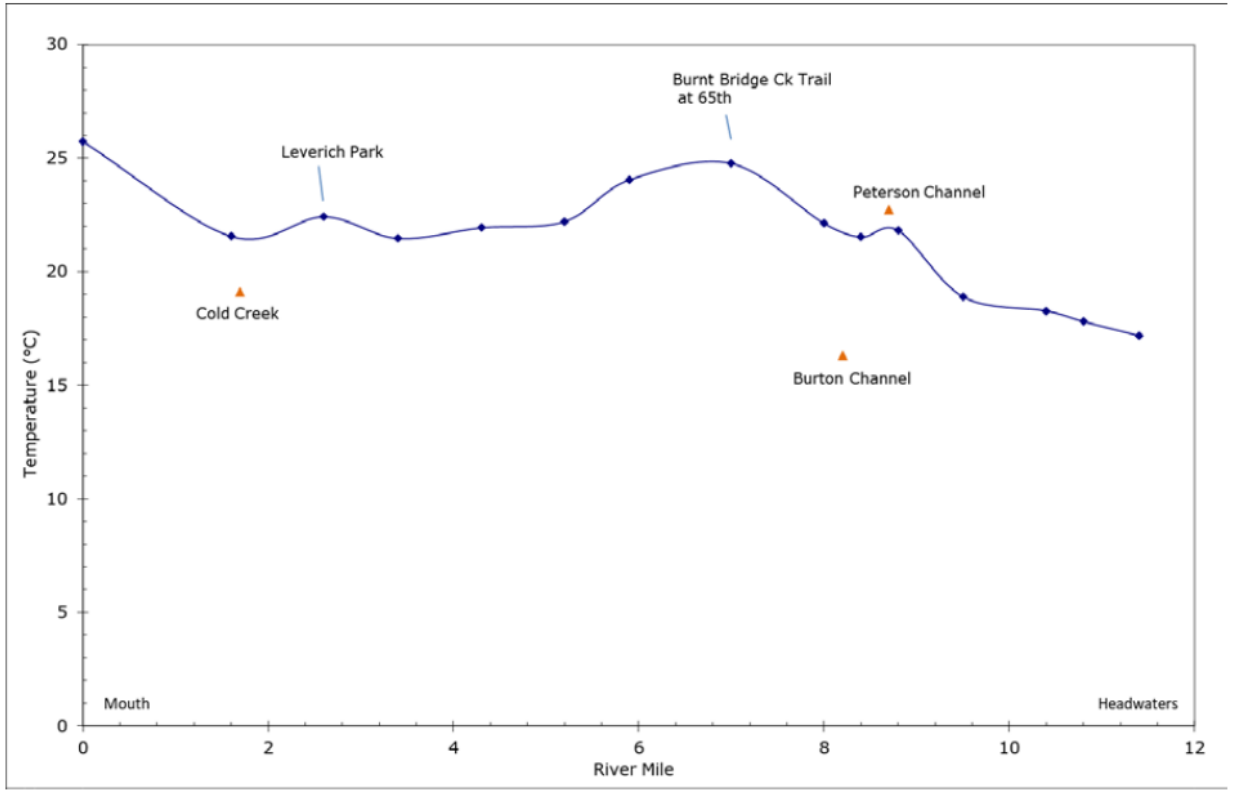


Seasonal Fecal Coliform Bacteria Reductions (%) Needed to Meet Water Quality Criteria

Temperature & Shade Results

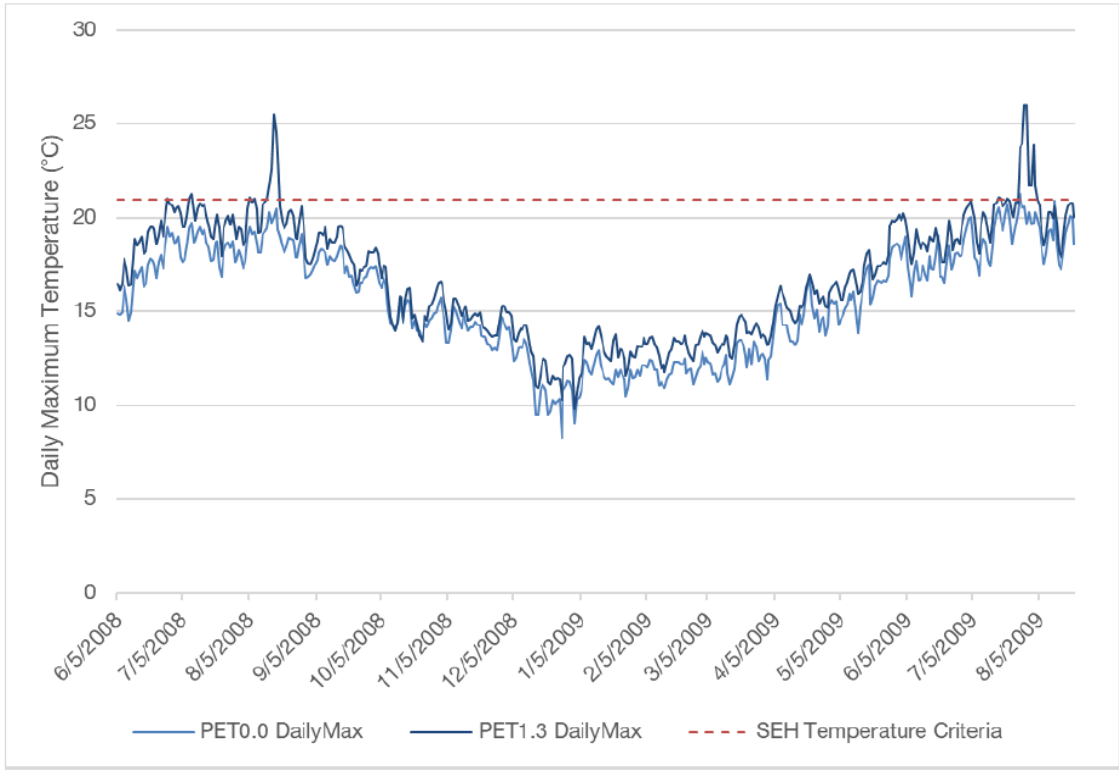
Temperature Monitoring Results

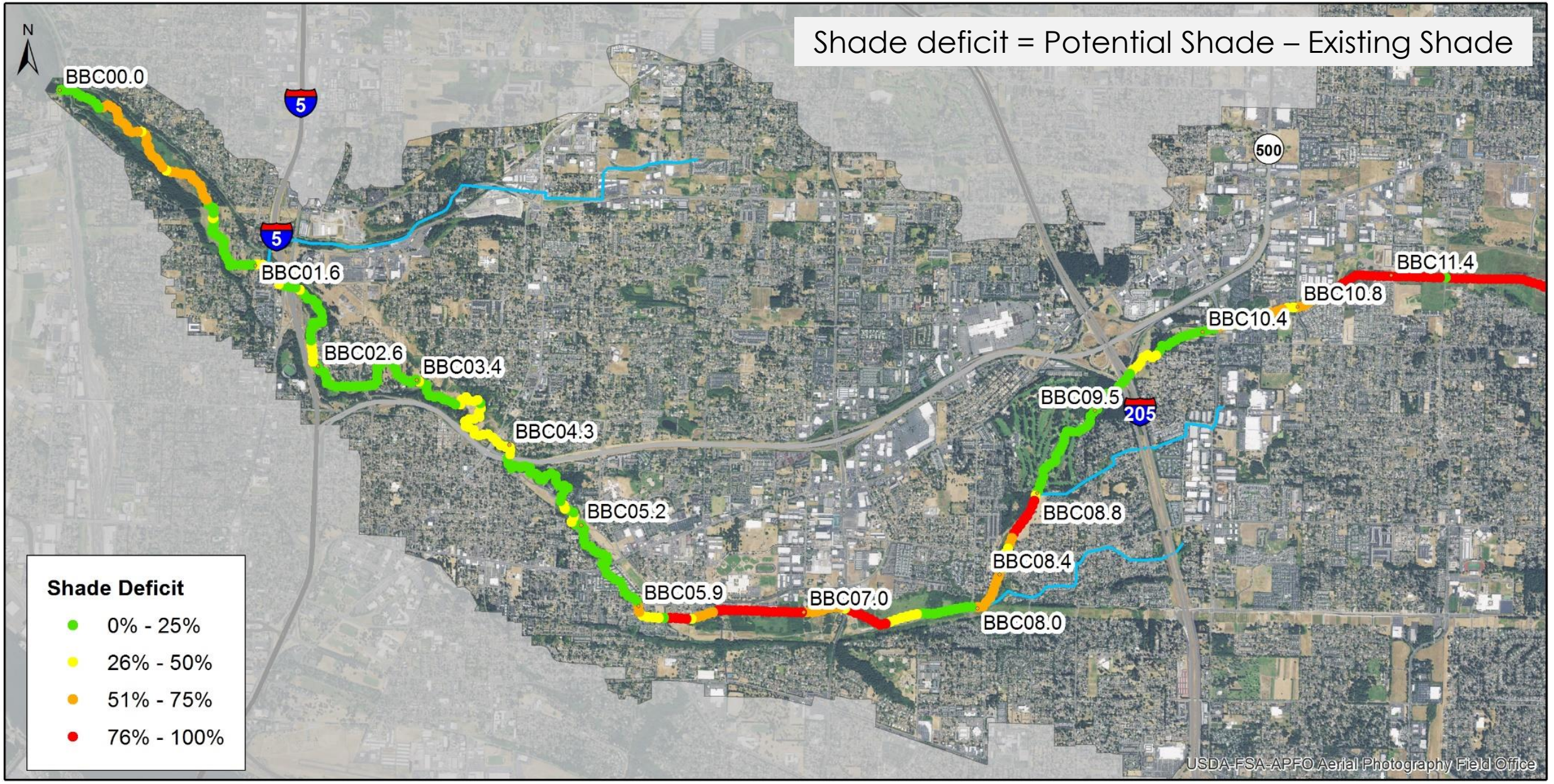
- All sites, except Cold Creek (COL00.0), exceeded temperature criteria
- Overall maximum temperatures were observed at BBC00.0
- Sites with the highest count exceeding temperature criteria were in the middle subbasin (BBC07.0 and BBC05.9)



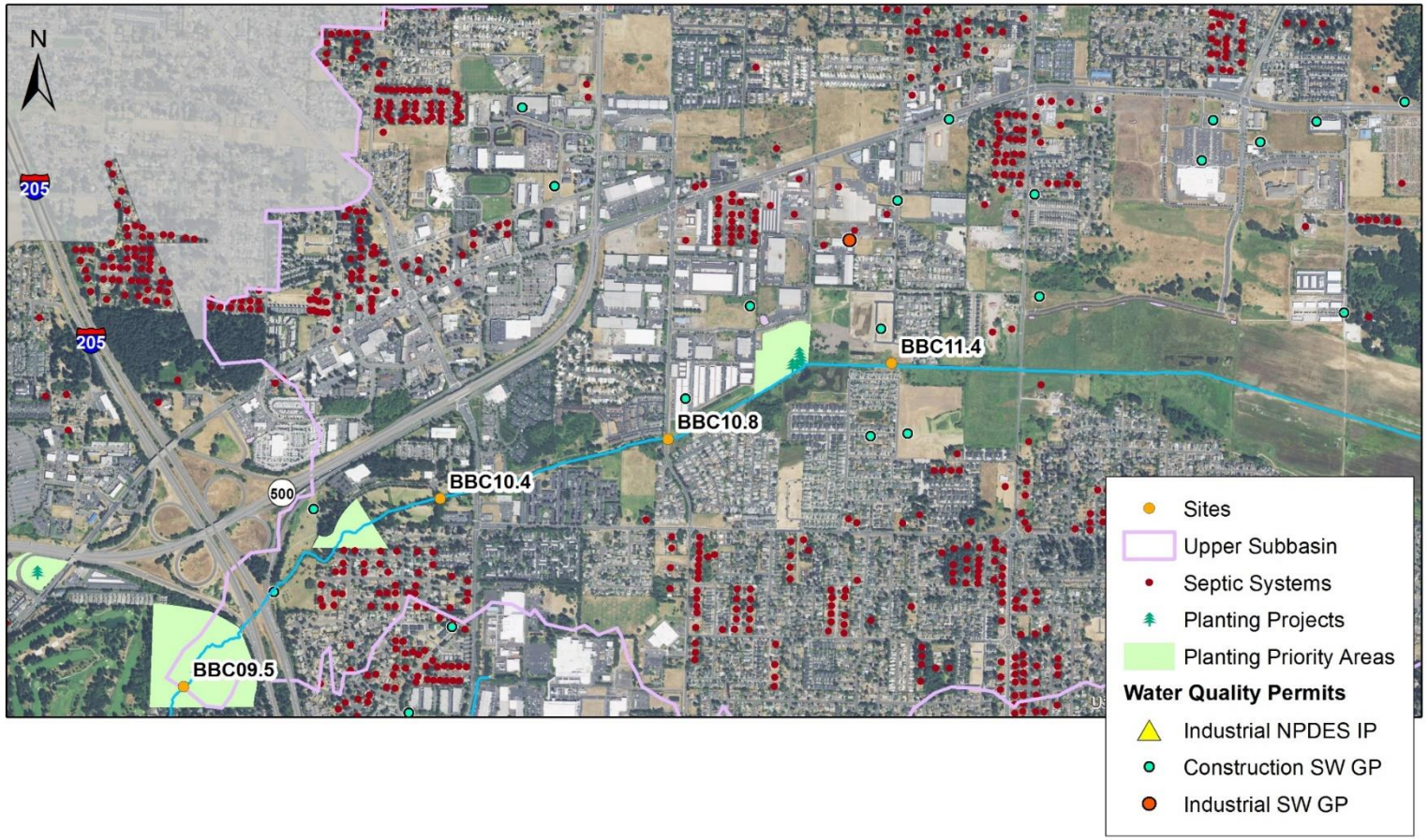
SEH America Facility

- SEH America contributes just over half (63%) of flow to Peterson Channel
- Temperature logger was installed near SEH America outfall (PET01.3)
- Temperatures are warmer near facility outfall than at mouth of Peterson Channel
- Temperature differences are largest during the summer months

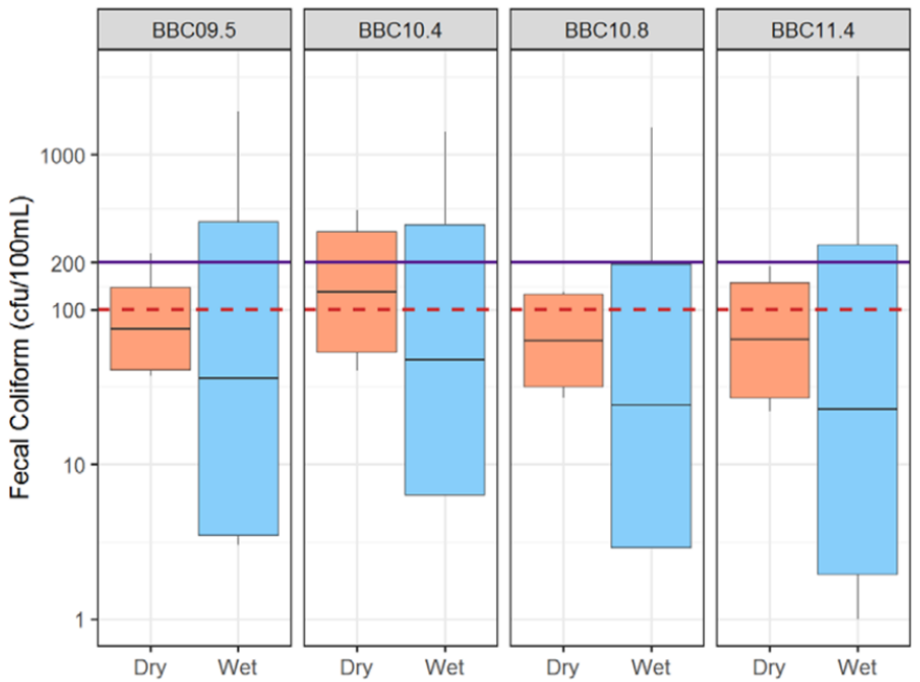


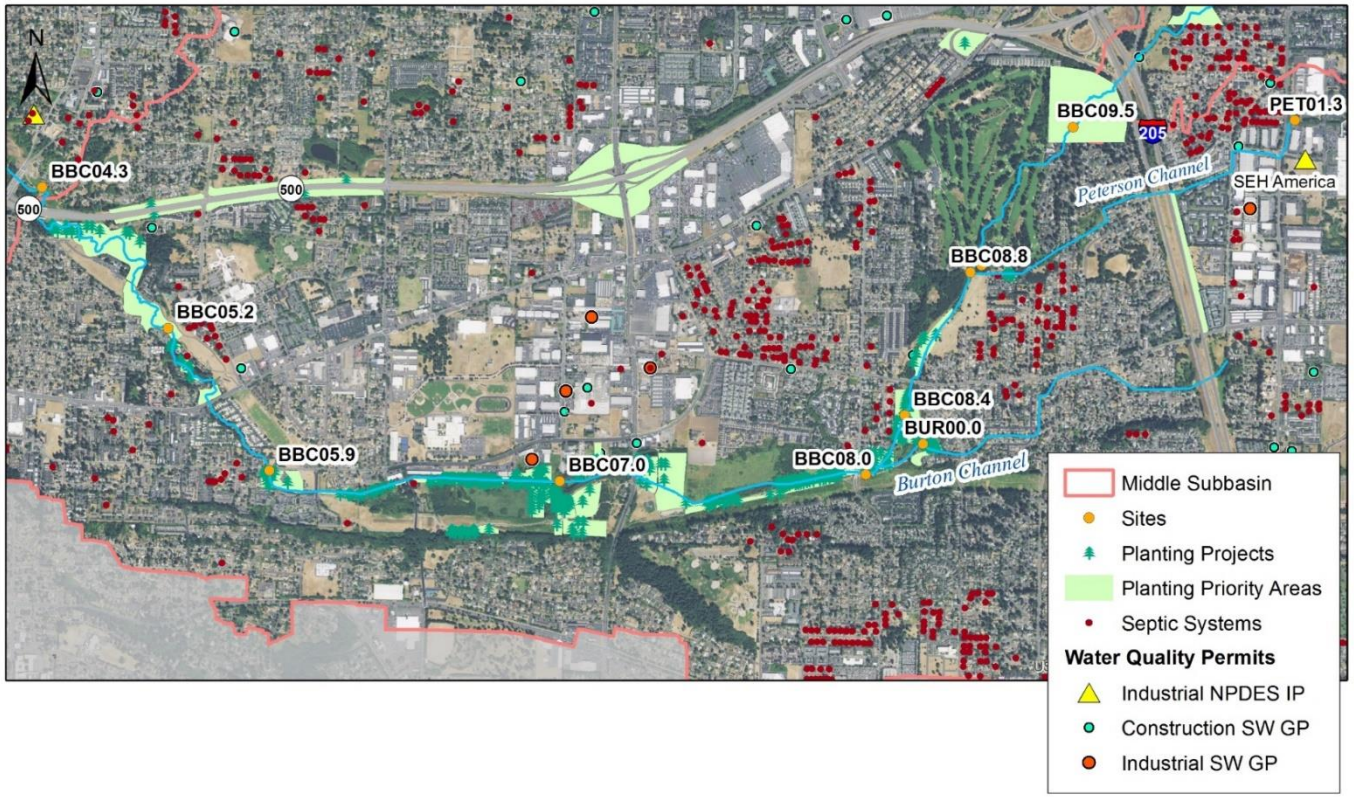

Shade deficit = Potential Shade – Existing Shade
N
BBC00.0
5
5
BBC01.6
BBC02.6
BBC03.4
BBC04.3
BBC05.2
BBC05.9
BBC07.0
BBC08.0
BBC08.4
BBC08.8
BBC09.5
205
BBC10.4
BBC10.8
BBC11.4
500
Shade Deficit
0% - 25%
26% - 50%
51% - 75%
76% - 100%
USDA-FSA-APFO Aerial Photography Field Office

Subbasin Summary

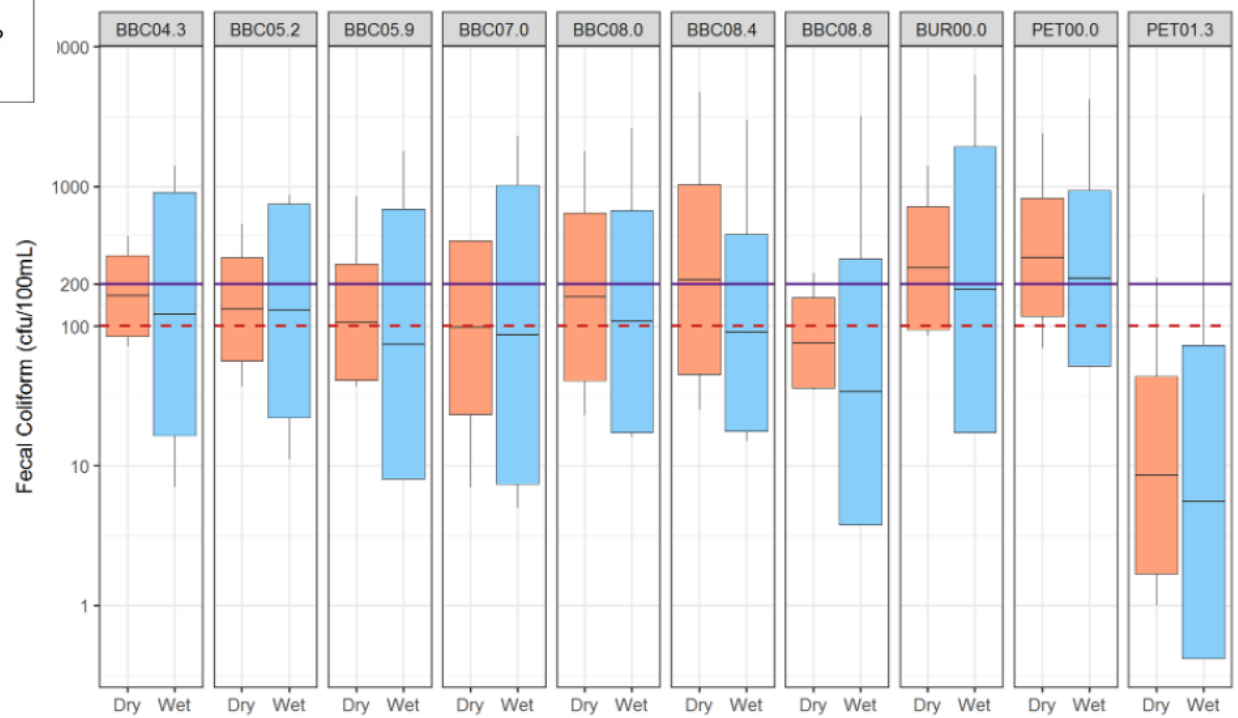


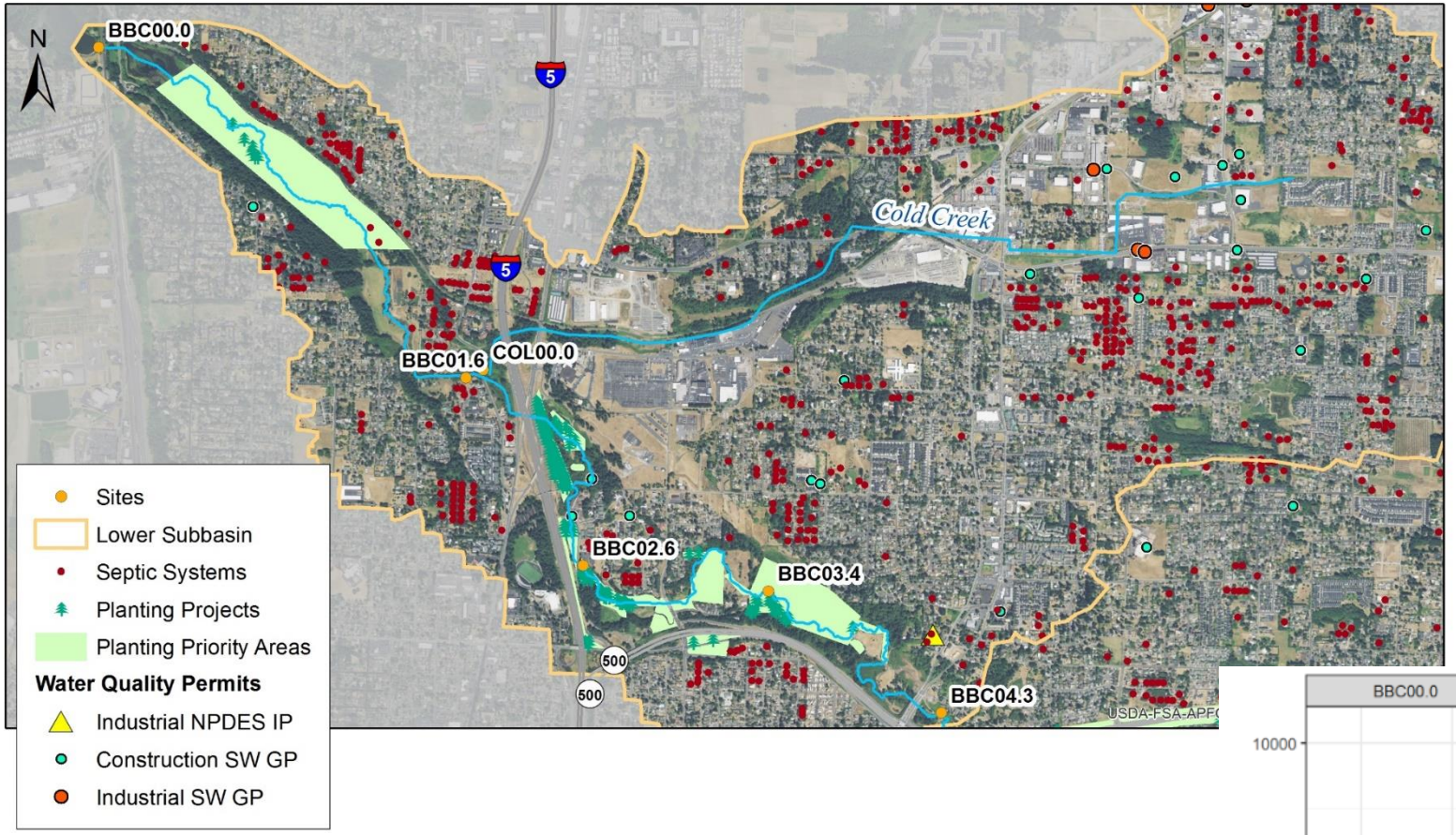
River Mile	Existing Shade	Potential Shade	Shade Deficit
10-11	66%	92%	26%
11-12	25%	98%	73%
12-13	6%	93%	87%
Average	32%	94%	62%



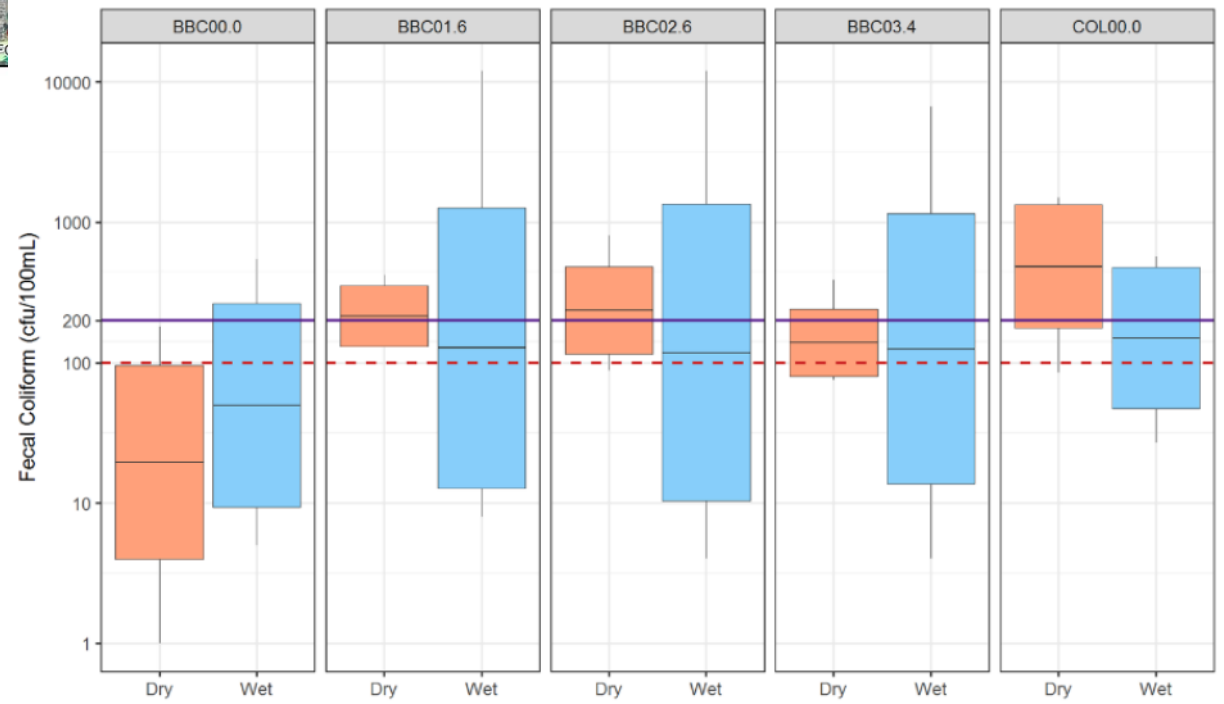


River Mile	Existing Shade	Potential Shade	Shade Deficit
5-6	81%	91%	11%
6-7	51%	85%	35%
7-8	12%	94%	83%
8-9	43%	88%	44%
9-10	46%	66%	21%
Average	47%	85%	39%





River Mile	Existing Shade	Potential Shade	Shade Deficit
0-1	40%	83%	43%
1-2	66%	97%	31%
2-3	67%	84%	17%
3-4	84%	94%	10%
4-5	57%	93%	36%
Average	63%	90%	27%



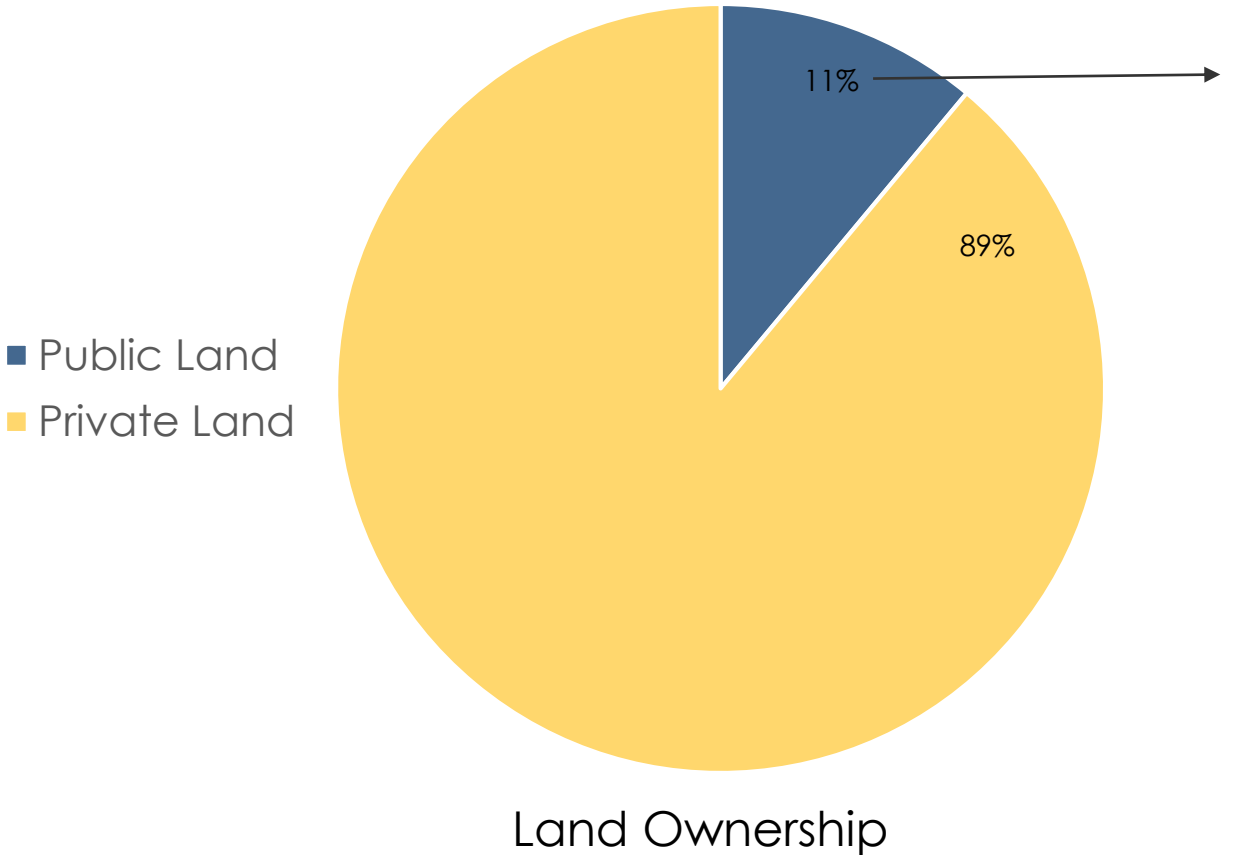
Recommendations

Recommendations

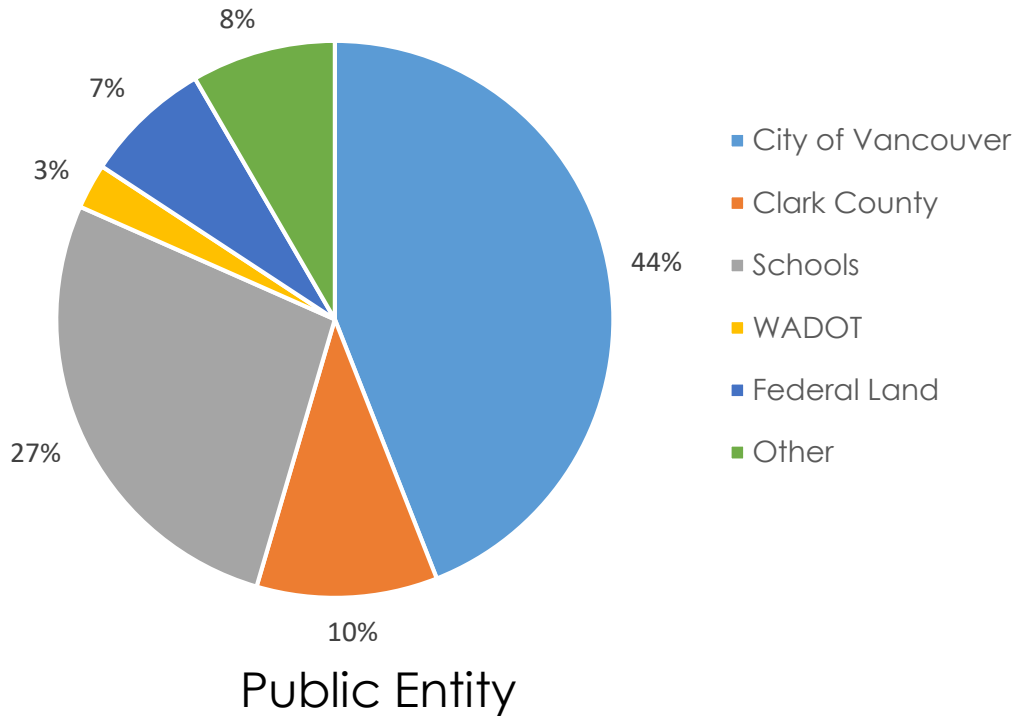
- Continue water quality monitoring
- Stormwater management
- Septic systems and wastewater
- Riparian restoration
- Groundwater and streamflow
- Public education and outreach

Questions & Discussion

Land Ownership in Watershed



Land Ownership



Public Entity