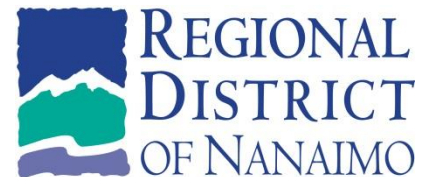


# RDN Community Watershed Monitoring Network 2015 Data Summary



Ministry of  
Environment



# Thank You!

- Government

- Ministry of Environment
- Regional District of Nanaimo
- City of Nanaimo
- Qualicum First Nation
- DFO (Big Qualicum Hatchery)

- Stakeholders

- Island Timberlands

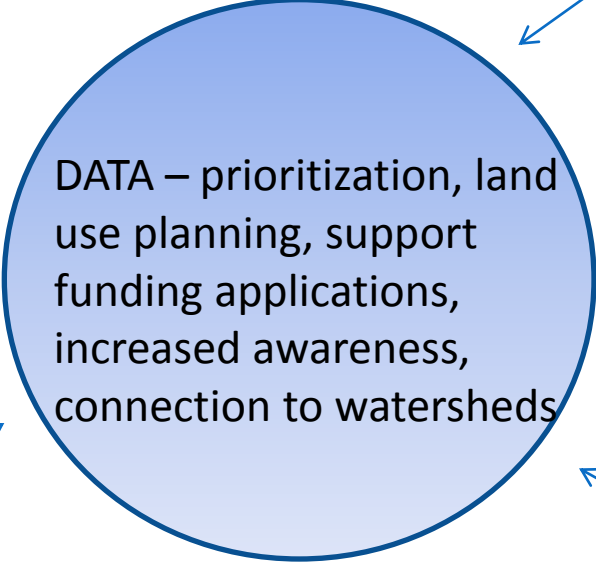
- Stewardship Groups

- Nile Creek Enhancement Society (NCES)
- Qualicum Beach Streamkeepers (QBS)
- Friends of French Creek Conservation Society (FFCCS)
- Mid Vancouver Island Habitat Enhancement Society (MVIHES)
- Lantzville / Nanoose Streamkeepers (LNS)
- Island Waters Fly Fishers (IWFF)
- Departure Creek Streamkeepers (DCS)
- Vancouver Island University (VIU)
- Nanaimo and Area Land Trust (NALT)
- Gabriola Streamkeepers (GSk)

# Partnership

RDN – equipment, technical support, training, outreach, data entry

MOE – technical support, training, data entry, data review



DATA – prioritization, land use planning, support funding applications, increased awareness, connection to watersheds

Stewardship Groups – sampling, local knowledge

Island Timberlands – safety gear, land access, QA/QC sponsorship

# Positives

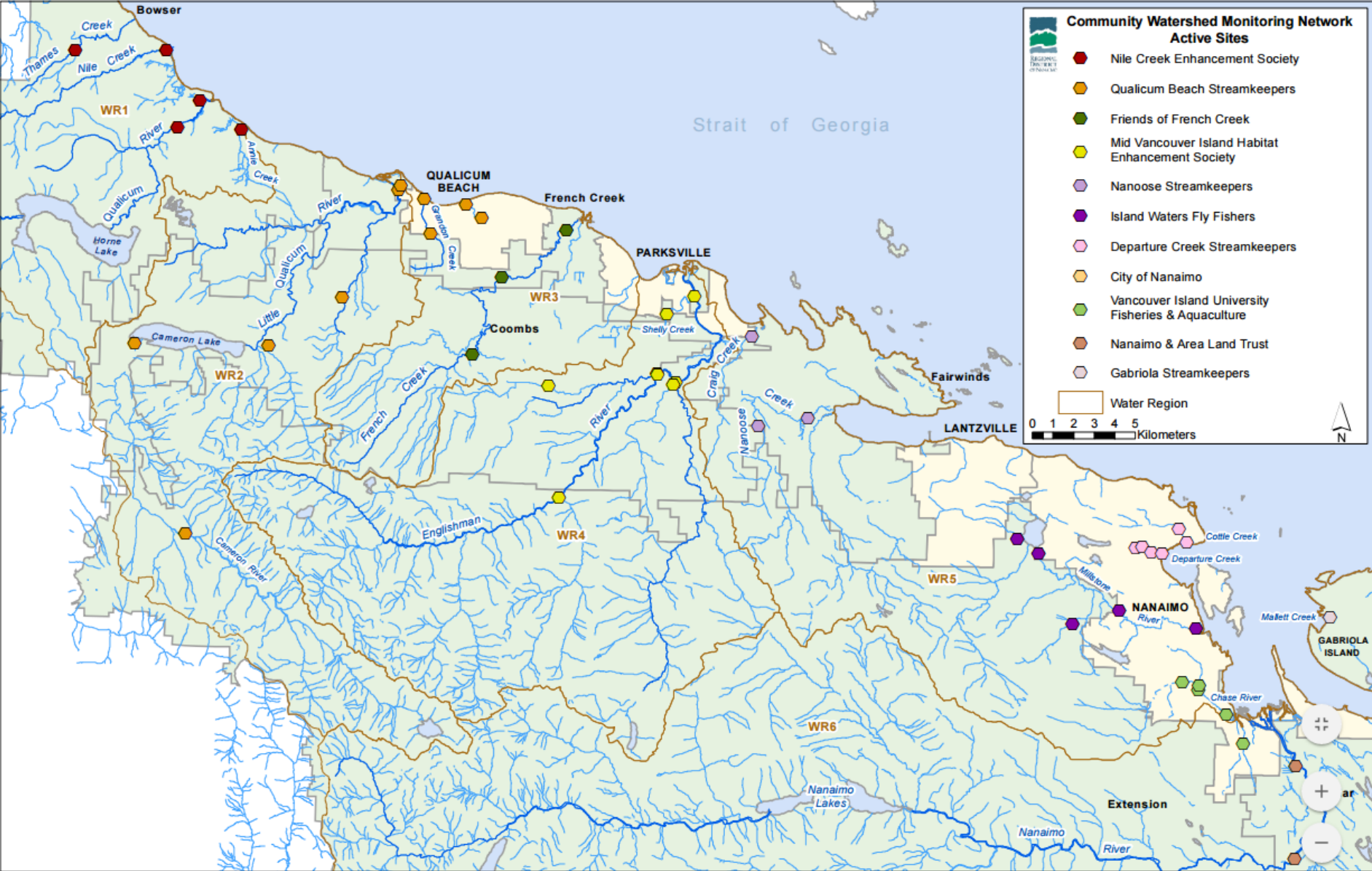
- Consistent data collection
- Excellent field notes
- Quality control helps determine where more training effort needed
- 49 sites in 18 different watersheds
- Excellent cooperation between all partners
- Lots of feedback
- Awareness in community

**Community Watershed Monitoring Network Active Sites**

- Nile Creek Enhancement Society
- Qualicum Beach Streamkeepers
- Friends of French Creek
- Mid Vancouver Island Habitat Enhancement Society
- Nanoose Streamkeepers
- Island Waters Fly Fishers
- Departure Creek Streamkeepers
- City of Nanaimo
- Vancouver Island University Fisheries & Aquaculture
- Nanaimo & Area Land Trust
- Gabriola Streamkeepers

Water Region

0 1 2 3 4 5 Kilometers



# 5<sup>th</sup> year of the Program

- 5<sup>th</sup> year of data (5 groups), 4<sup>th</sup> year of data (4 groups), 3<sup>rd</sup> year of data (1 group), 1<sup>st</sup> year of data (1 group).
- Trends can start to be observed after a minimum of 3 years
- Use data to learn about watershed health; to determine where more effort is needed (i.e. upstream determination of sources)

# New in 2015....

- **New sites were added to understand areas / reaches not previously monitored**
  - Heikkela Brook (Doumont Area) – *no flow for most of the monitoring season*
  - Mallet Creek (Gabriola Island)
- **Sites were put on hiatus where there were not recurring concerns**
  - Cottle Creek @ Landalt
  - N. Cottle Creek 100m d/s Burma Rd
  - Haslam Creek u/s Nanaimo River
- **New parameters for lab analysis (E.Coli, Total P, Metals) were added**
  - Chase R. @ Park Ave
  - Cat Stream @ Park Ave above confluence w/ Chase
  - Beck Creek @ Cedar Rd
  - McGarrigle Creek @ Jingle Pot Rd
  - Millstone R. @ Biggs, @ East Wellington, in Barsby Park

# Moving forward with recommendations

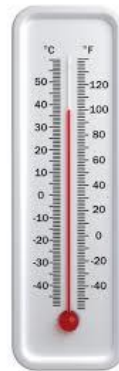
- **Stream/ Riparian Assessments** – using the Provincial “Urban Salmon Habitat Program” methodology took place last June with volunteers on Grandon Creek and French Creek. This helped document the physical characteristics that may be influencing DO and Temperature and Turbidity.
- **Seed funding for stewardship / restoration projects** – *contact [waterprotection@rdn.bc.ca](mailto:waterprotection@rdn.bc.ca) or call 250-390-6560 for more information*



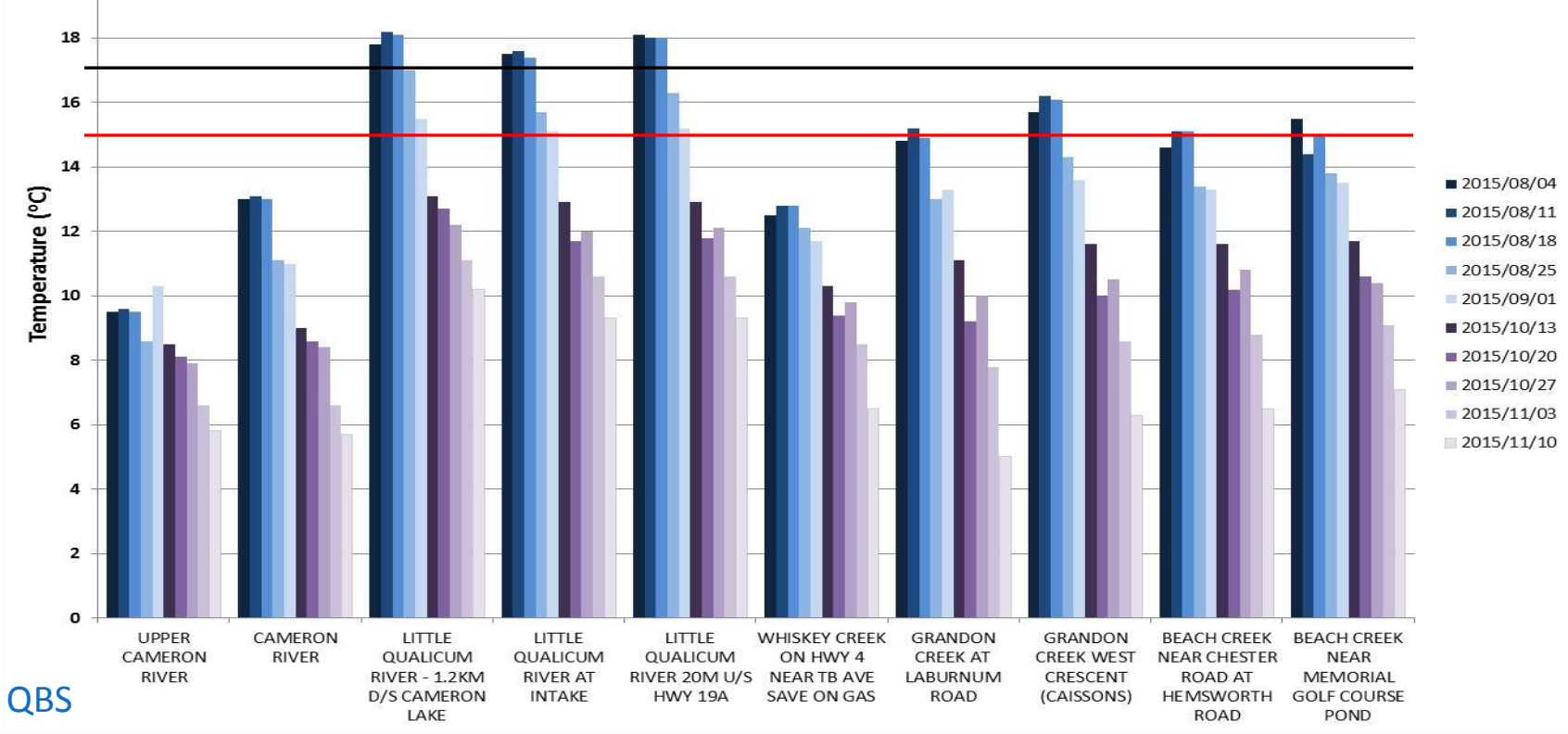
# Water Quality Monitoring Parameters

- Temperature
  - affects processes in water and in aquatic life
- Dissolved Oxygen
  - supports life
  - lower when flows are lower
- Specific Conductivity
  - ability to conduct electric current
  - higher when more dissolved minerals, higher turbidity or less dilution
- Turbidity
  - particles in water
  - linked to higher levels of contaminants

# Temperature

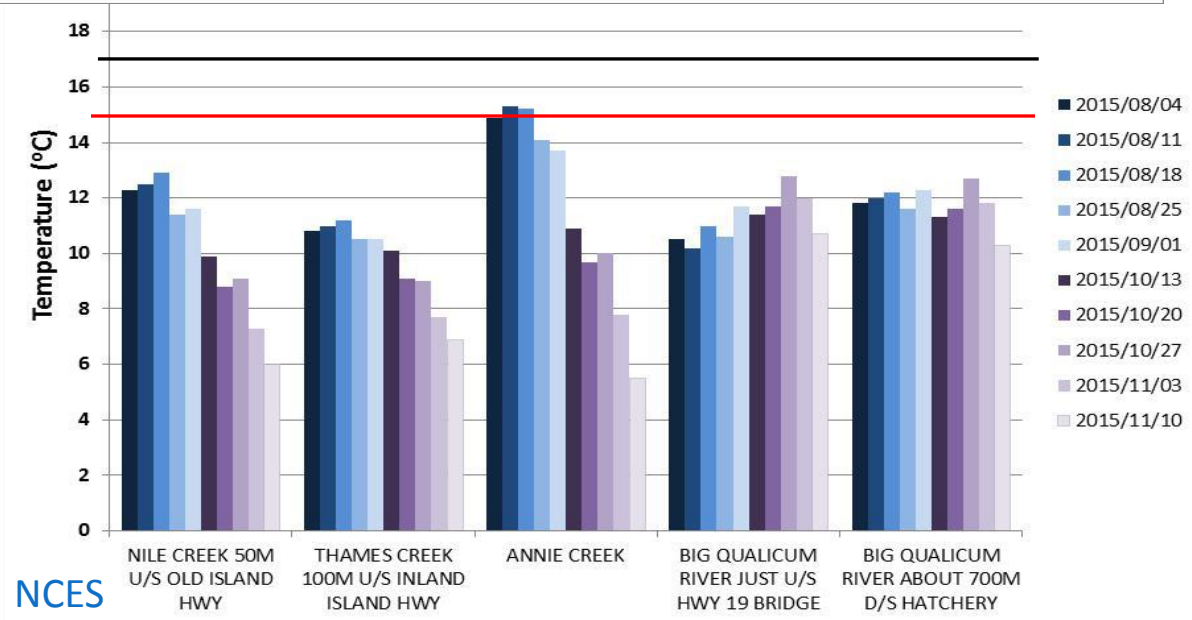


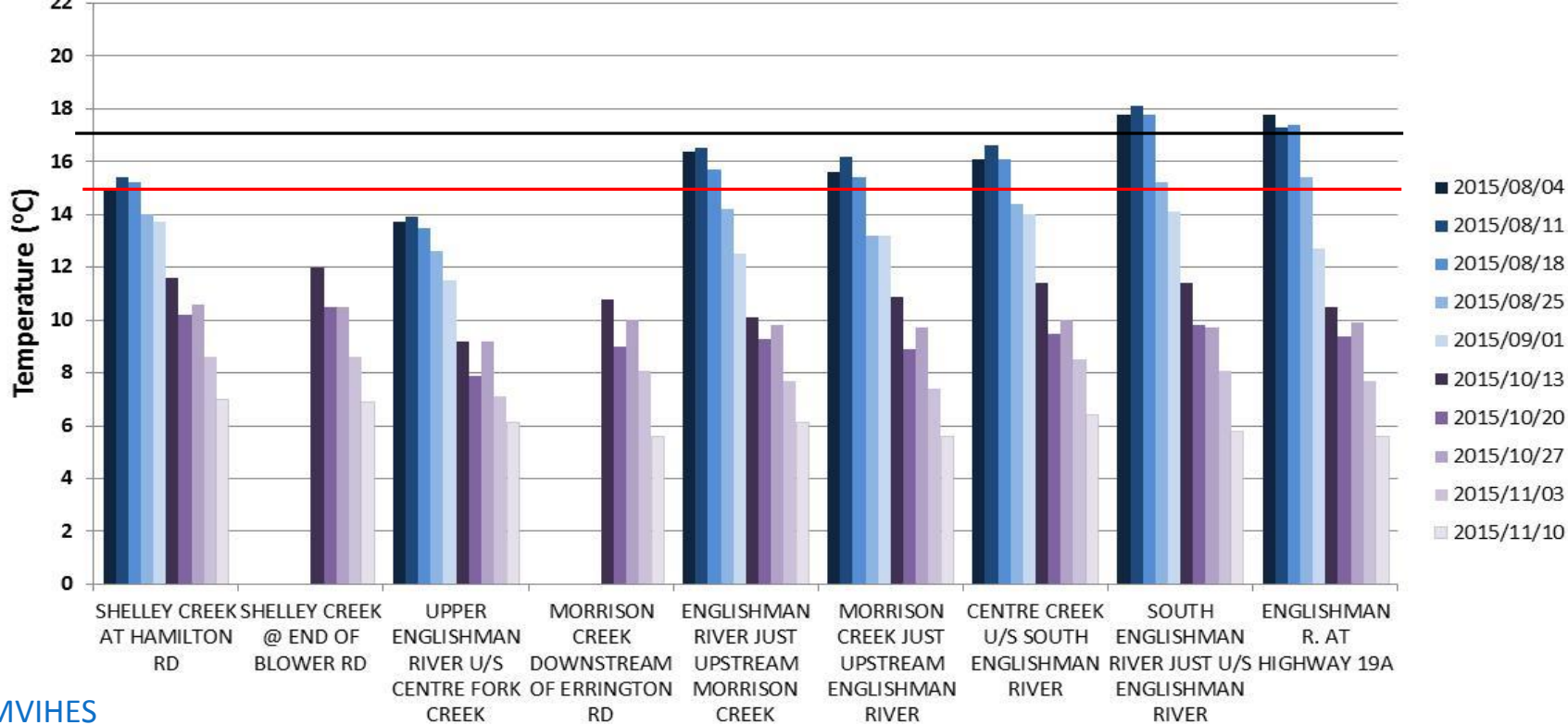
- Aesthetic drinking water objective (weekly average  $\leq 15^{\circ}\text{C}$ )
- Aquatic life guideline for Coho rearing (weekly average  $\leq 17^{\circ}\text{C}$ )



Aesthetic drinking water objective (15°C)

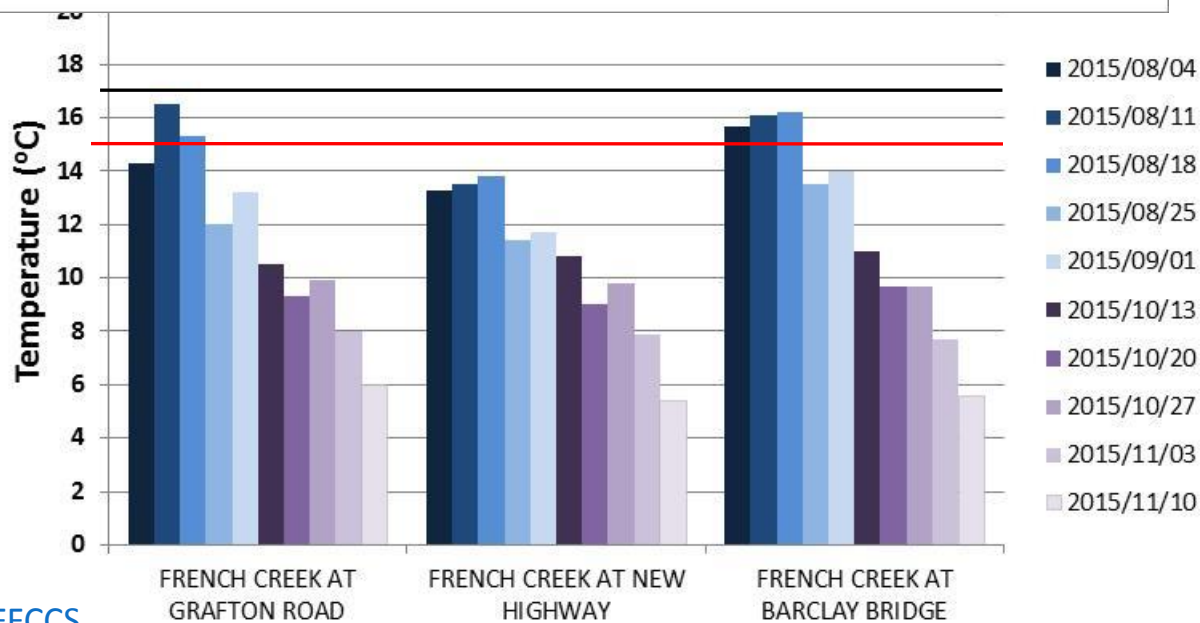
Aquatic life guideline for Coho rearing (17°C)

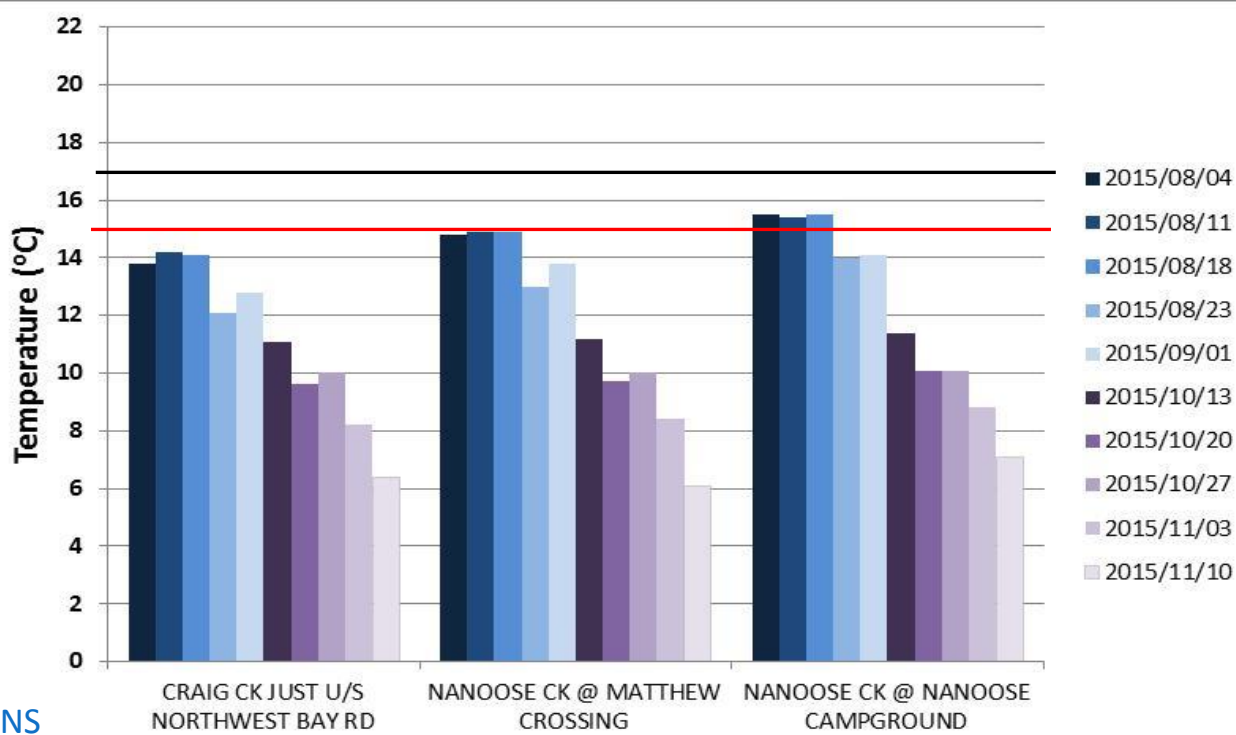




Aesthetic drinking water objective (15°C)

Aquatic life guideline for Coho rearing (17°C)

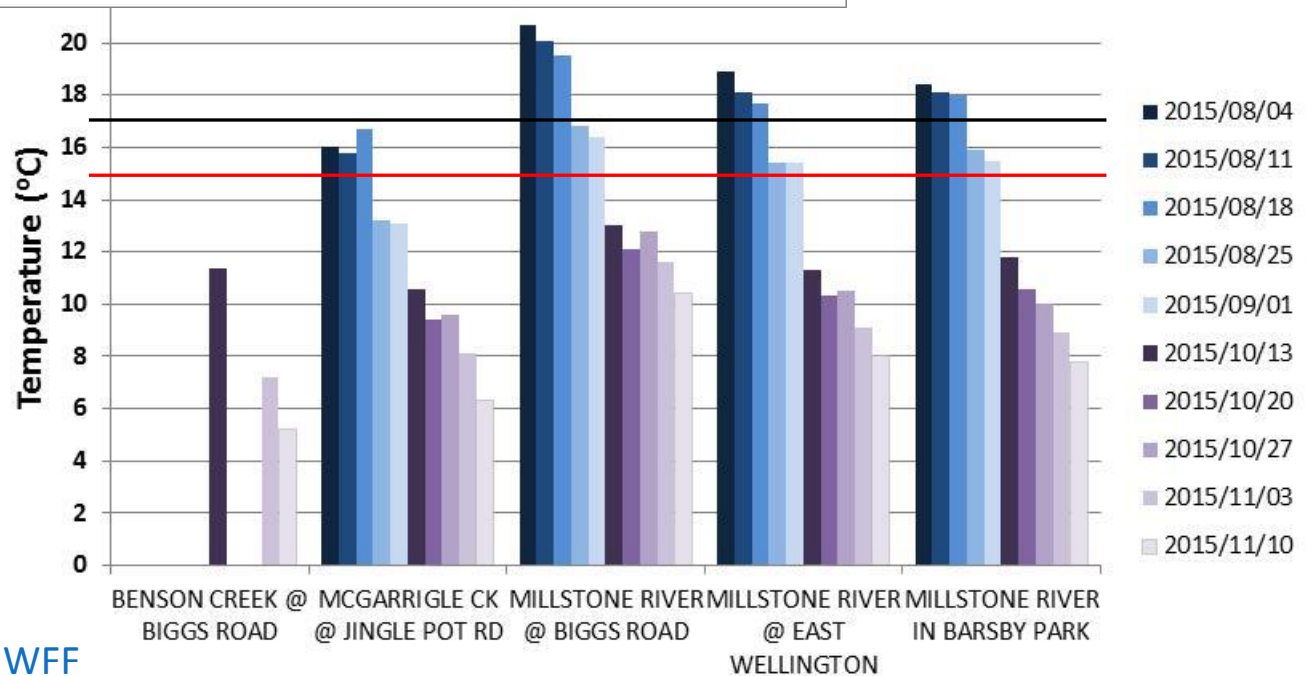




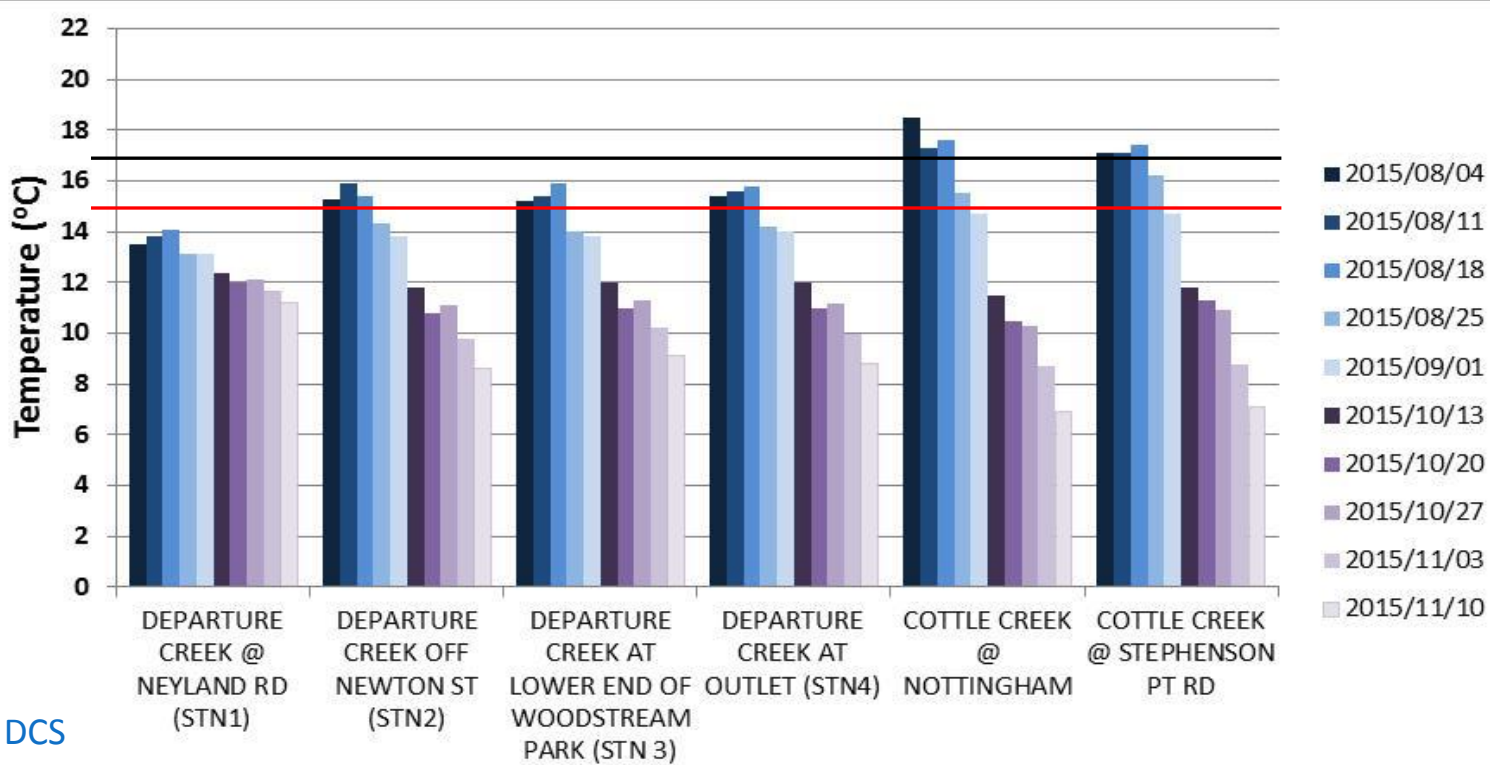
Aesthetic drinking water objective (15°C)

Aquatic life guideline for coho rearing (17°C)

LNS



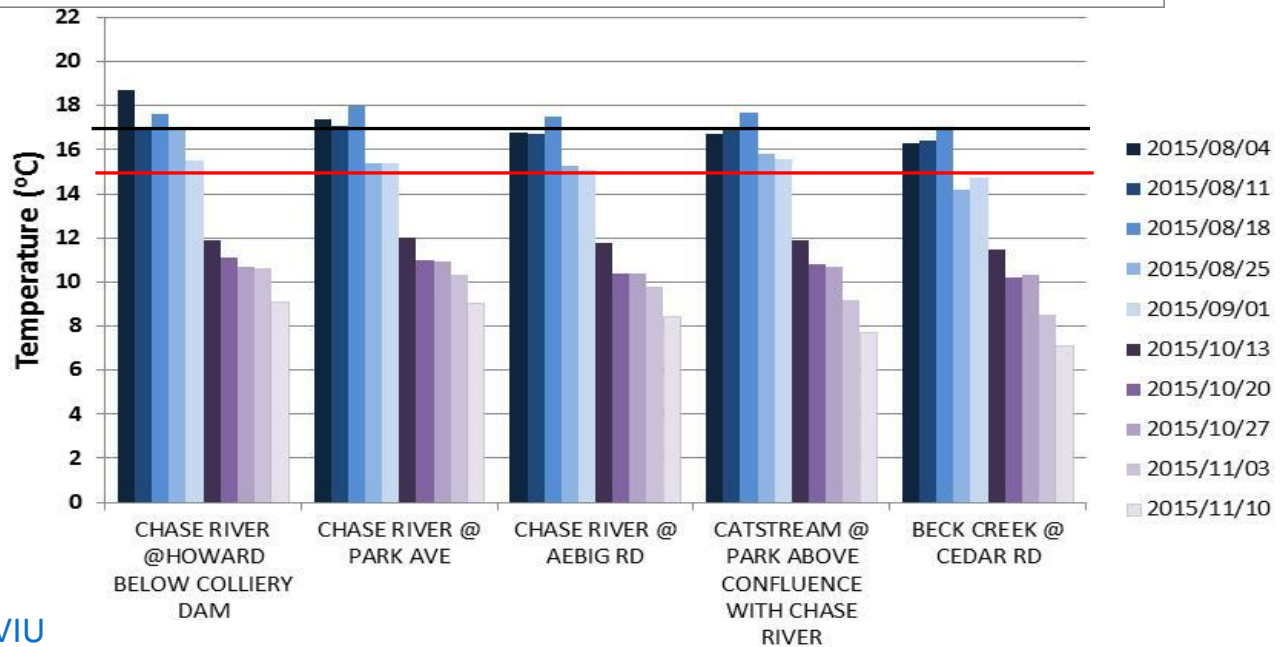
IWFF



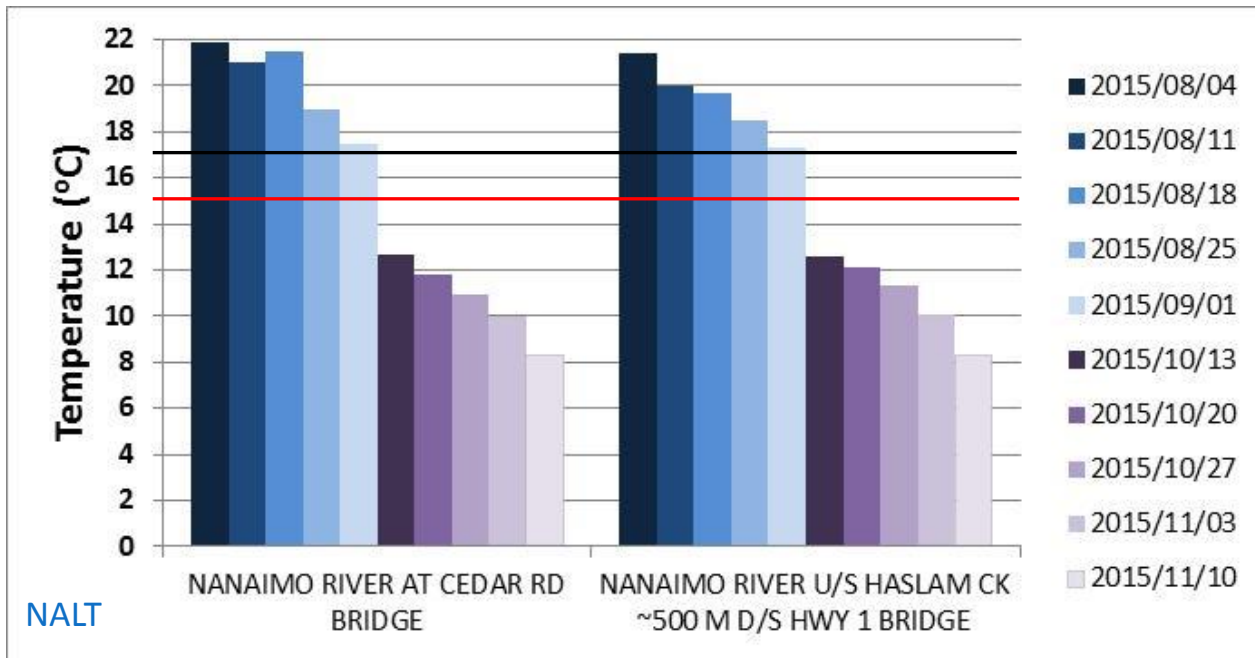
DCS

Aesthetic drinking water objective (15°C)

Aquatic life guideline for Coho rearing (17°C)

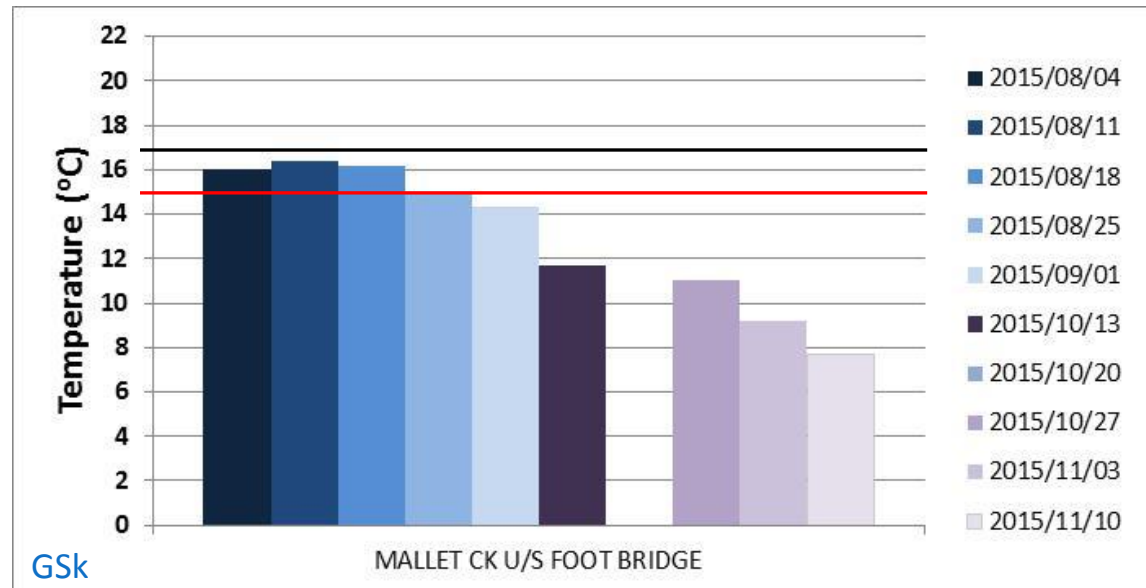


VIU



Aesthetic drinking water objective (15°C)

Aquatic life guideline for Coho rearing (17°C)



**Aesthetic drinking water objective (weekly average  $\leq 15^{\circ}\text{C}$ )  
Potential to exceed at:**

most low elevation sites in summer

**Aquatic life guideline for Coho rearing ( $\leq 17^{\circ}\text{C}$ )  
Potential to exceed in:**

**Nanaimo River**

**Millstone River**

**Little Qualicum River**

**Cottle Creek**

**South Englishman River**

**Chase River**

**Englishman River**

**Cat Stream**

- Typical of shallow wide portions of lower watersheds
- Okay if juvenile fish have lower temperature refuges (riparian, pools, etc.)
- Fewer summer dates and sites in 2015 with higher water temperature values than in 2014
- *Additional sites with potential for exceedences in 2014: French Creek, Centre Creek, Morrison Creek, McGarrigle Creek, Departure Creek, Beck Creek*



Temperature

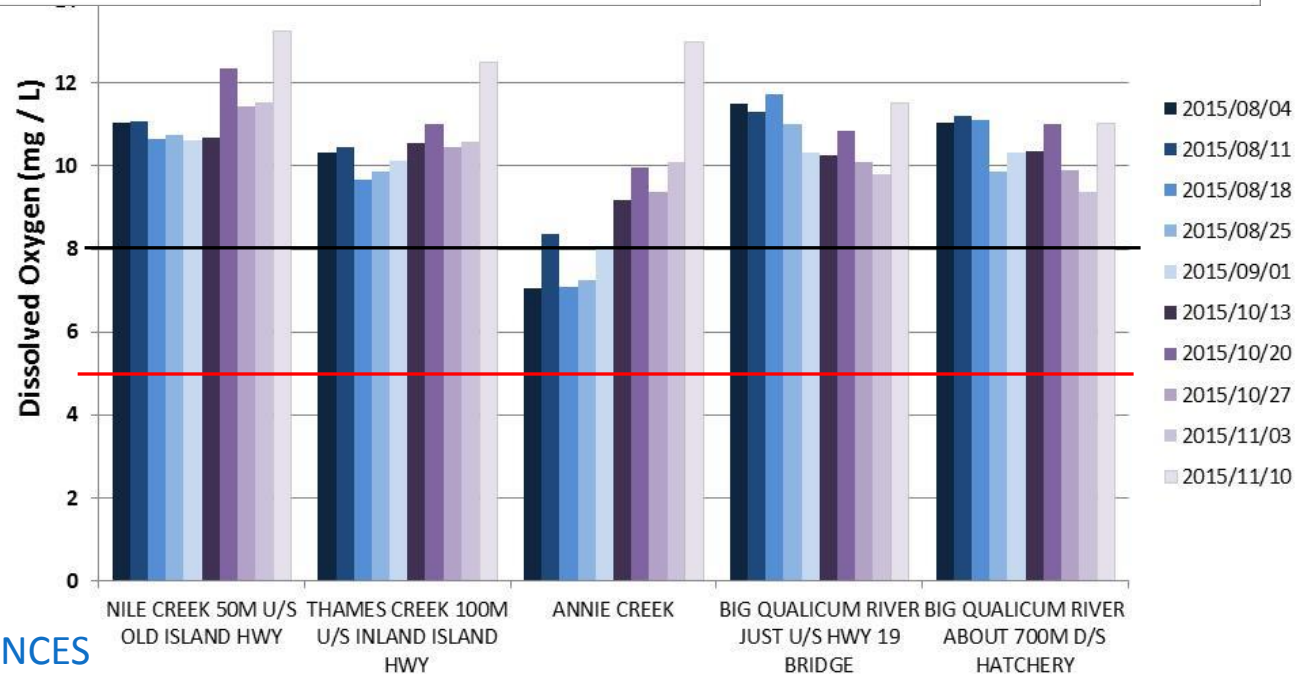
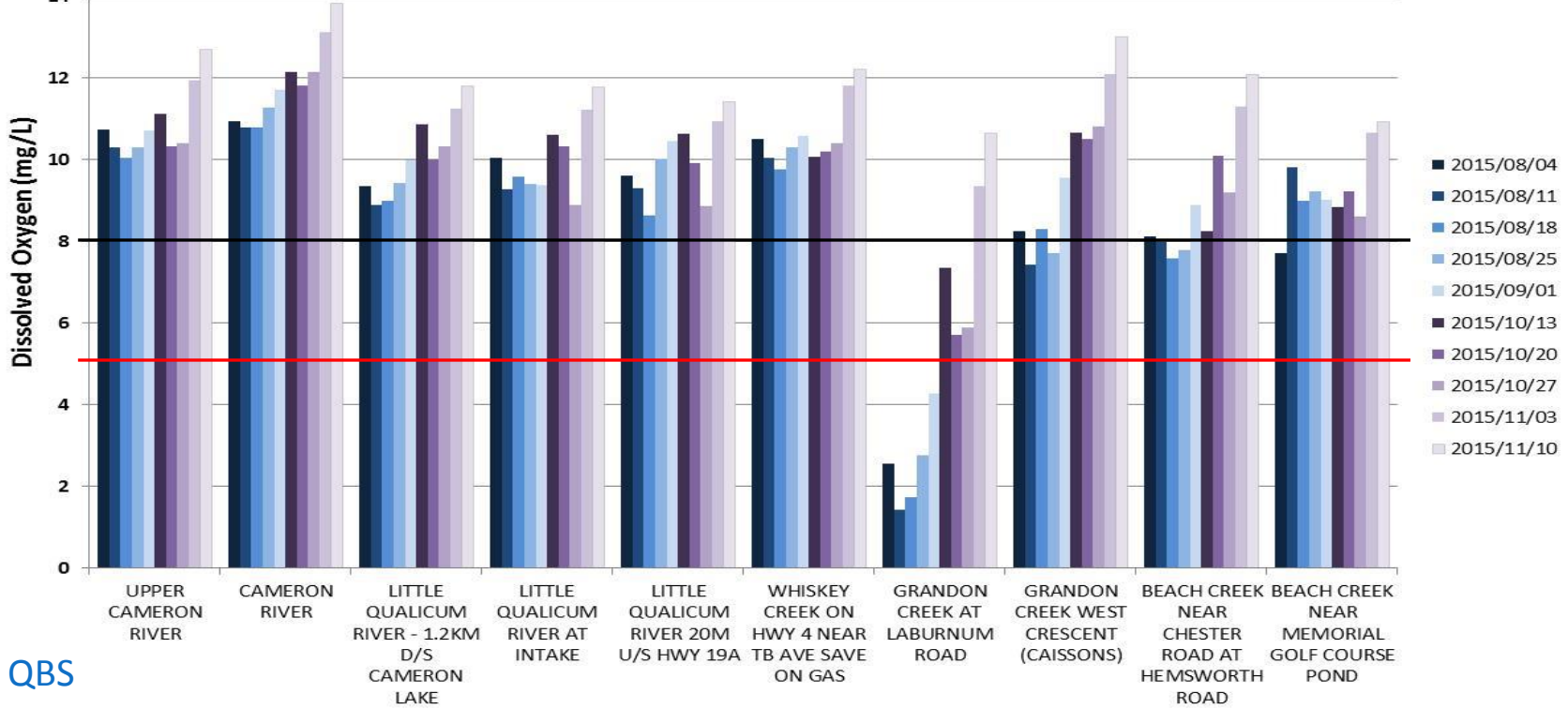


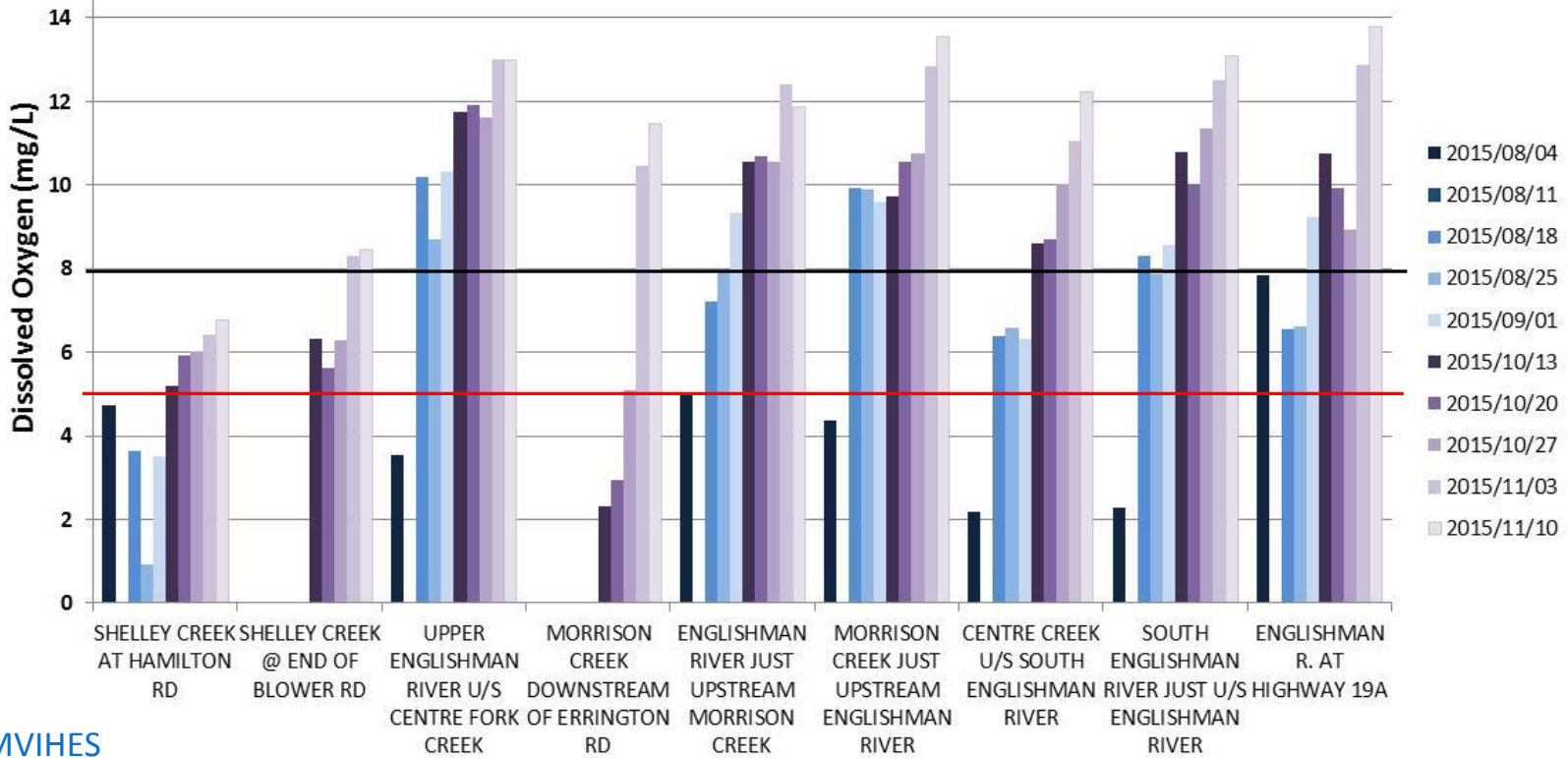


# Dissolved Oxygen



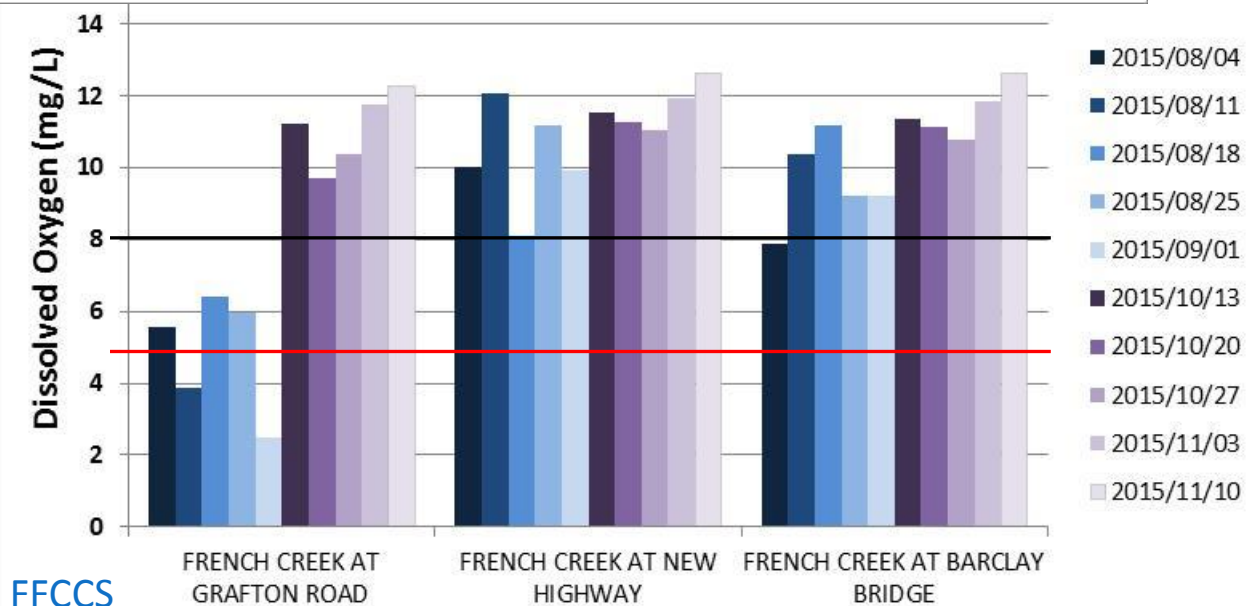
- 30 day average: 8 mg/L
- Instantaneous minimum: 5 mg/L

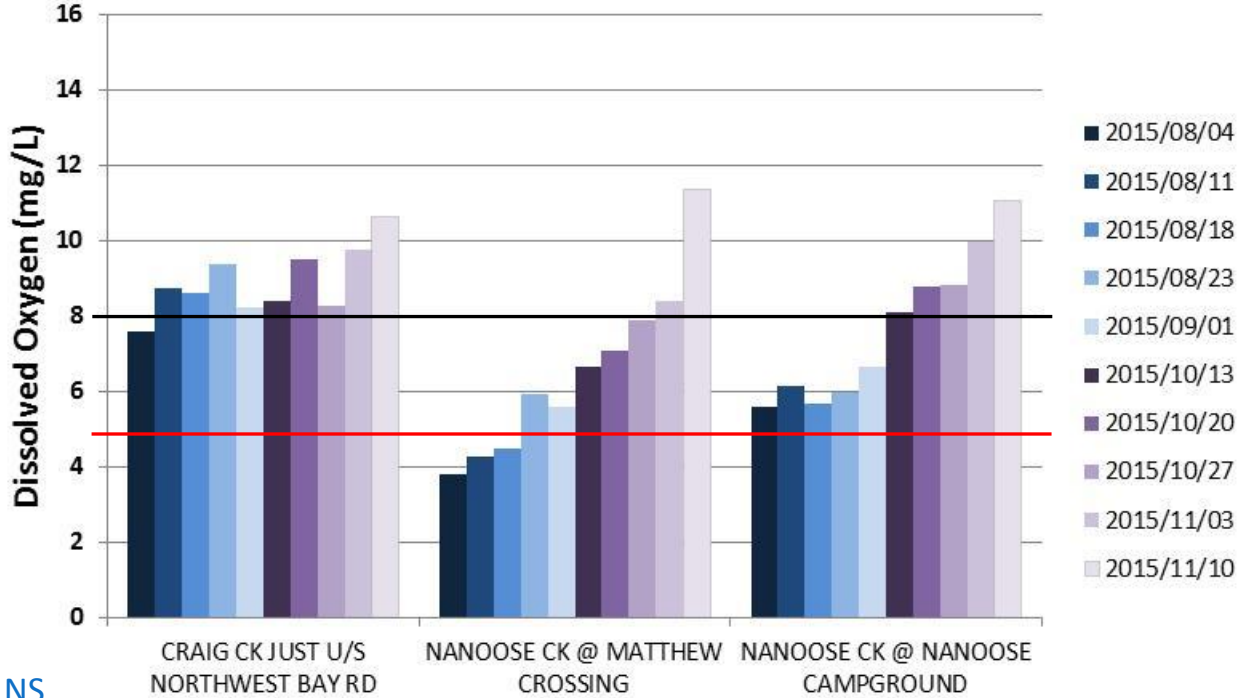




30 day average: 8 mg/L

Instantaneous minimum: 5 mg/L

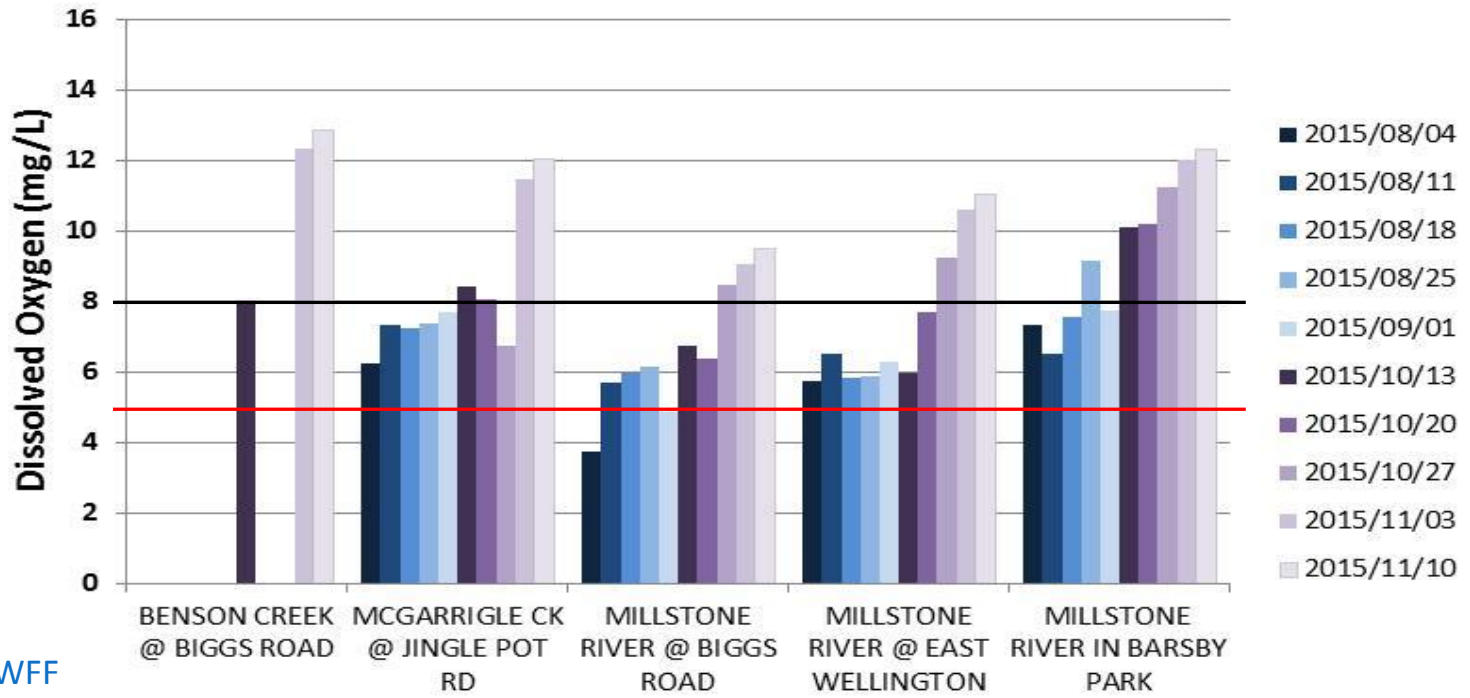




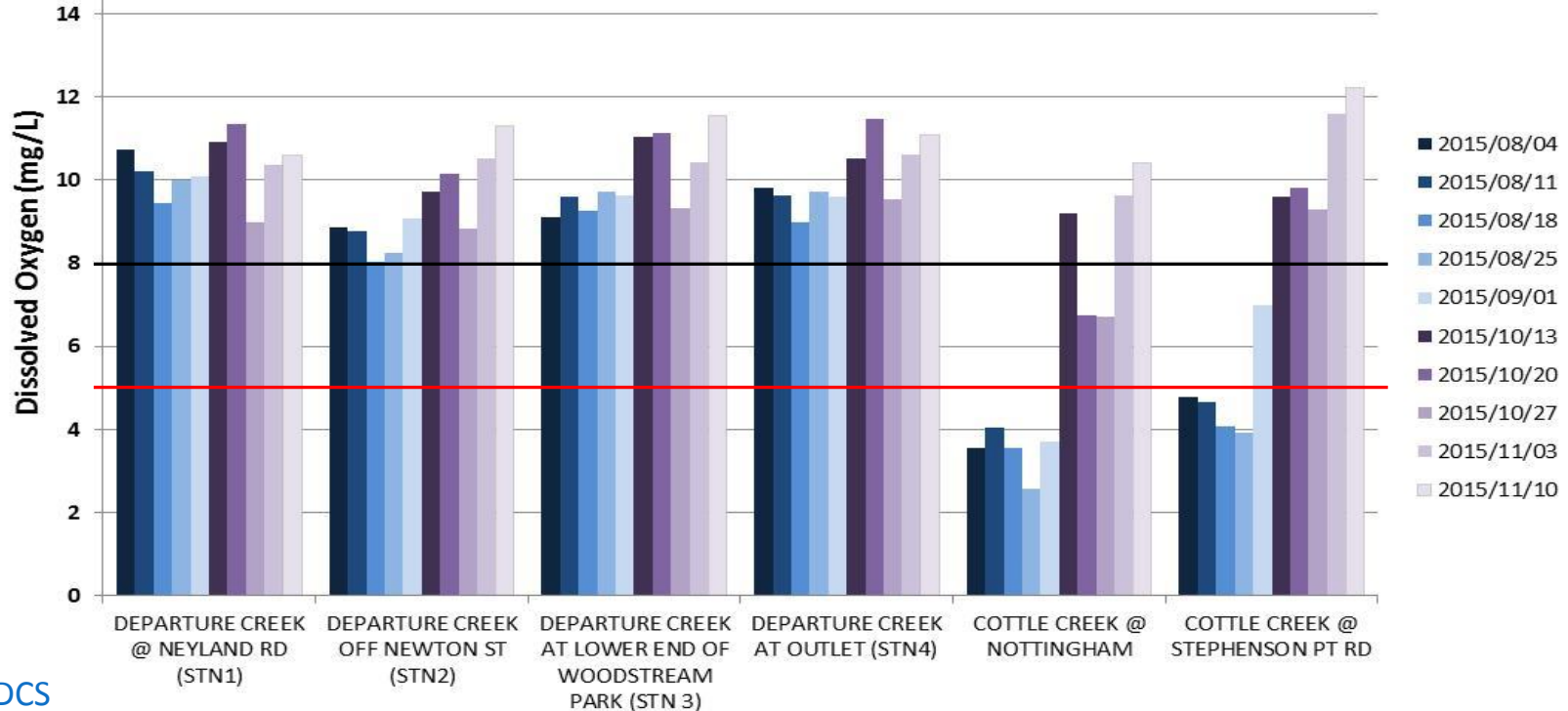
30 day average:  
8 mg/L

Instantaneous minimum:  
5 mg/L

LNS



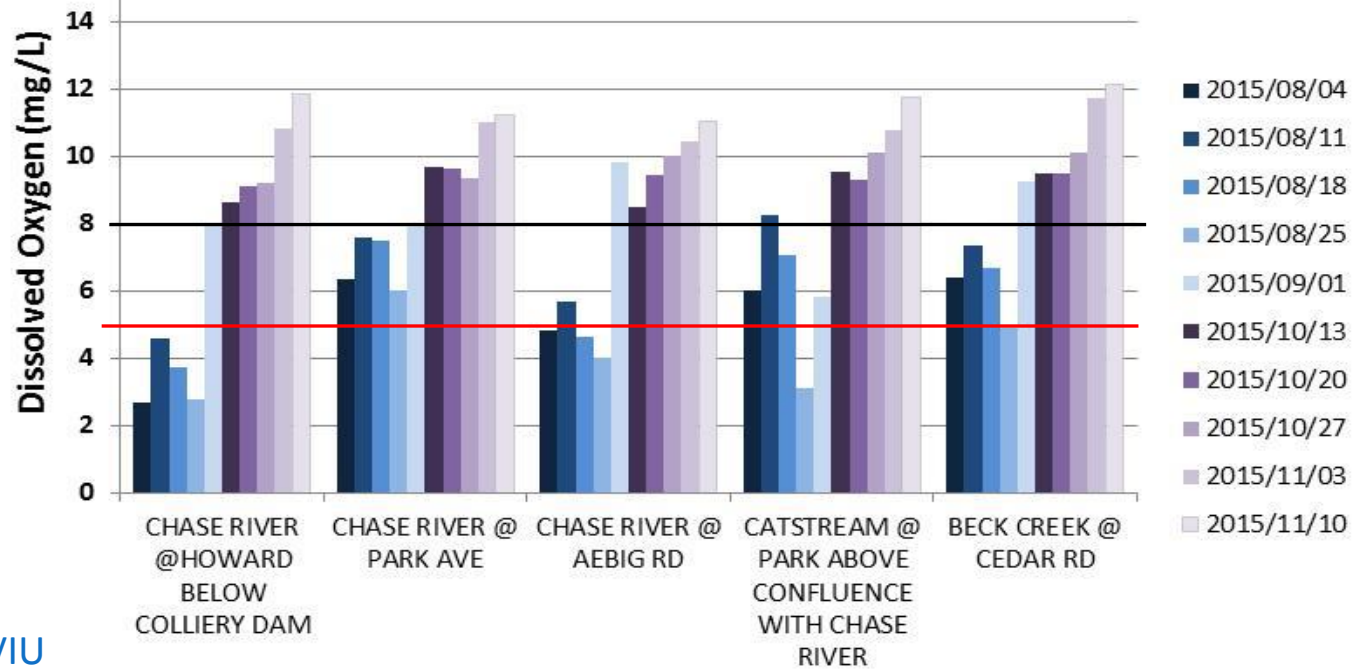
IWFF



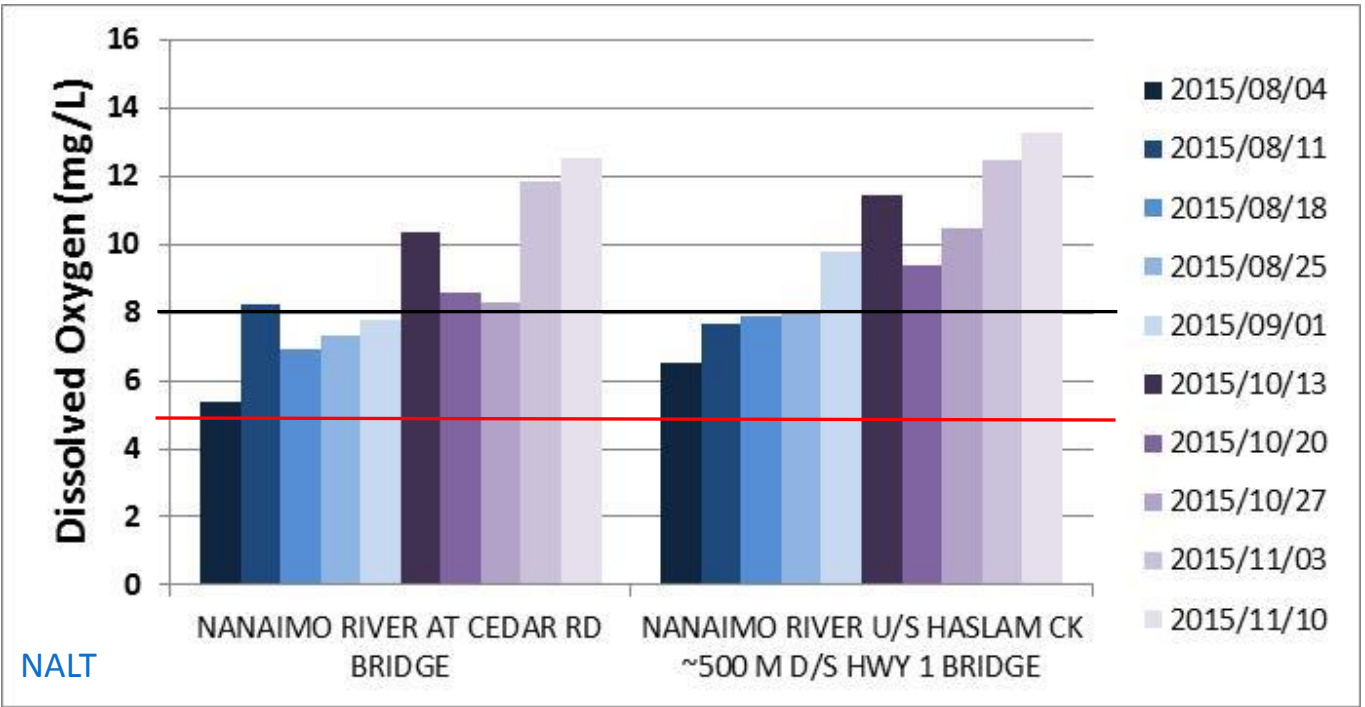
DCS

30 day average:  
8 mg/L

Instantaneous minimum:  
5 mg/L

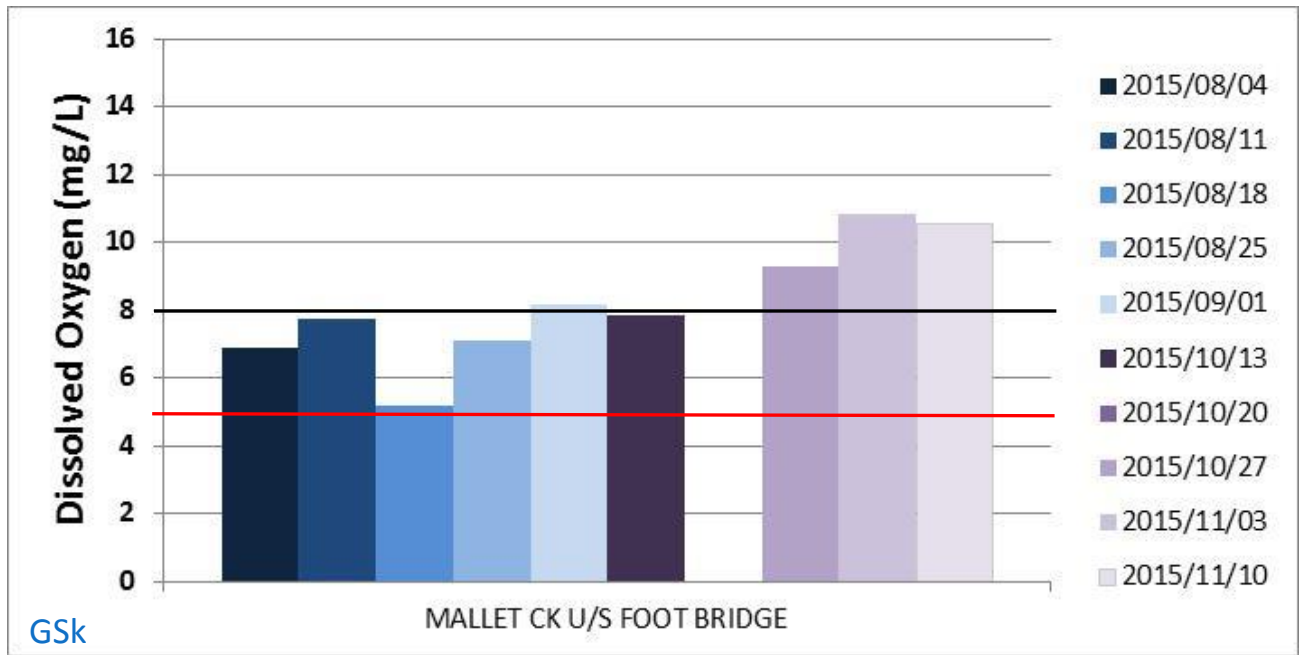


VIU



30 day average:  
8 mg/L

Instantaneous  
minimum:  
5 mg/L



## 30 day average guideline (8 mg / L) exceeded at :

Annie Creek	Englishman at 19a and u/s Morrison	Beck Creek
Grandon Creek all sites	Shelly Creek at Hamilton Rd (summer & winter)	Cat Stream
French Creek at Grafton Rd	Morrison Creek d/s Errington (winter)	Millstone at Biggs + Wellington
Nanoose Creek all sites	Cottle Creek all sites	McGarrigle Creek
Centre Creek	Chase River all sites	Nanaimo River all sites
		Mallet Creek

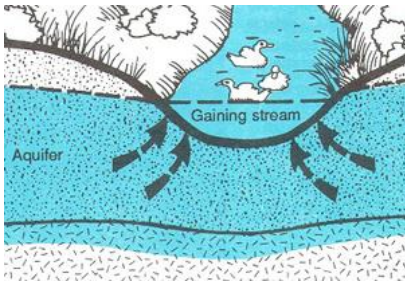
## Instantaneous guideline (5 mg / L) exceeded at:

Grandon at Laburnum	Cottle Creek all sites	Beck Creek
Shelly Creek at Hamilton Rd (summer only)	Nanoose Creek at Matthew Crossing	Cat Stream
French Creek at Grafton Rd	Chase River at Aebig + Howard	Millstone at Biggs

# Dissolved Oxygen

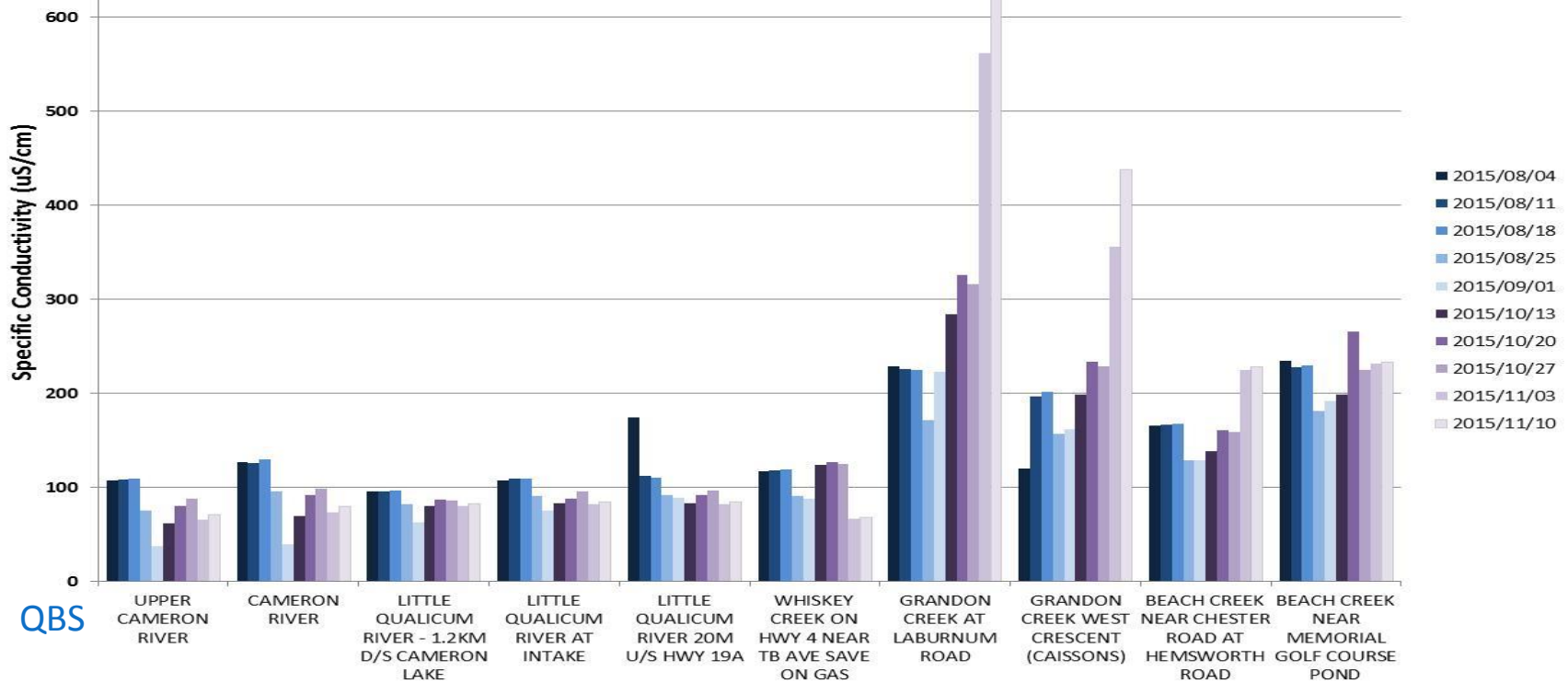
- Exceedances occurred at very low flow sites
- Sites were dry in summer 2015 period that were not in 2014 (Morrison Creek d/s Errington and Benson Creek)

# Specific Conductance



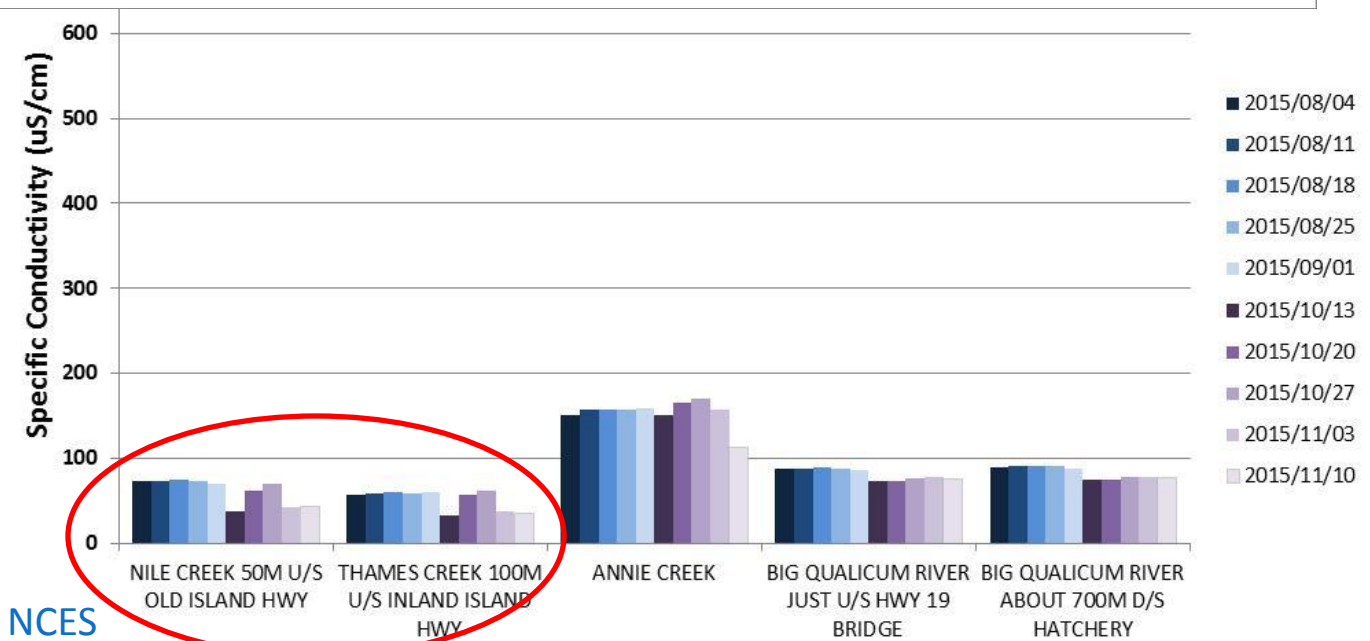
- Most coastal streams less than 80  $\mu\text{S}/\text{cm}$  but can be more if groundwater influences
- No guideline

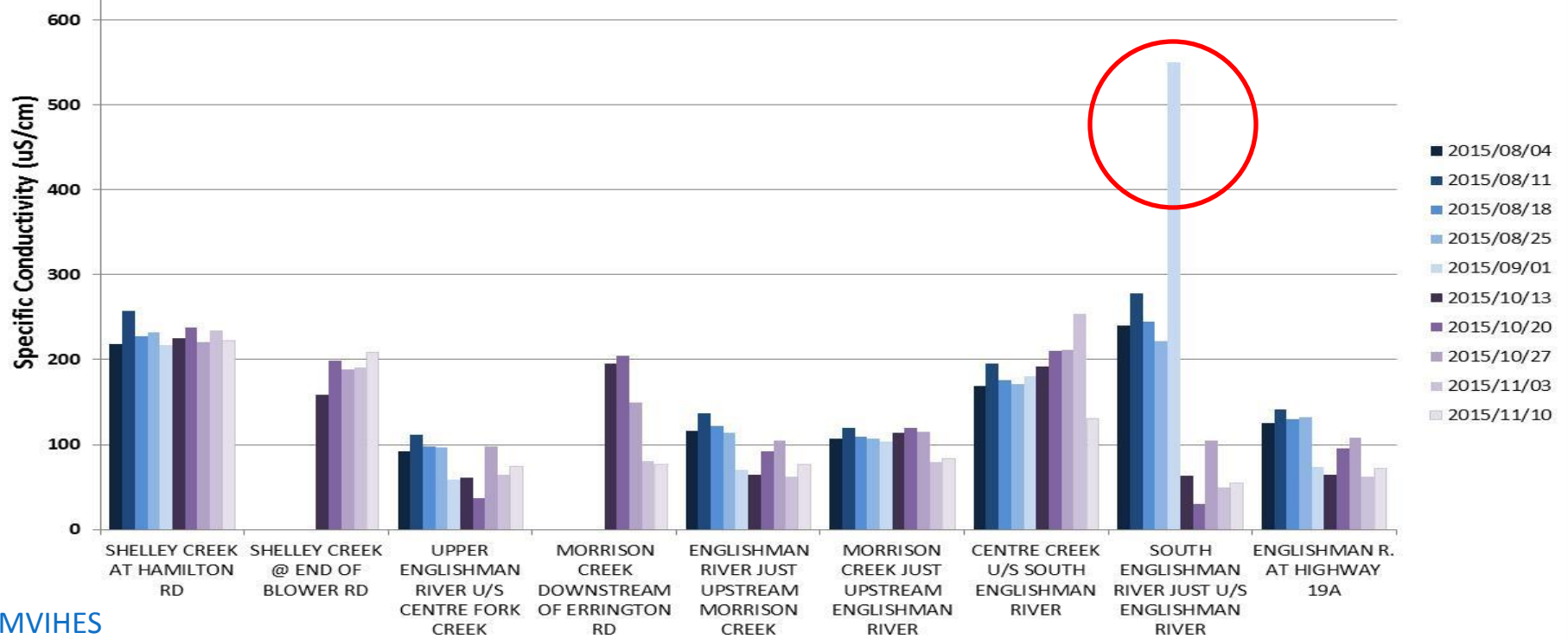




Most coastal streams less than 80 uS/cm but can be more if groundwater influences

No guideline

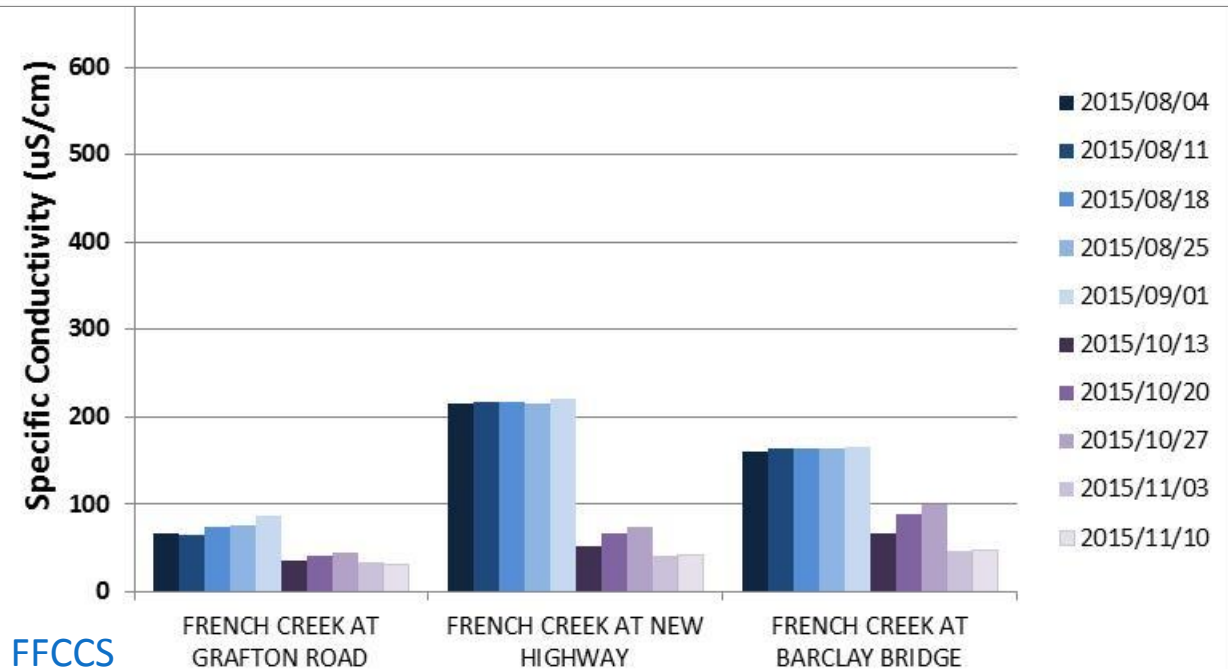




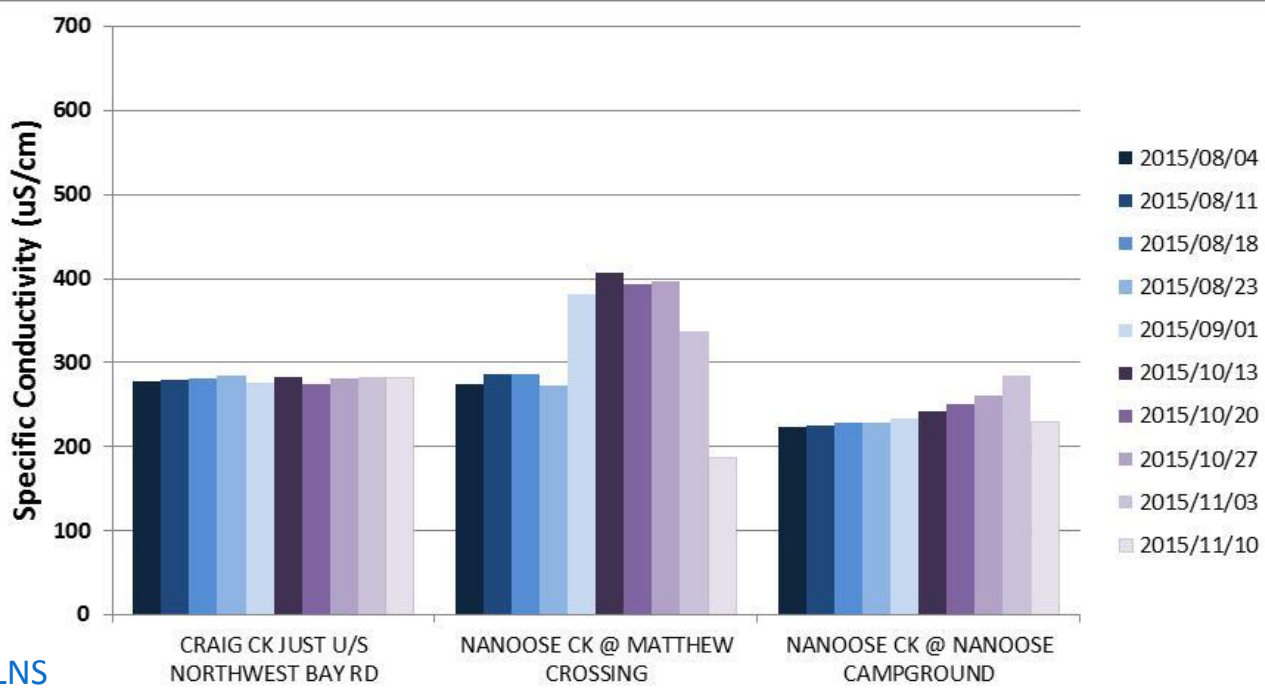
MVIHES

Most coastal streams less than 80 uS/cm but can be more if groundwater influences

No guideline



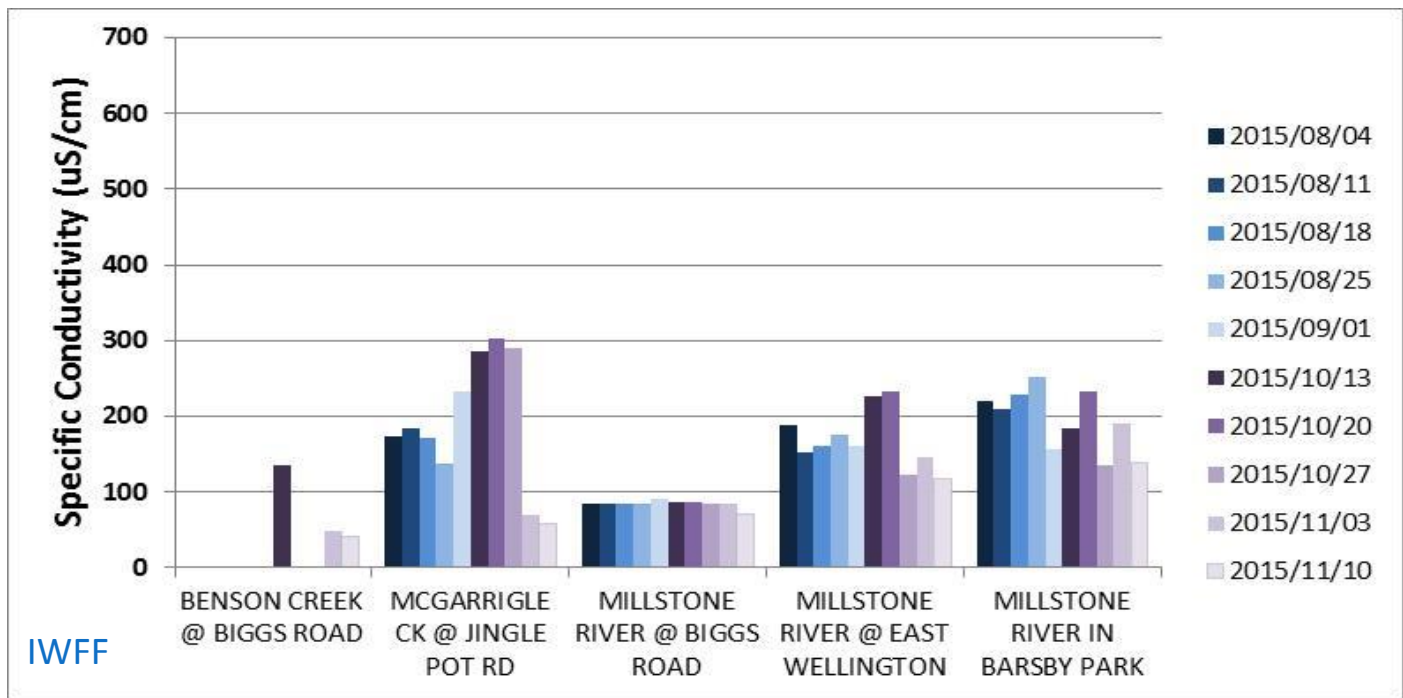
FFCCS



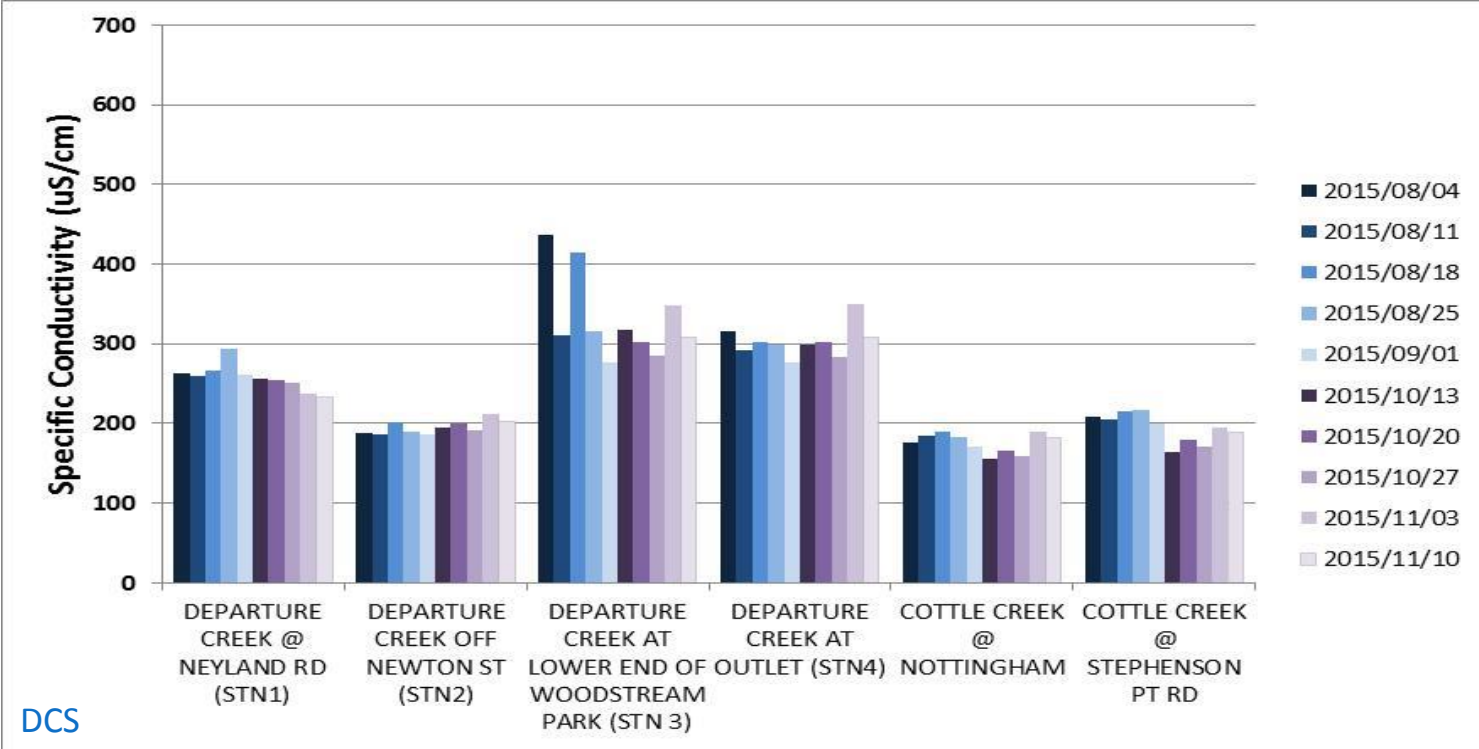
Most coastal streams less than 80 uS/cm but can be more if groundwater influences

No guideline

LNS

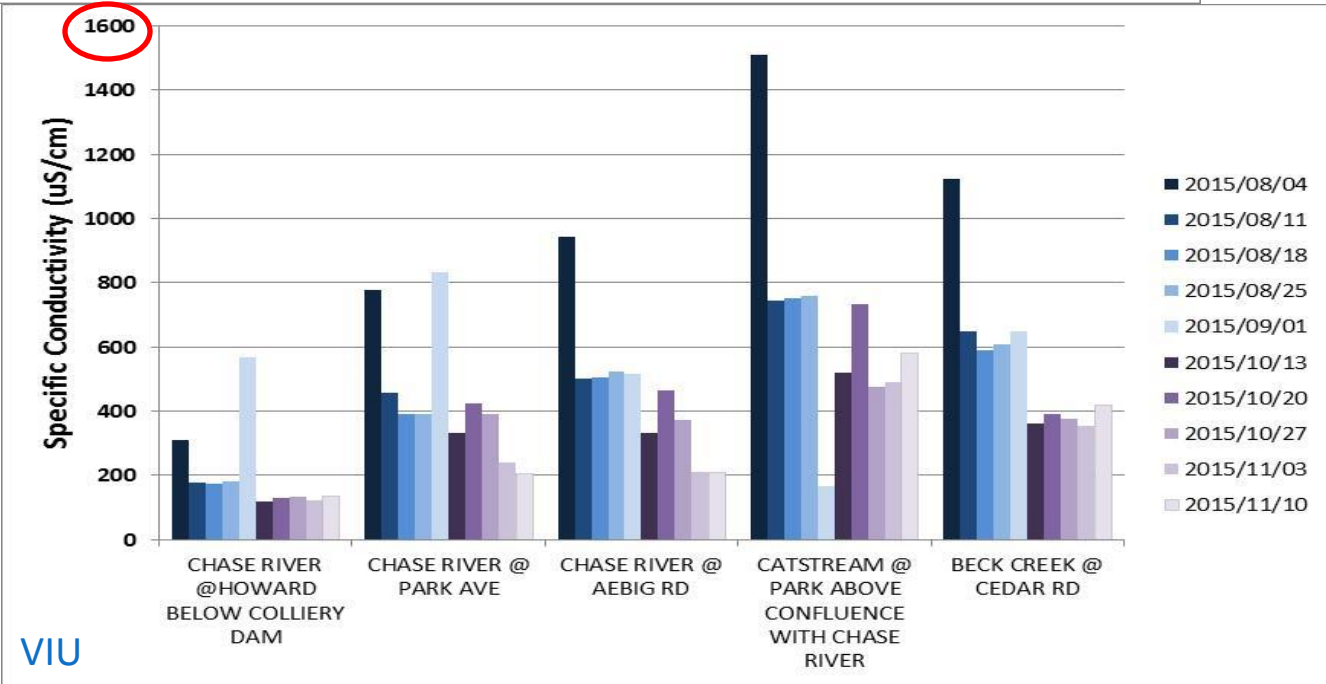


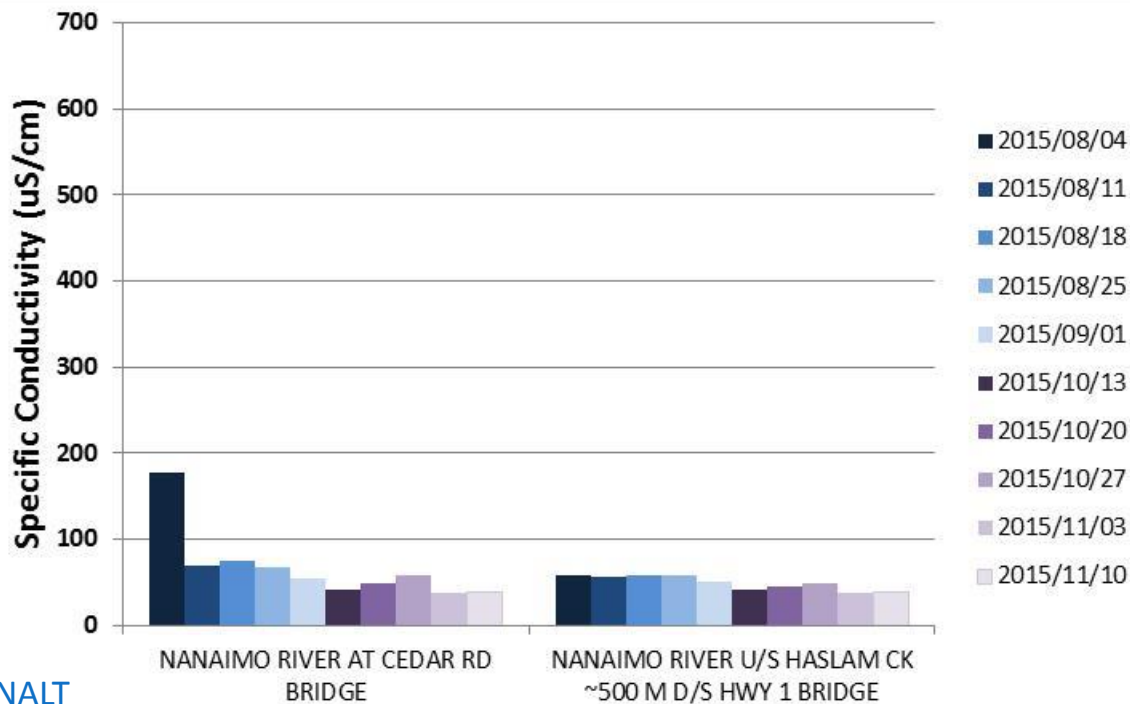
IWFF



Most coastal streams less than 80 uS/cm but can be more if groundwater influences

No guideline

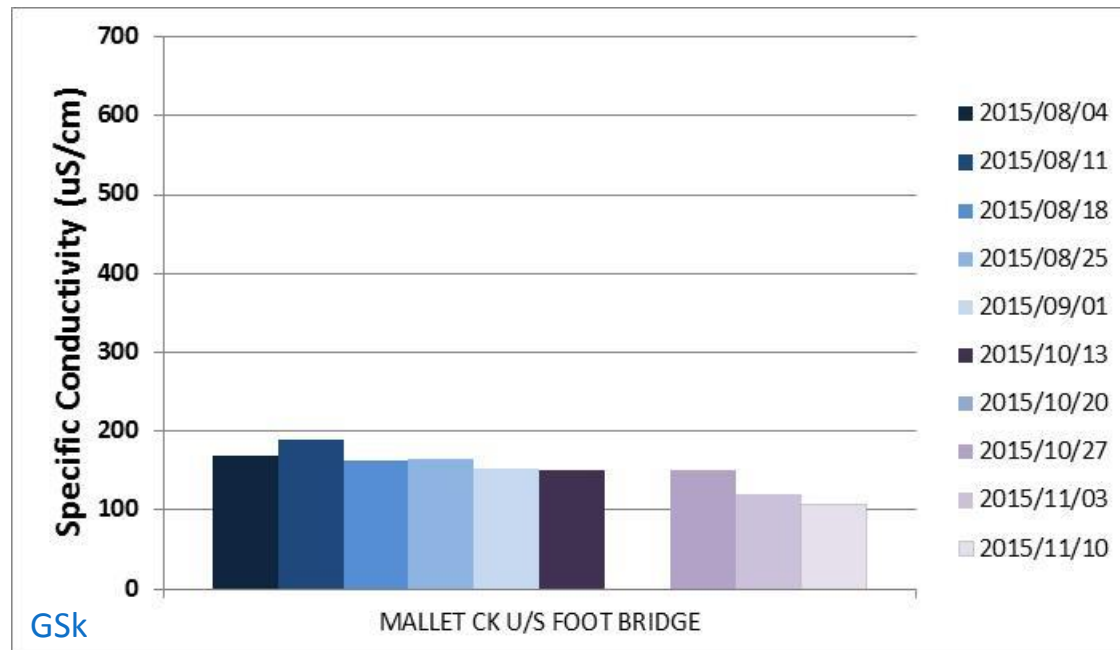




NALT

Most coastal streams less than 80 uS/cm but can be more if groundwater influences

No guideline



GSK

Higher than typical specific conductivity could be attributed to:

### Groundwater influence:

South Englishman	Nanoose Creek
French Creek sites	Mallet Creek

### Likely increased turbidity:

Morrison Creek	Millstone at East Wellington	McGarrigle Creek
Shelly Creek	Millstone at Barsby Park	Nanaimo River at Cedar

### Urban streams, unknown sources:

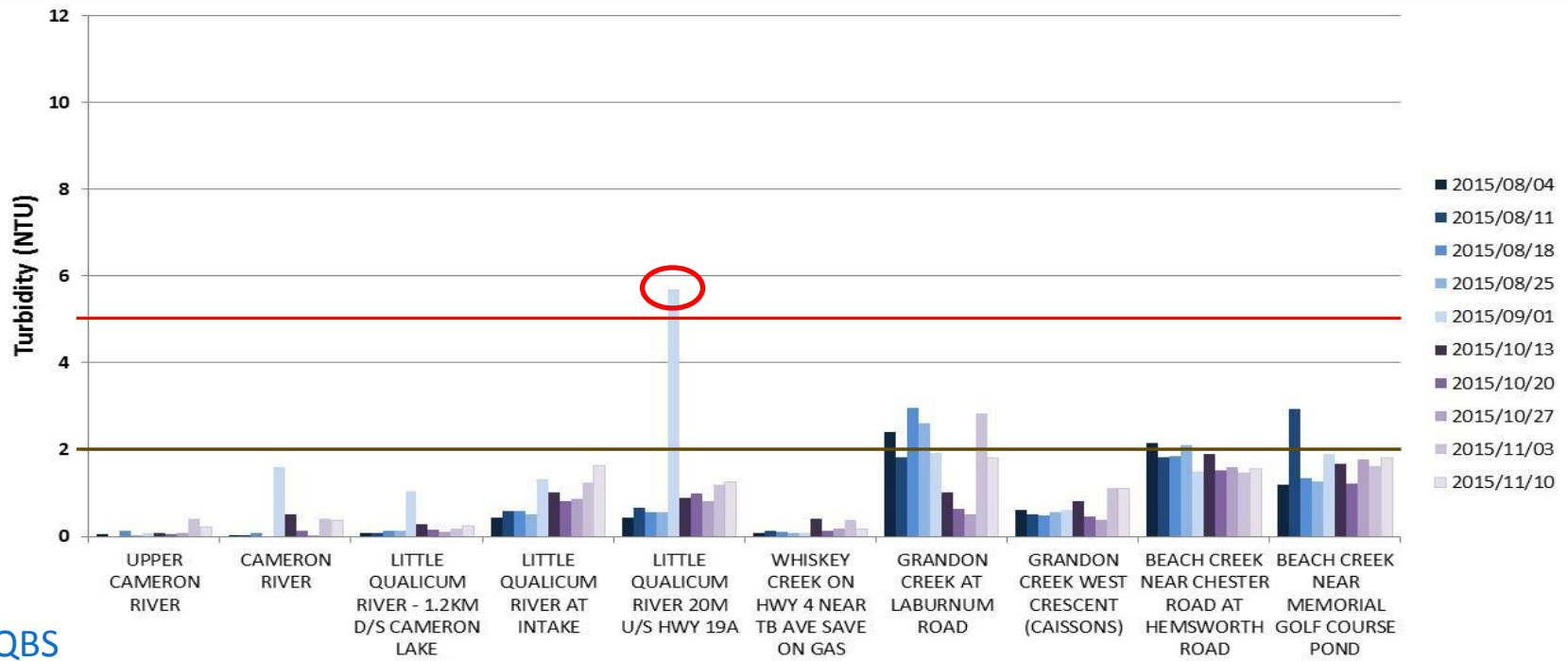
Grandon Creek	Departure Creek	Beck Creek
Beach Creek	Cat Stream	Chase River sites

# Specific Conductivity (SpC)

# Turbidity



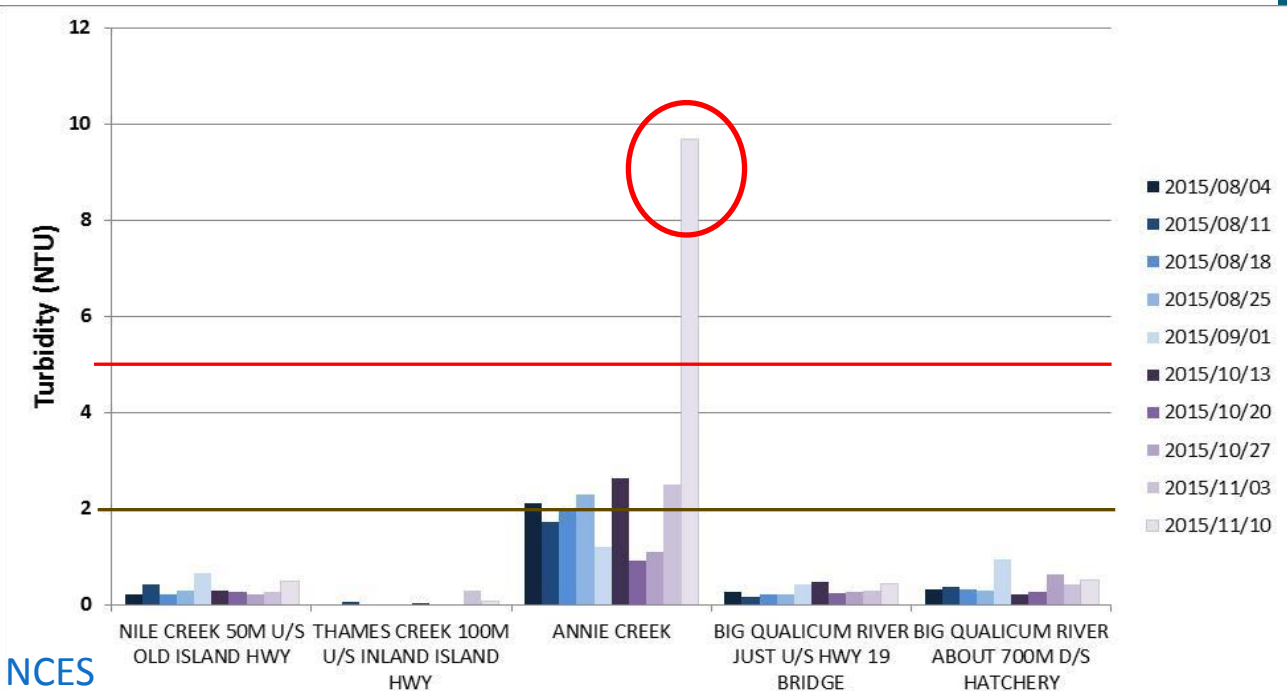
- January to September (summer period) maximum: 2 NTU
- October to December (winter period) maximum: 5 NTU



QBS

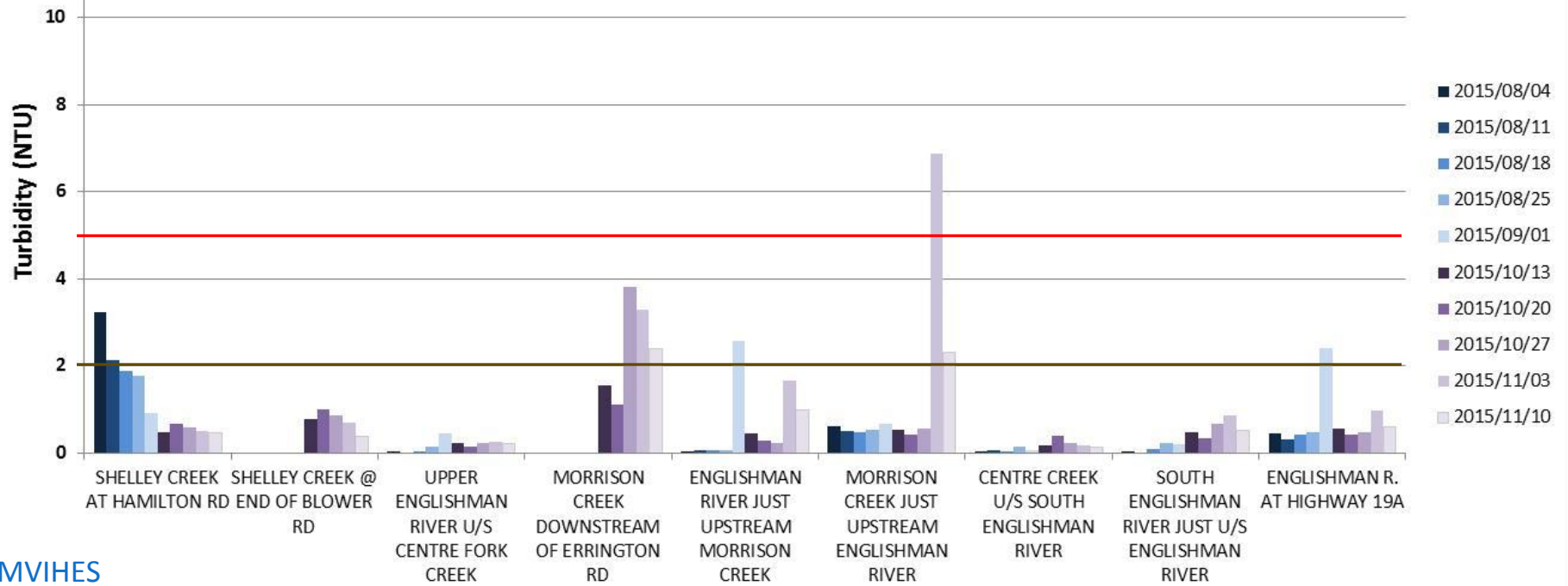
Oct-Dec max 5 NTU (winter period)

Jan-Sept max 2 NTU (summer period)



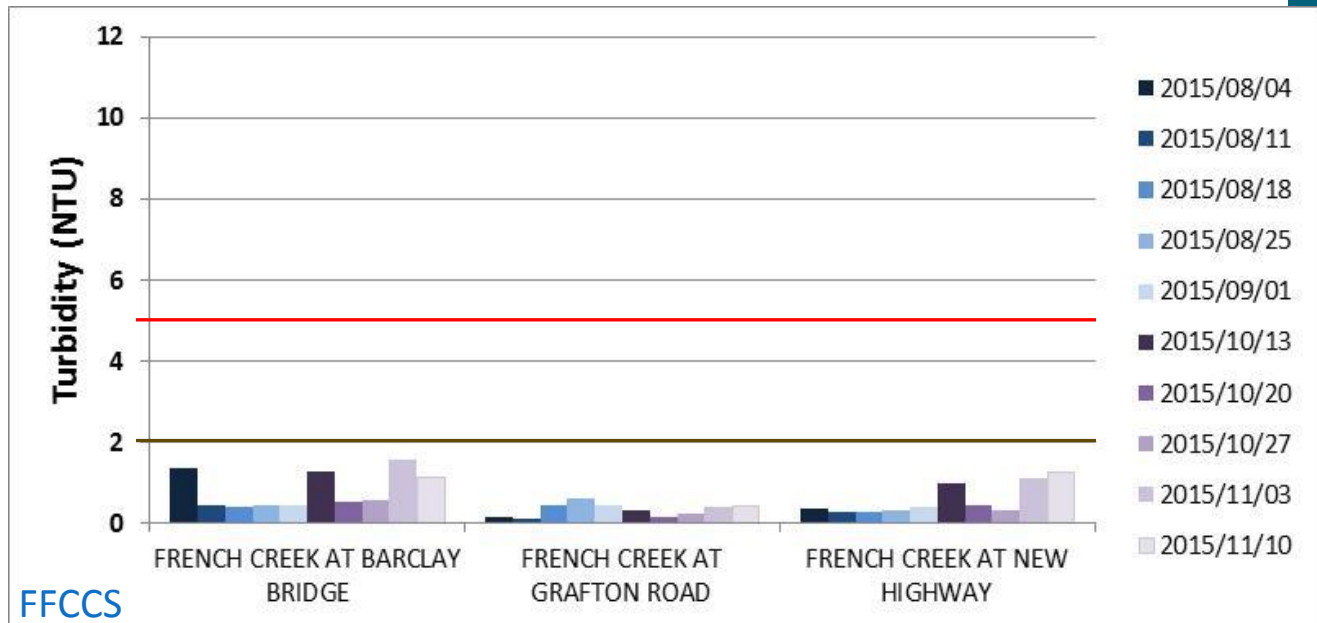
NCES

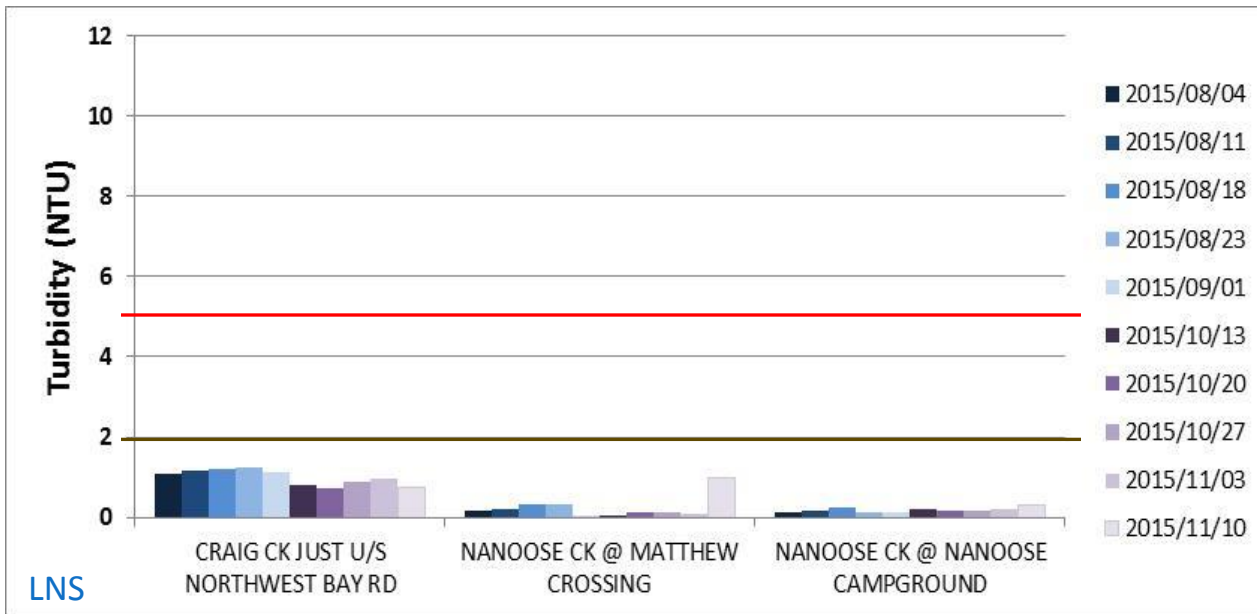




Oct-Dec max 5 NTU  
(winter period)

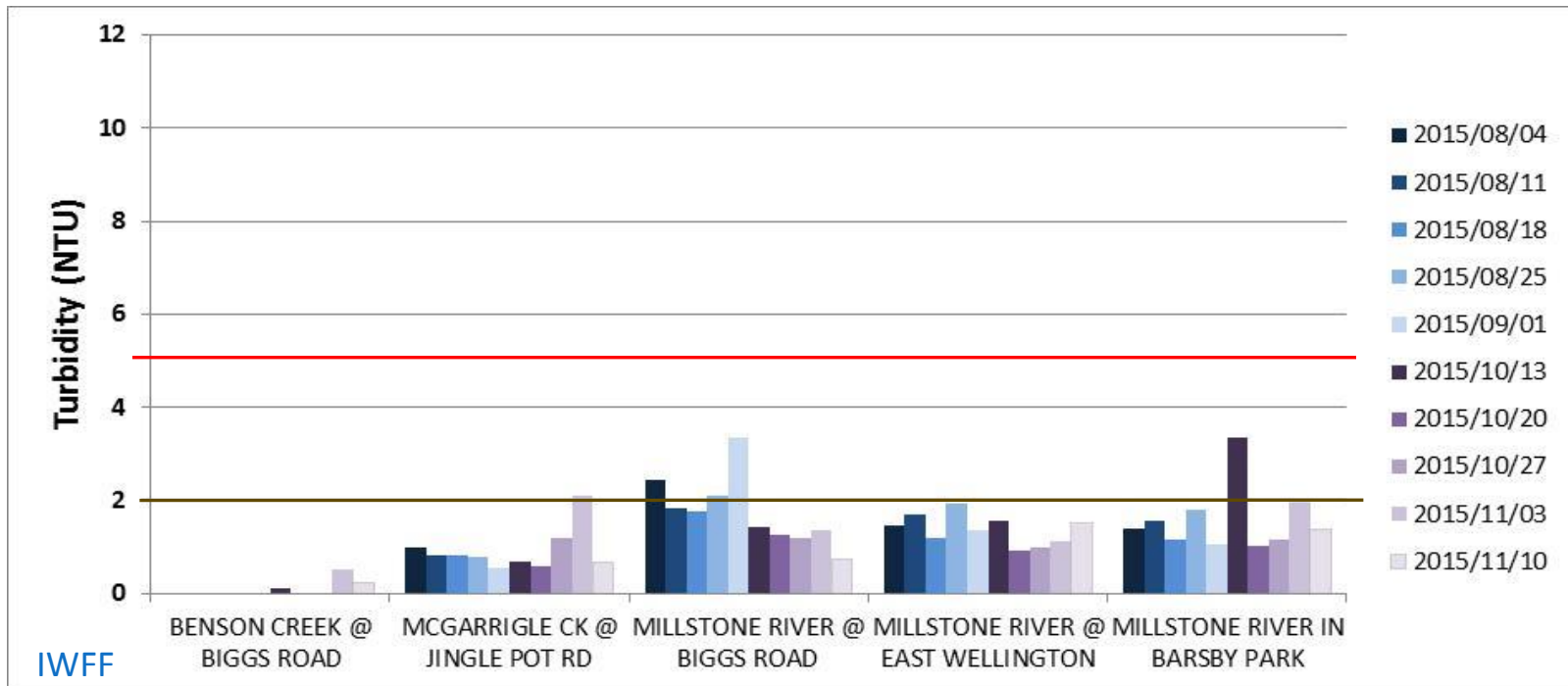
Jan-Sept max 2 NTU  
(summer period)

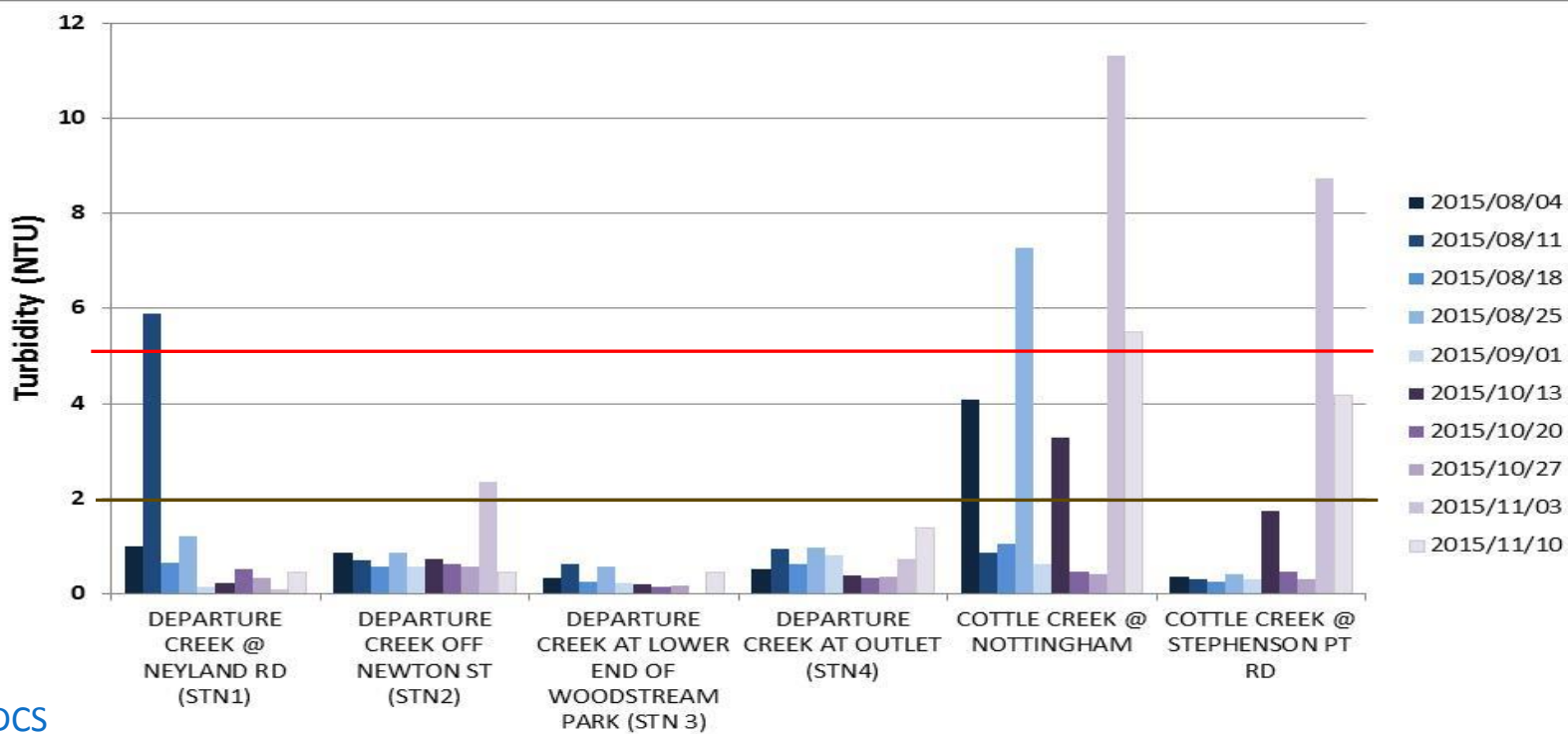




Oct-Dec max 5 NTU  
(winter period)

Jan-Sept max 2 NTU  
(summer period)

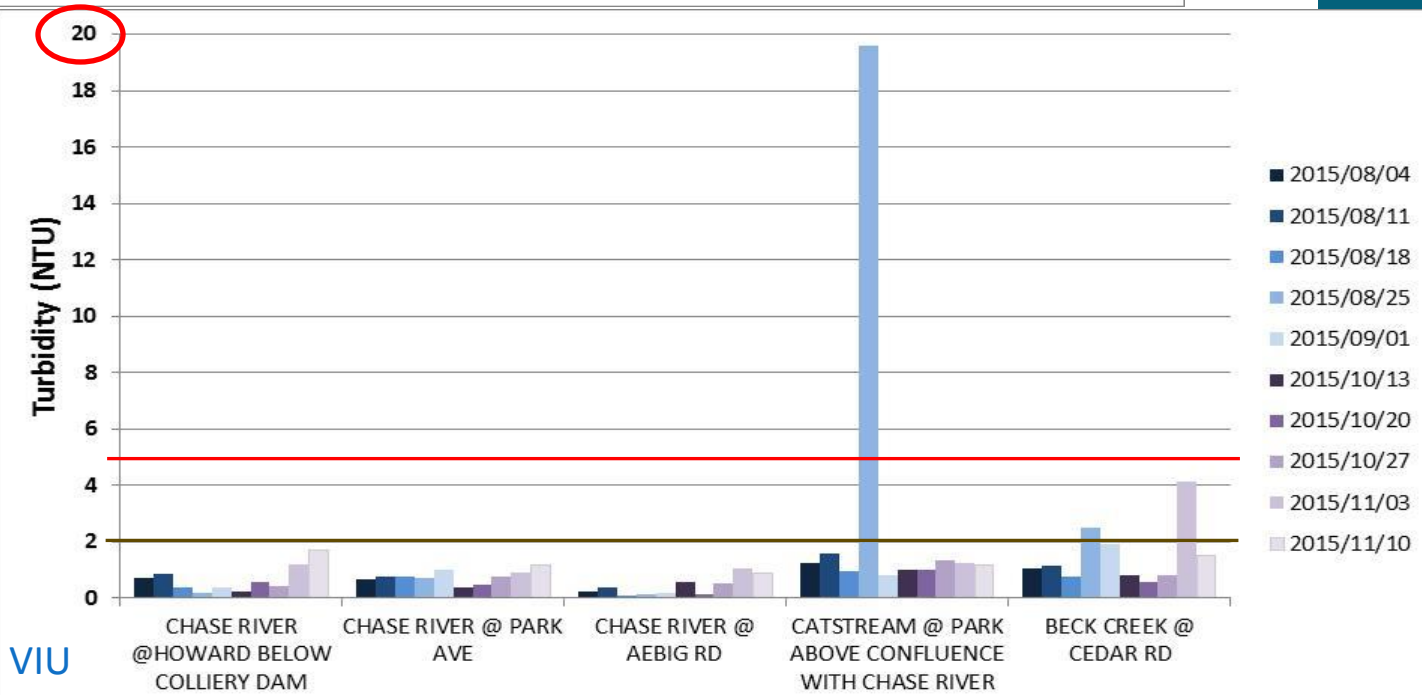




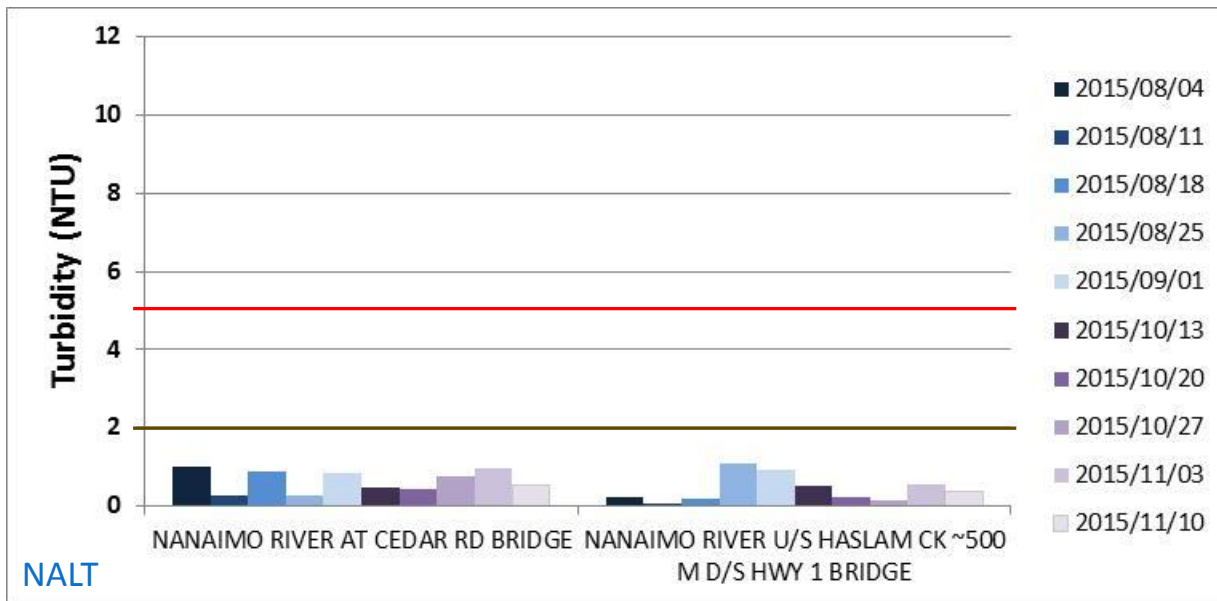
DCS

Oct-Dec max 5 NTU (winter period)

Jan-Sept max 2 NTU (summer period)

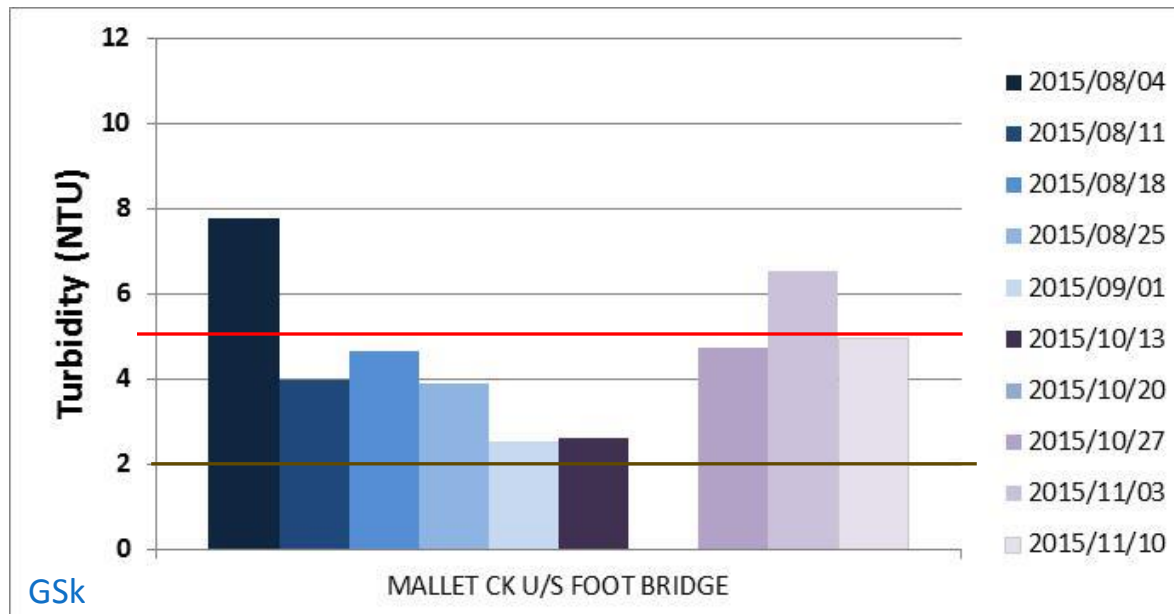


VIU



Oct-Dec max 5 NTU  
(winter period)

Jan-Sept max 2 NTU  
(summer period)



## Jan-Sept (summer) guideline exceeded occasionally at:

Beach Creek	Shelly Creek at Hamilton	Cottle Creek at Nottingham
Grandon Creek	Englishman u/s Morrison + at 19A	Cat Stream
Little Qualicum at 19A	Millstone at Biggs	Beck Creek
Annie Creek	Departure Creek at Neyland	

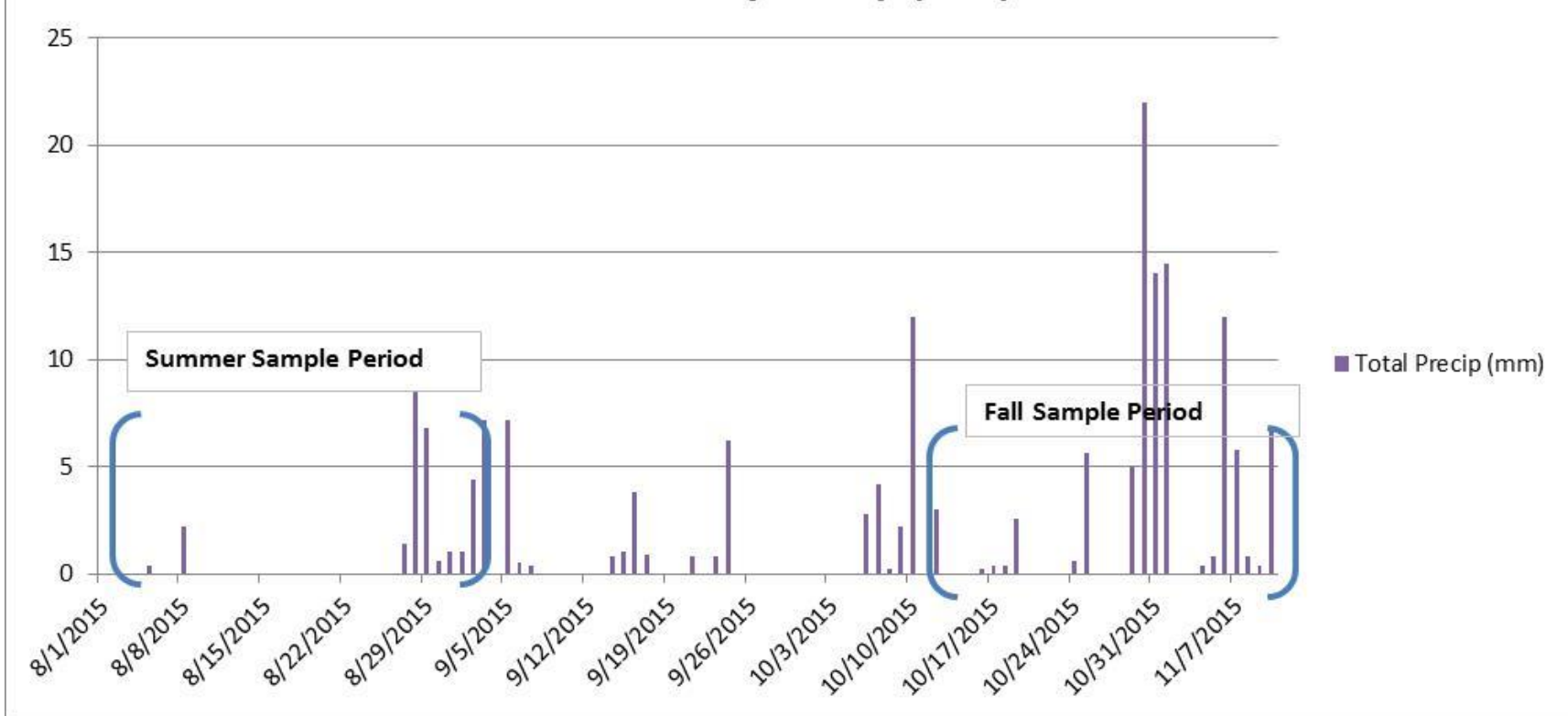
## Oct-Dec (fall) guideline exceeded occasionally at:

Annie Creek	Cottle Creek sites	Morrison Creek u/s Englishman	Mallet Creek
-------------	--------------------	-------------------------------	--------------

- Proximity of creeks to developed areas suggests anthropogenic inputs; some high values explained by field observations that day
- Increased fall values associated with rainfall / storm events and salmon
- Urban streams much more difficult to interpret
- In 2014 more fall exceedences compared to 2015 (*Departure Creek, Chase River, Cat Stream, Beck Creek, Craig Creek, Millstone River, Morrison Creek, Shelly Creek, Englishman River, French Creek, Grandon Creek*)
- In 2015 fall turbidity exceedences not seen in Shelly Creek + Englishman River at 19A (*below confluence with Shelly Creek*)

Turbidity

## Nanaimo Airport - August to November 2015 Total Daily Precip (mm)



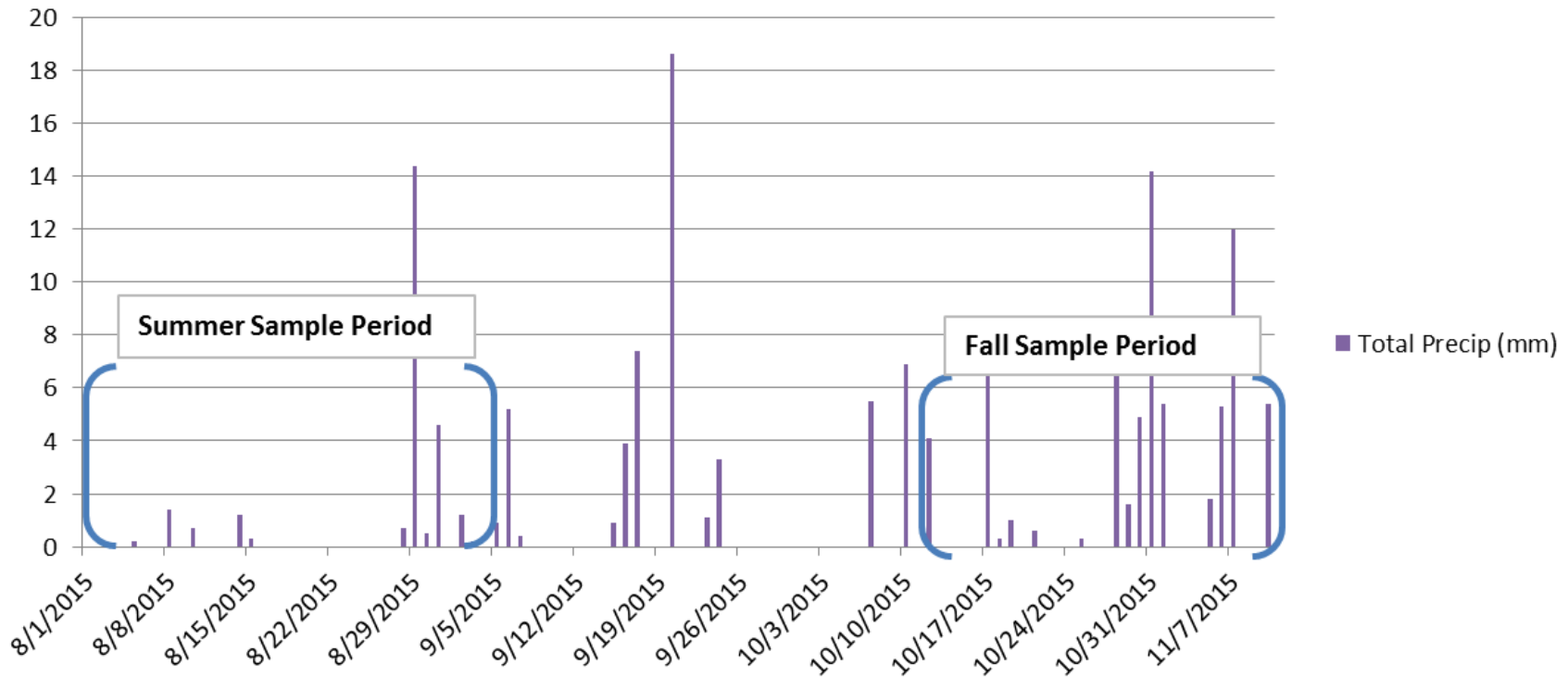
### 2014 rainfall:

- **22.6 mm** Summer (Aug 1 – Sept 10)
- **282.2 mm** Fall (Oct 1 – Nov 12)

### 2015 rainfall:

- **22.1 mm** Summer (Aug 1 – Sept 1)
- **116.7 mm** Fall (Oct 1 – Nov 11)

## Qualicum Airport - August to November 2015 Total Daily Precip (mm)



### 2014 rainfall:

- **29.4 mm** Summer (Aug 1 – Sept 10)
- **187.5 mm** Fall (Oct 1 – Nov 12)

### 2015 rainfall:

- **24.0 mm** Summer (Aug 1 – Sept 1)
- **82.3 mm** Fall (Oct 1 – Nov 11)

# Lab Analysis

Group	EMS #	Site	E. Coli	Total P	Metals	QA/QC Turbidity
			(10 bottles)	(5 bottles)	(2 bottles)	(10 bottles)
DCS	E290469	Departure Creek @ Neyland	X	X	X	X
DCS	E290470	Departure Creek off Newton	X	X	X	
DCS	E290471	Departure Creek @ Woodstream Park	X	X	X	
DCS	E290472	Departure Creek @ Outlet	X	X	X	
IWFF	E290479	McGarrigle Creek @ Jingle Pot	X	X		
IWFF	E290478	Millstone River @ Biggs	X	X		
IWFF	E290480	Millstone River @ East Wellington	X	X		X
IWFF	E290481	Millstone River in Barsby Park	X	X	X	X
VIU	E290485	Chase River @ Park Ave	X	X	X	X
VIU	E290486	Cat Stream @ Park Ave above Chase River		X	X	X
VIU	E290487	Beck Creek @ Cedar Road	X	X		X

Fall samples taken only

- Lab analysis still to be analyzed, preliminary review shows exceedences in most waterways tested



# Benefits of Data Collection?

- Trend analysis – identification of key target areas (for further monitoring, restoration, outreach, policy)
- Develop specific water quality objectives (WQOs)
- As part of Liquid Waste Management Plan (LWMP), can adopt enforceable bylaws to help ensure these WQOs are being met
- Work towards achievement of WQOs and broader stormwater management goals

# Great work everyone!



# Data collected is a starting point to guide further actions in partnership...



Turbidity

- Analysis of parameters (E. Coli, Total P, metals) performed by lab where results indicate need to ID specific contaminants



Temperature, DO, Turbidity

- Flow monitoring / Stream discharge (dependent on resources for data analysis & equipment)
- Stream / riparian assessment – *coming this June on Millstone River and Holden Creek*



Future Actions:

**Restoration projects** where results show this is needed

**Targeted outreach** campaigns, where results are tied to land use practices  
- Agriculture, Septic, Streamside landowners

Now what?

# Outlook for 2016...



- Groups that have reached the 3 year mark already – encouraged to keep participating; **the more data over time the better** to really grasp what is going on in our streams over the long term!
- If these groups would like to scale back # of sites, option to only continue monitoring priority sites identified in the current 3-year trend analysis. **WILL BE WORKING WITH GROUPS ON THIS IN THE COMING MONTHS.**
- On our end (RDN and MOE)... Data reporting may take on a 2 or 3 year cycle in the future. Better to see trends on that timeframe, helps with workload.
- Groups can always request data analysis for areas of concern prior to full data report.

Your communities and streams  
thank you!

