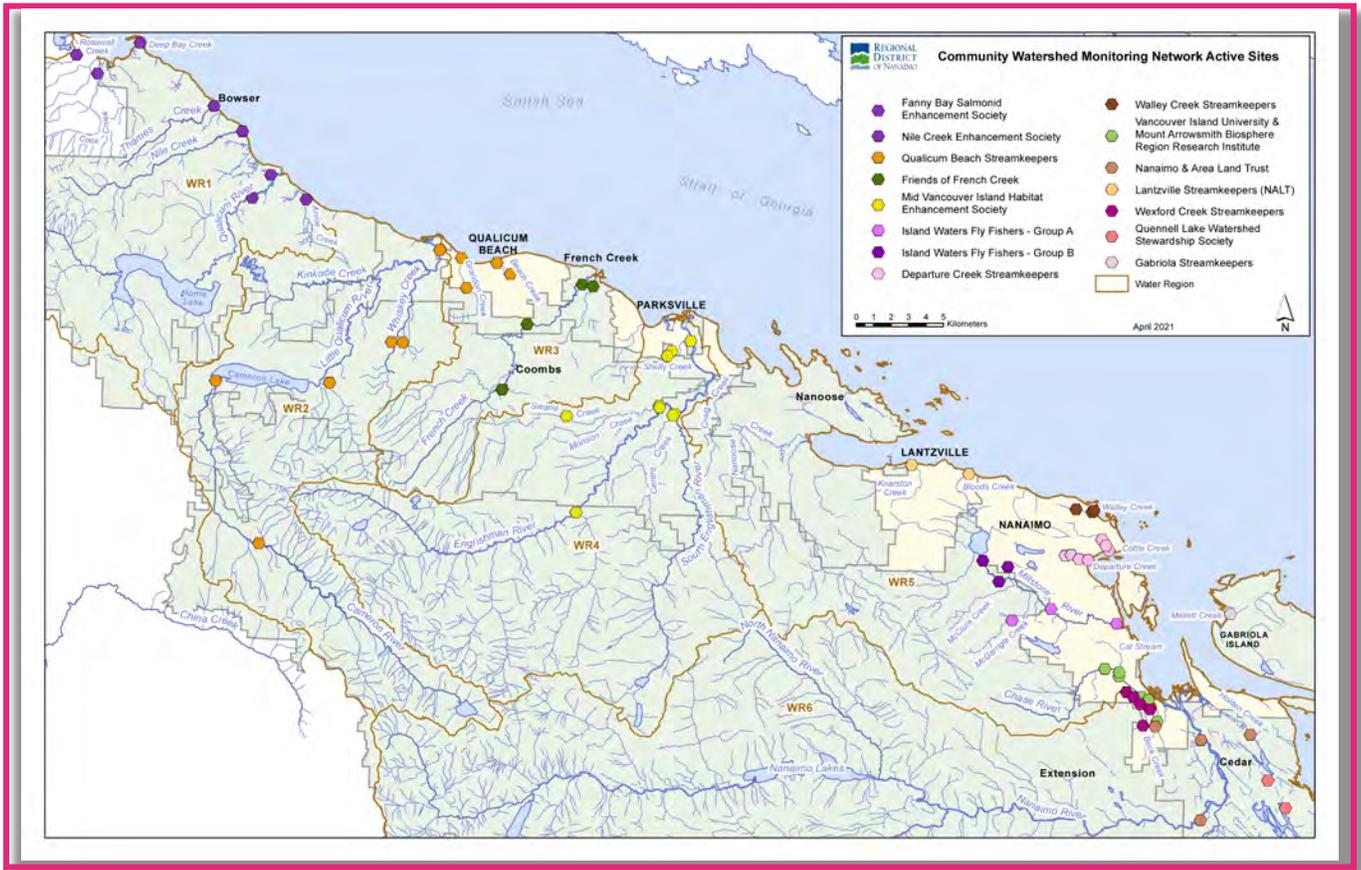


# Community Watershed Monitoring Network 2020

## Results by Water Region



### Included in your Water Region Package:

1. CWMN Sample Sites in Water Region (WR) 6
2. How to Interpret a Box Plot and Summer / Fall Exceedance Maps
3. Box Plot Comparison 2020 Data to Previous Years: *Graphs displayed per parameter (Temperature, Dissolved Oxygen, Turbidity, Conductivity) and per sample period (summer and fall)*
4. 2011-2020 Water Quality Trend Analysis Map
5. 2011-2020 Summer Exceedance Map
6. 2011-2020 Fall Exceedance Map
7. VIU Site Map
8. NALT Site Map
9. WxCS Site Map
10. QLWSS Site Map



Water Region 6  
sampled by:

**Vancouver Island University Coastal Hydrology & Climate Change Research Lab and Mount Arrowsmith Biosphere Region Research Institute (VIU)**  
**&**  
**Nanaimo and Area Land Trust (NALT)**  
**&**  
**Wexford Creek Streamkeepers (WxCS)**  
**&**  
**Quennell Lake Watershed Stewardship Society (QLWSS)**



## **CWMN Sample Sites in WR 6:**

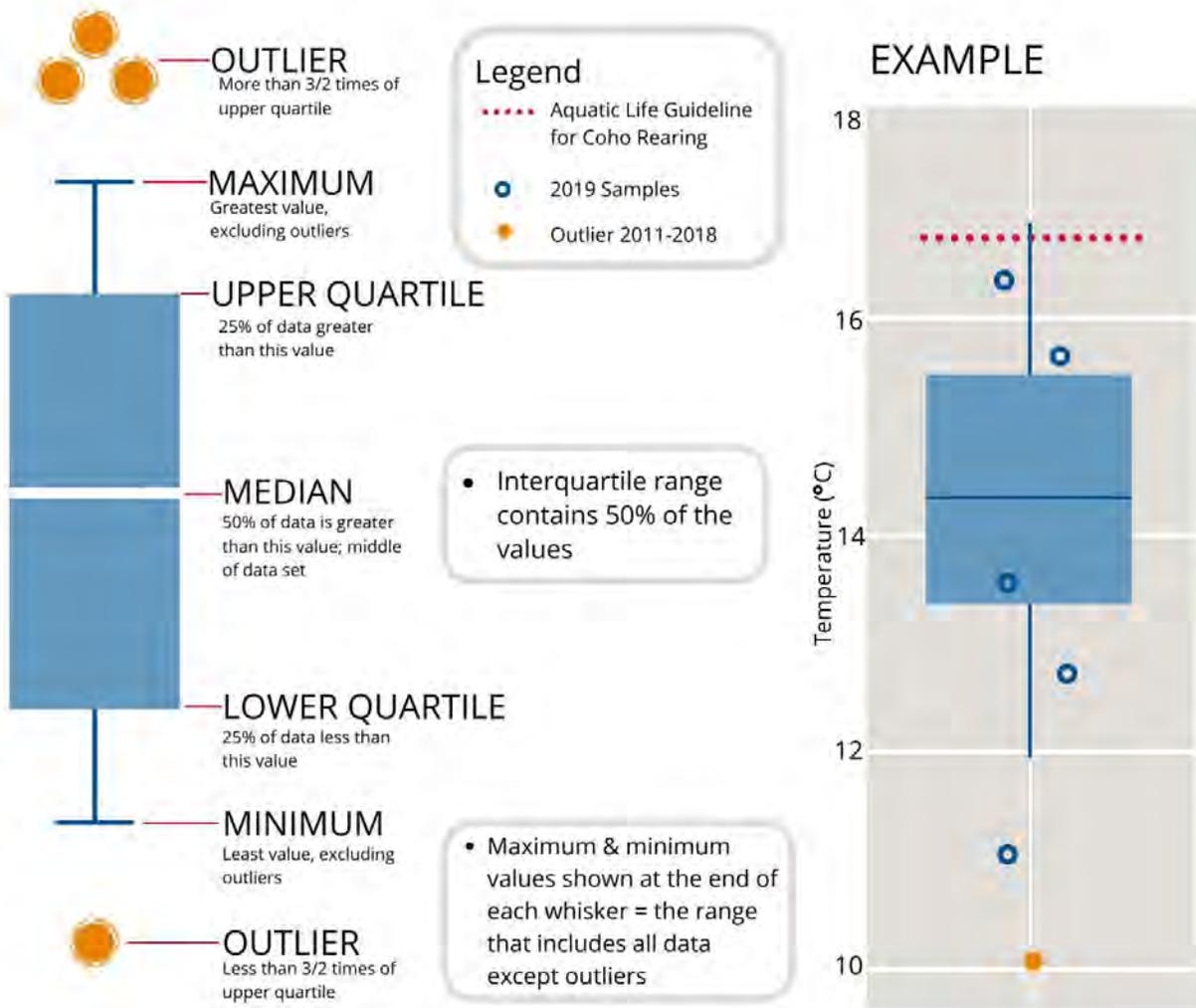
The table below shows the groups and sites monitored, as well as the number of years and which years a site was sampled. The number of years is important to keep in mind when interpreting the box plots as the plot for each site may contain a slightly different temporal range.

<b>Group</b>	<b>EMS ID</b>	<b>Geographic Description</b>	<b>Years Sampled*</b>	<b>Years Monitored</b>
VIU	E290487	Beck Creek @ Cedar Rd	9	2012 - present
NALT	E287699	Nanaimo River u/s Haslam Ck ~500m d/s Hwy Bridge	10	2011 - present
NALT	E215789	Nanaimo River at Cedar Road Bridge	7	2014 - present
NALT	E310147	Holden Creek off East Side of Lazo Lane	3.5	fall 2017 - present
WxCS	E318152	North Wexford Ck just d/s Douglas Ave	2	2019 - present
WxCS	E318153	North Wexford Ck just d/s Tenth St	2	2019 - present
WxCS	E318153	North Wexford Ck just u/s seniors complex	2	2019 - present
WxCS	E318153	Wexford Ck ~20m d/s Confluence of N and Main Arm	2	2019 - present
WxCS	E318153	Wexford Ck at Community Park (Glenford Pl)	2	2019 - present
QLWSS	E321393	Unknown Trib (Haley Creek) 15m d/s Yellow Point Road	1	2020 - present
QLWSS	E321392	Holden Creek 10m d/s Tiesu Rd	1	2020 - present

*\*The number of years sampled up to and including 2020.*



## How to Interpret a Box Plot:

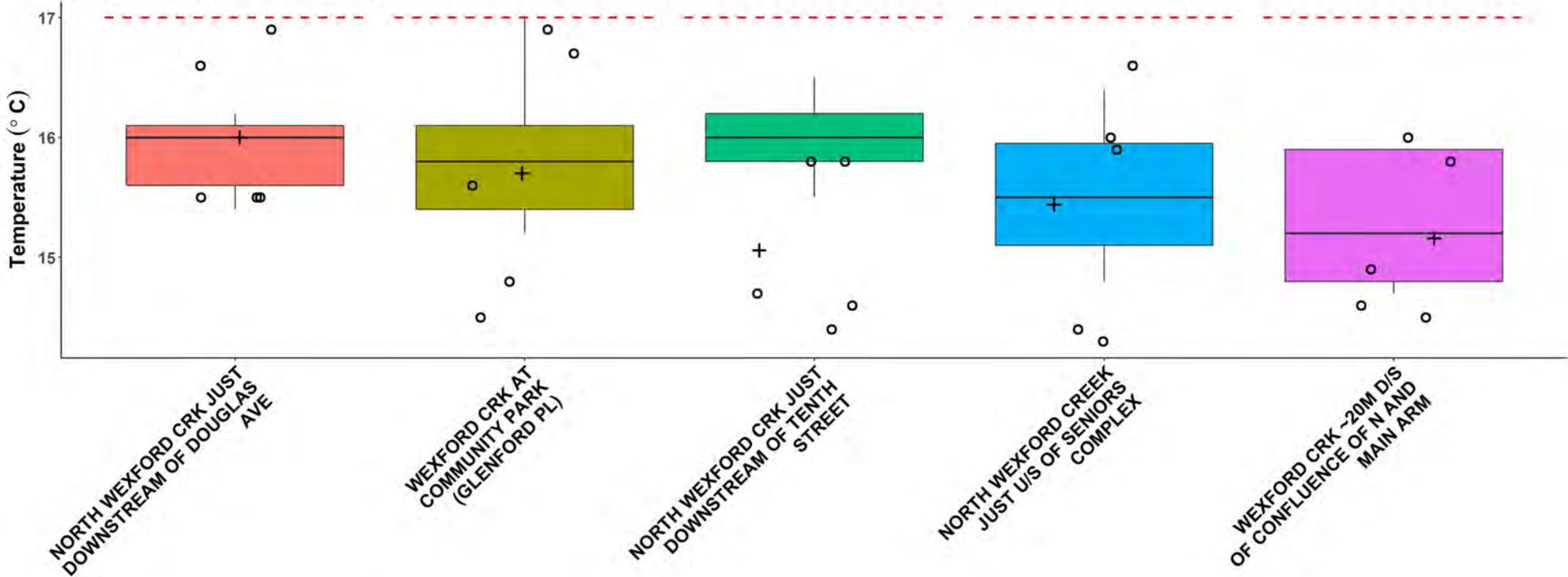


## How to Interpret Summer and Fall Exceedance Maps:

The summer and fall exceedance frequency maps included in this package express the number of sample periods (summer low-flow / fall flush) with exceedances for each site. There are four frequency categories for the number of sample periods with exceedances: no exceedance recorded (0), low (1 – 2), moderate (3 – 4), and high (5 or more). The exceedance categories are for the three parameters with aquatic water quality guidelines and objectives based on the following thresholds: temperature  $\geq 17^{\circ}\text{C}$ , dissolved oxygen  $\leq 5\text{mg/L}$ , summer turbidity  $\geq 2\text{NTU}$ , and fall turbidity  $\geq 5\text{NTU}$ .



# WR6a Summer Temperature

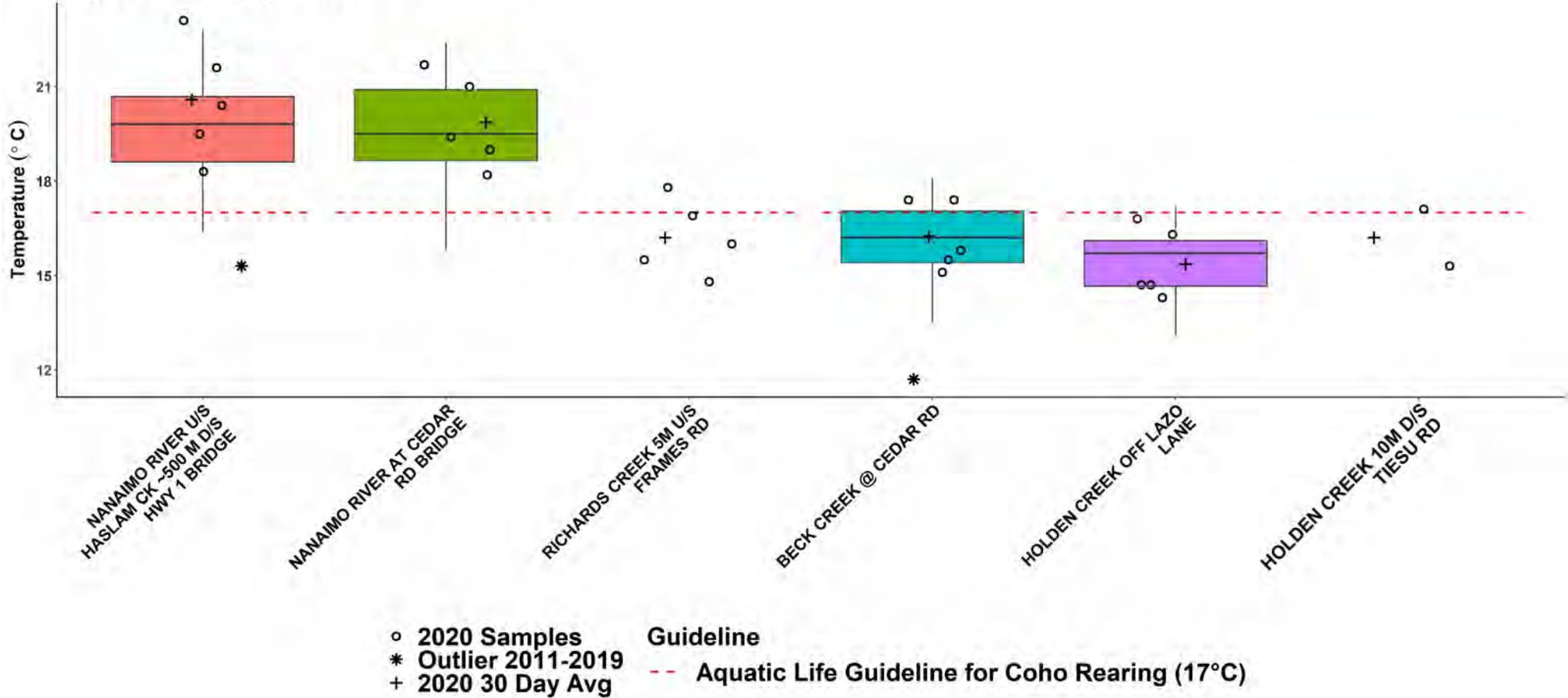


○ 2020 Samples  
+ 2020 30 Day Avg

**Guideline**  
-- Aquatic Life Guideline for Coho Rearing (17°C)

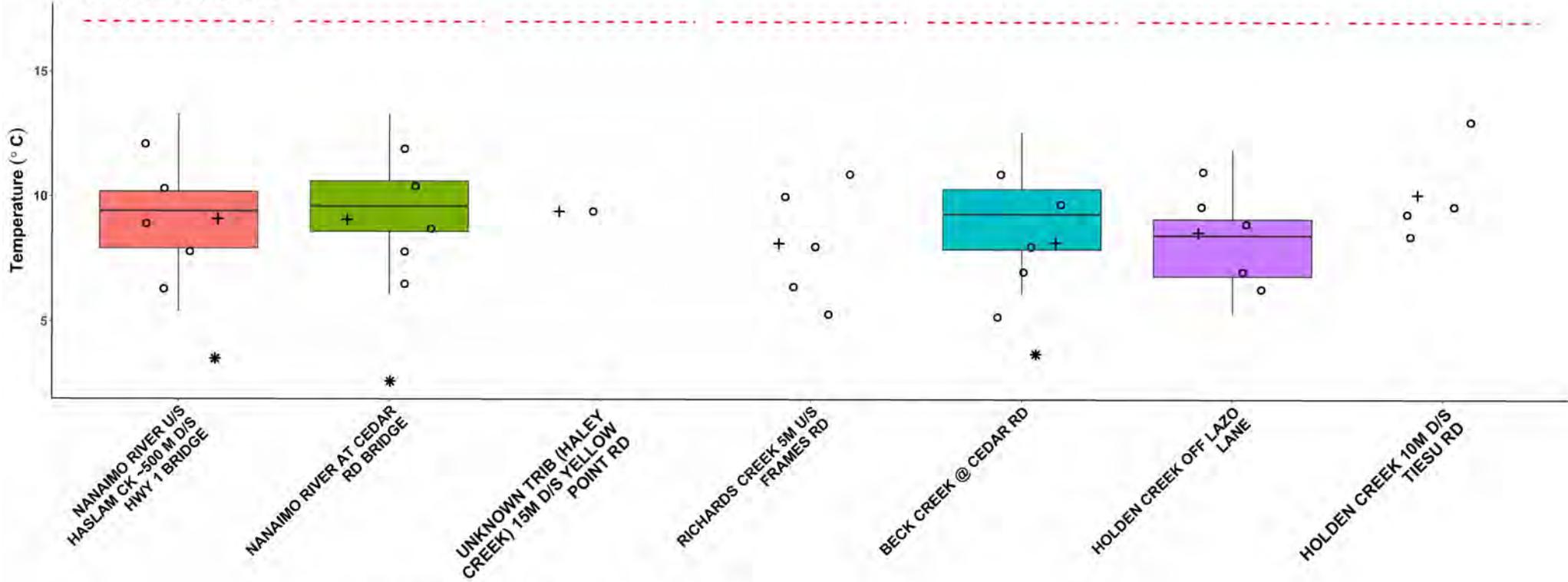


# WR6b Summer Temperature





### WR6b Fall Temperature



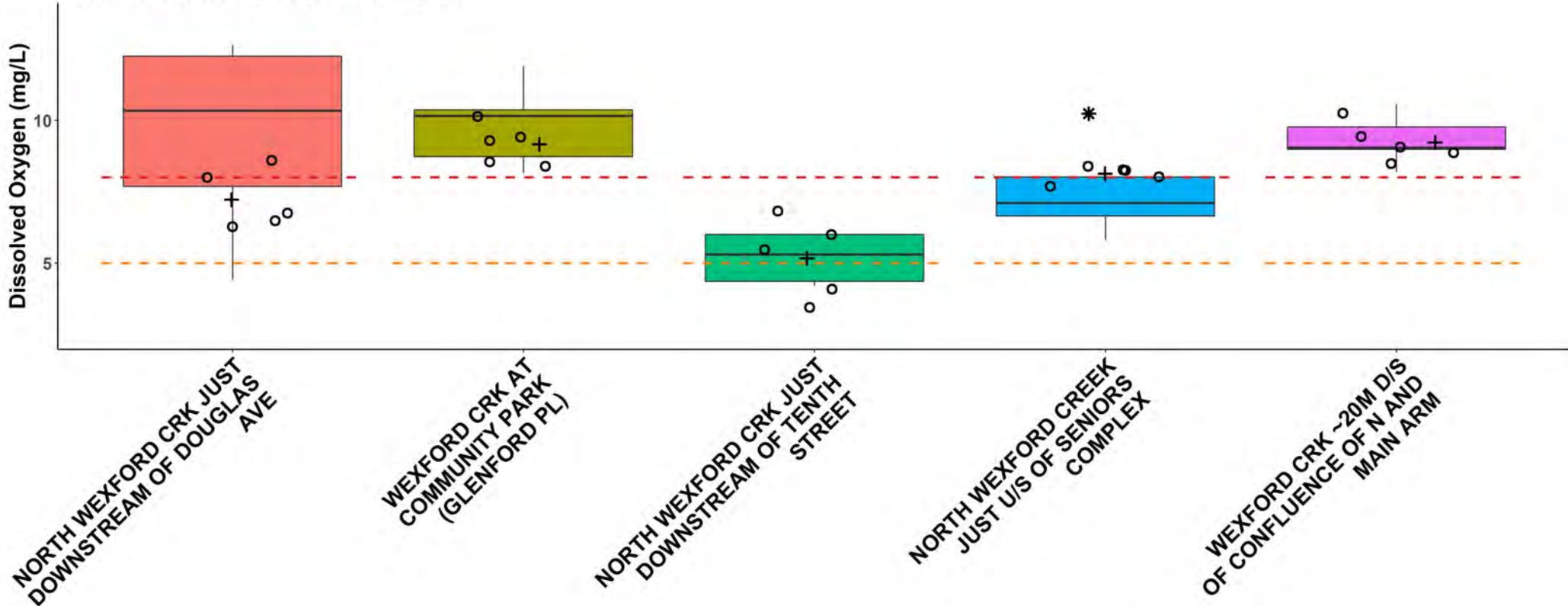
- 2020 Samples
- \* Outlier 2011-2019
- + 2020 30 Day Avg

### Guideline

-- Aquatic Life Guideline for Coho Rearing (17°C)



# WR6a Summer Dissolved Oxygen



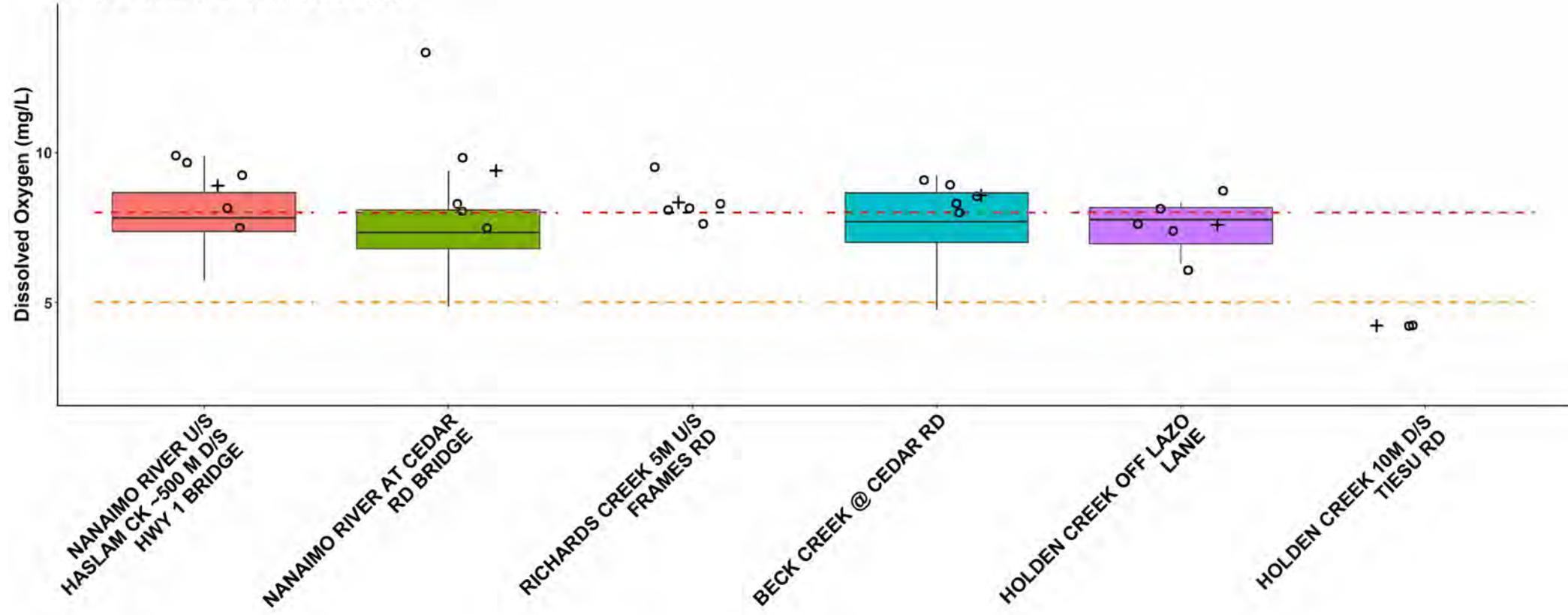
## Guideline

- - 30 Day Average (<8 mg/L)
- - Instantaneous Minimum (<5 mg/L)

- 2020 Samples
- \* Outlier 2019-2020
- + 2020 30 Day Avg



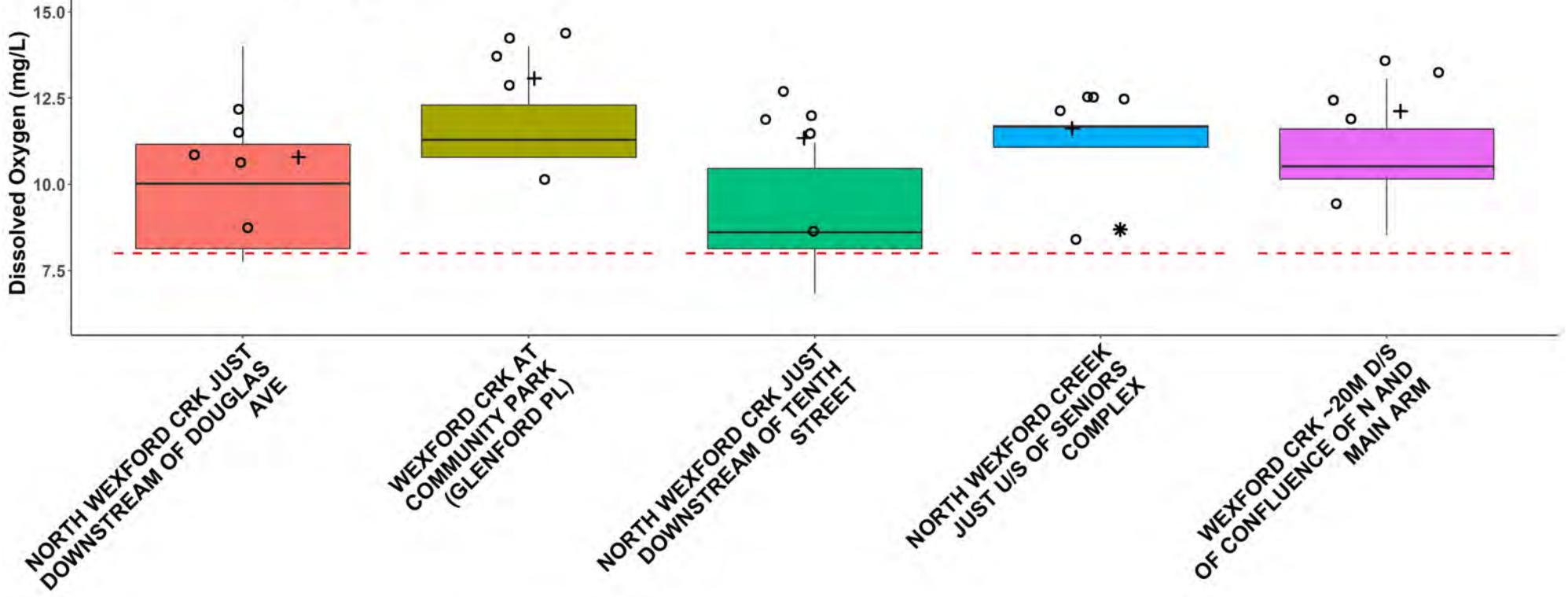
# WR6b Summer Dissolved Oxygen



○ 2020 Samples  
 + 2020 30 Day Avg  
**Guideline**  
 - - 30 Day Average (<8 mg/L)  
 - - Instantaneous Minimum (<5 mg/L)



# WR6a Fall Dissolved Oxygen



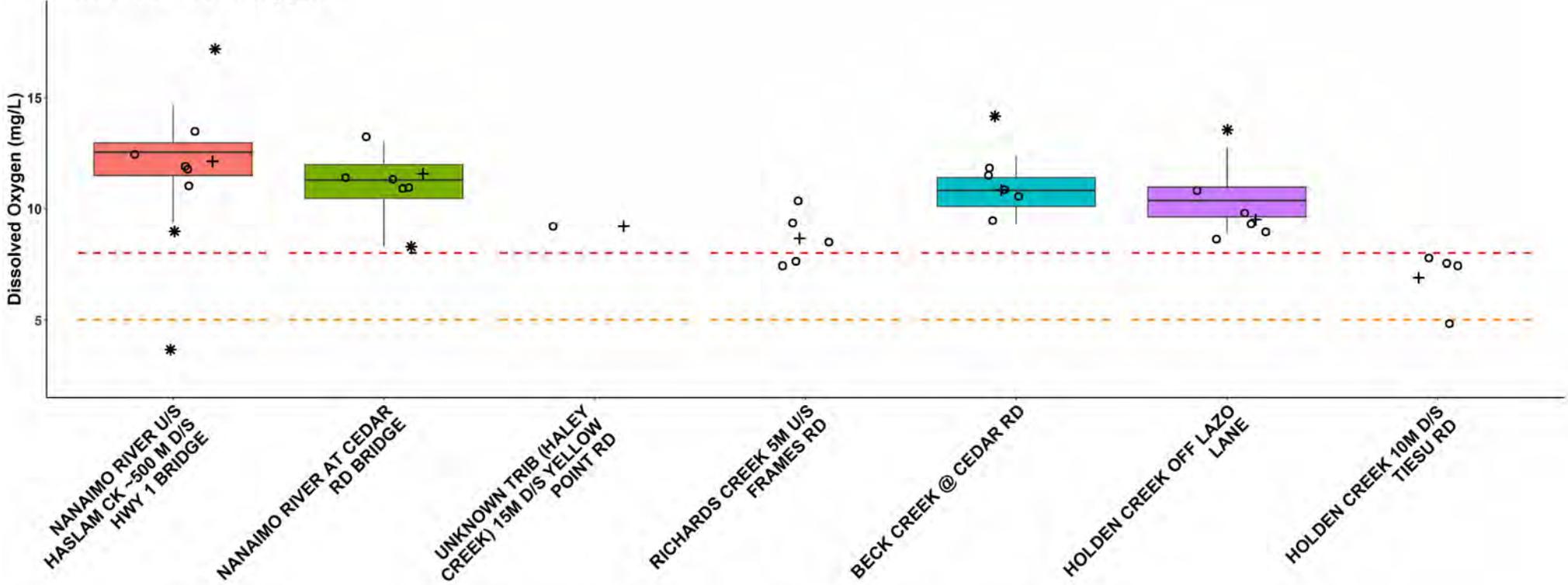
## Guideline

- - 30 Day Average (<8 mg/L)
- - Instantaneous Minimum (<5 mg/L)

- 2020 Samples
- \* Outlier 2019-2019
- + 2020 30 Day Avg



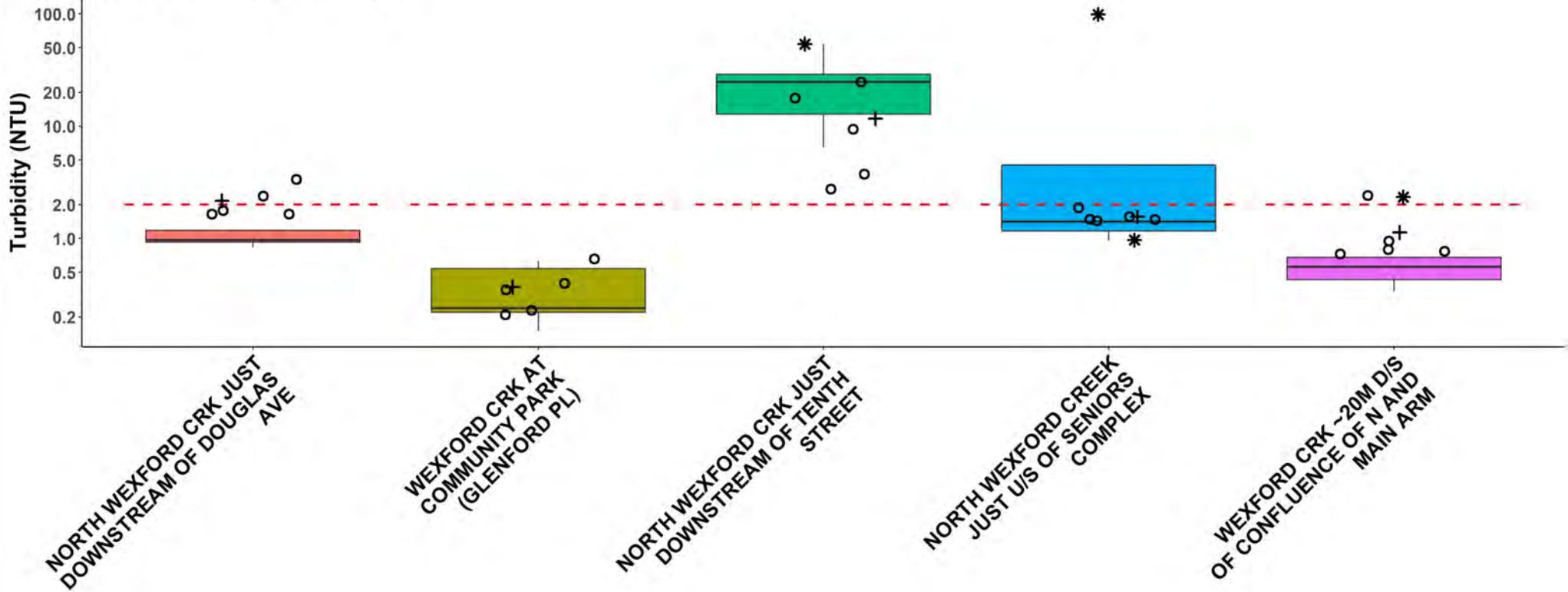
### WR6b Fall Dissolved Oxygen



- 2020 Samples
  - \* Outlier 2011-2019
  - + 2020 30 Day Avg
- Guideline**
- 30 Day Average (<8 mg/L)
  - Instantaneous Minimum (<5 mg/L)



# WR6a Summer Turbidity

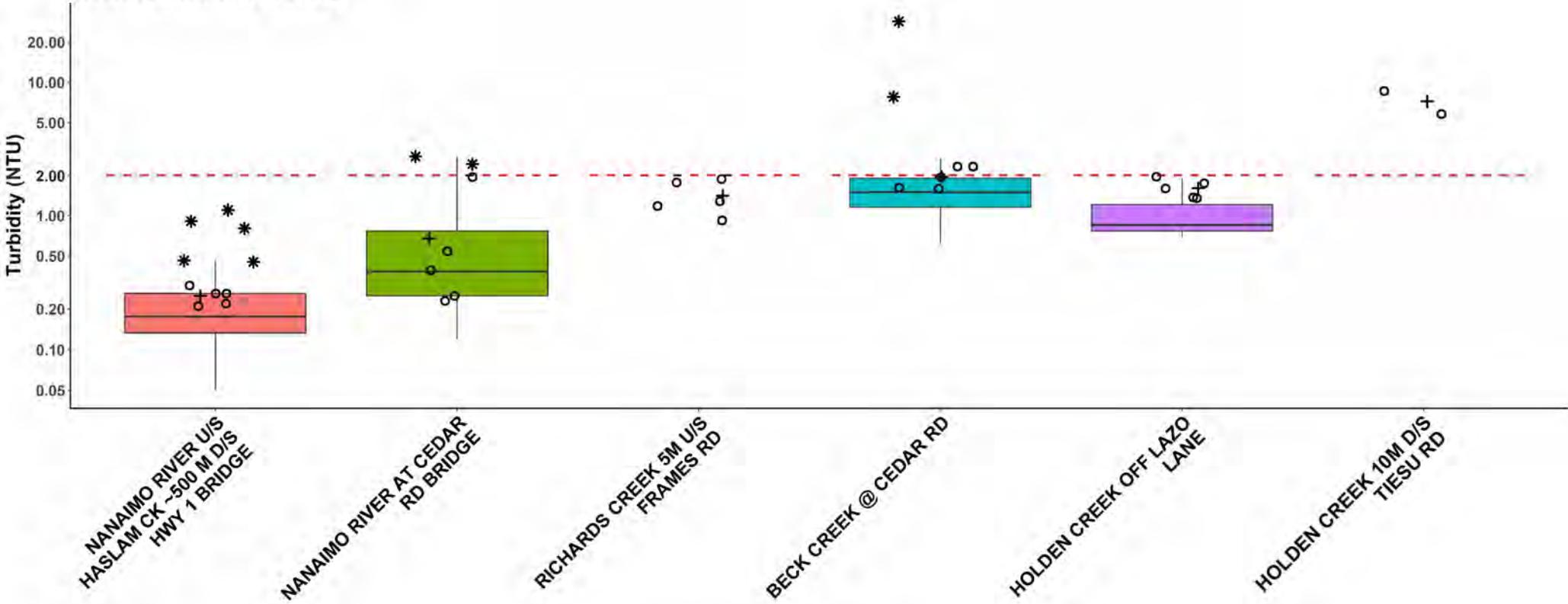


**Guideline**  
 - - Jan-Sept Max (2 NTU)

o 2020 Samples  
 \* Outlier 2019-2019  
 + 2020 30 Day Avg



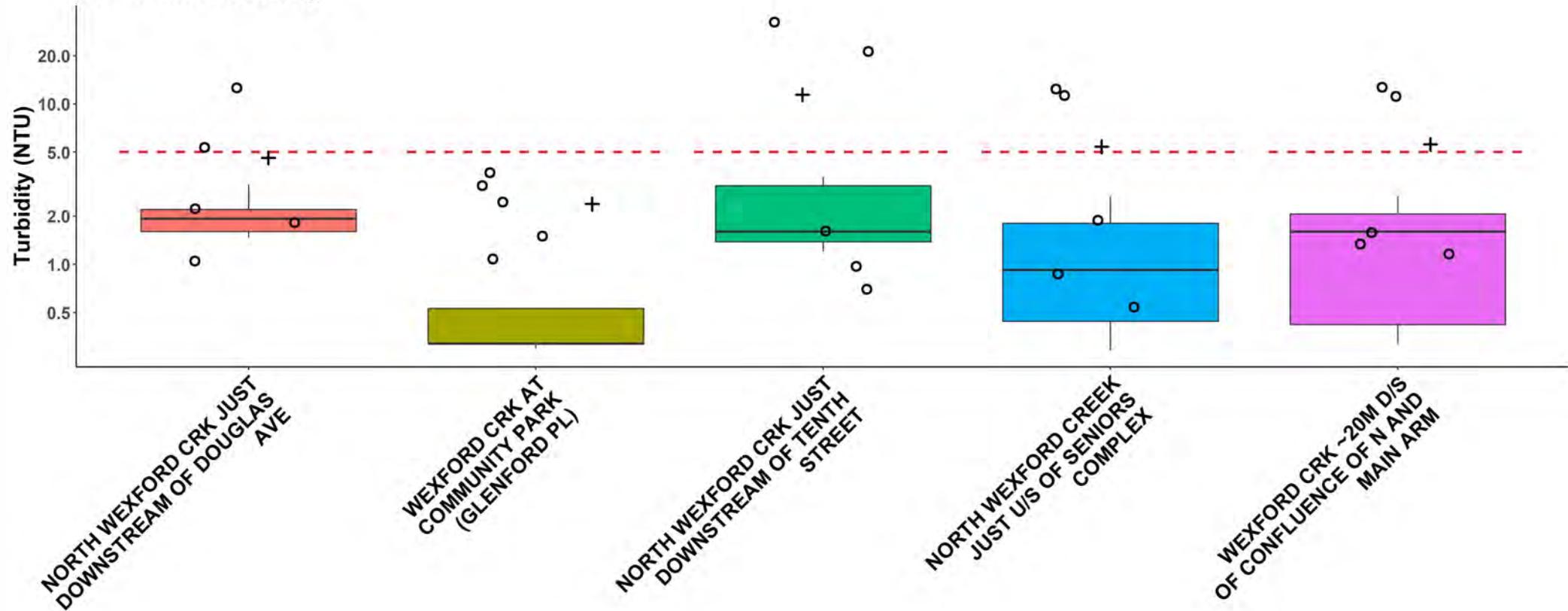
# WR6b Summer Turbidity



○ 2020 Samples  
 \* Outlier 2011-2019  
 + 2020 30 Day Avg  
**Guideline**  
 - - Jan-Sept Max (2 NTU)



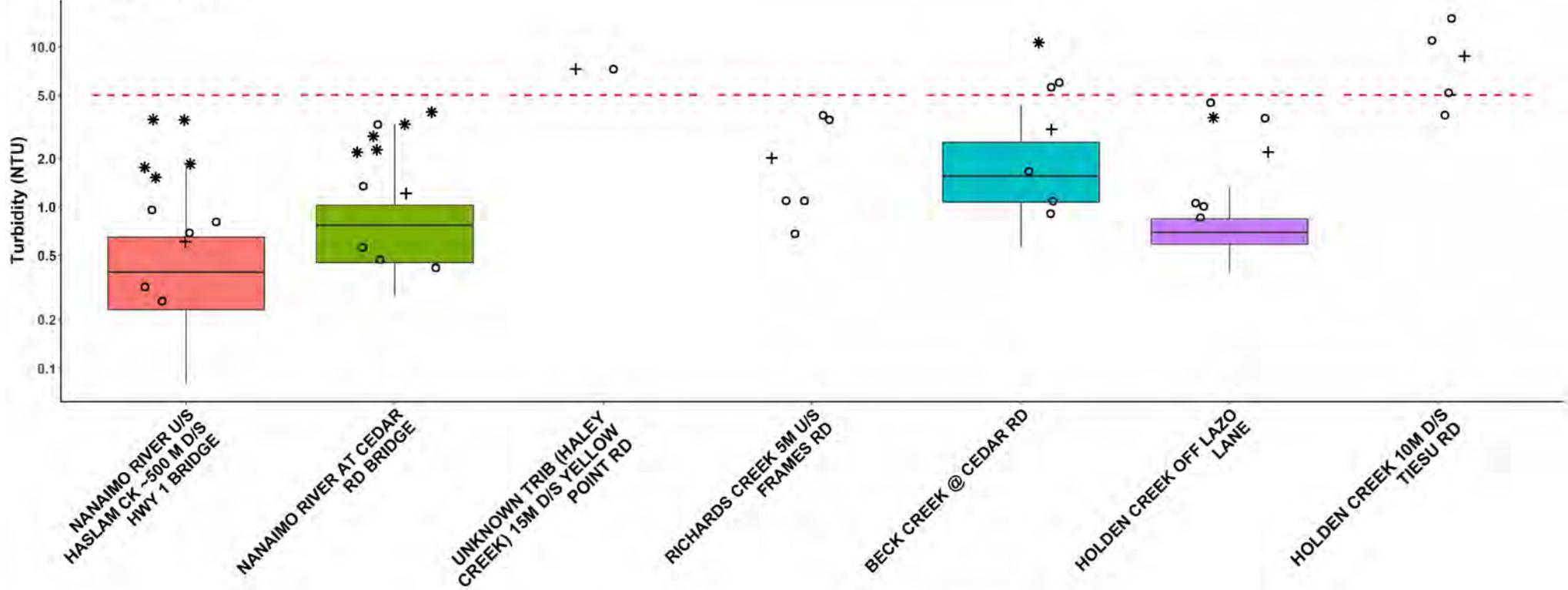
# WR6a Fall Turbidity



○ 2020 Samples      + 2020 30 Day Avg      Guideline  
-- Oct-Dec Max (5 NTU)



### WR6b Fall Turbidity

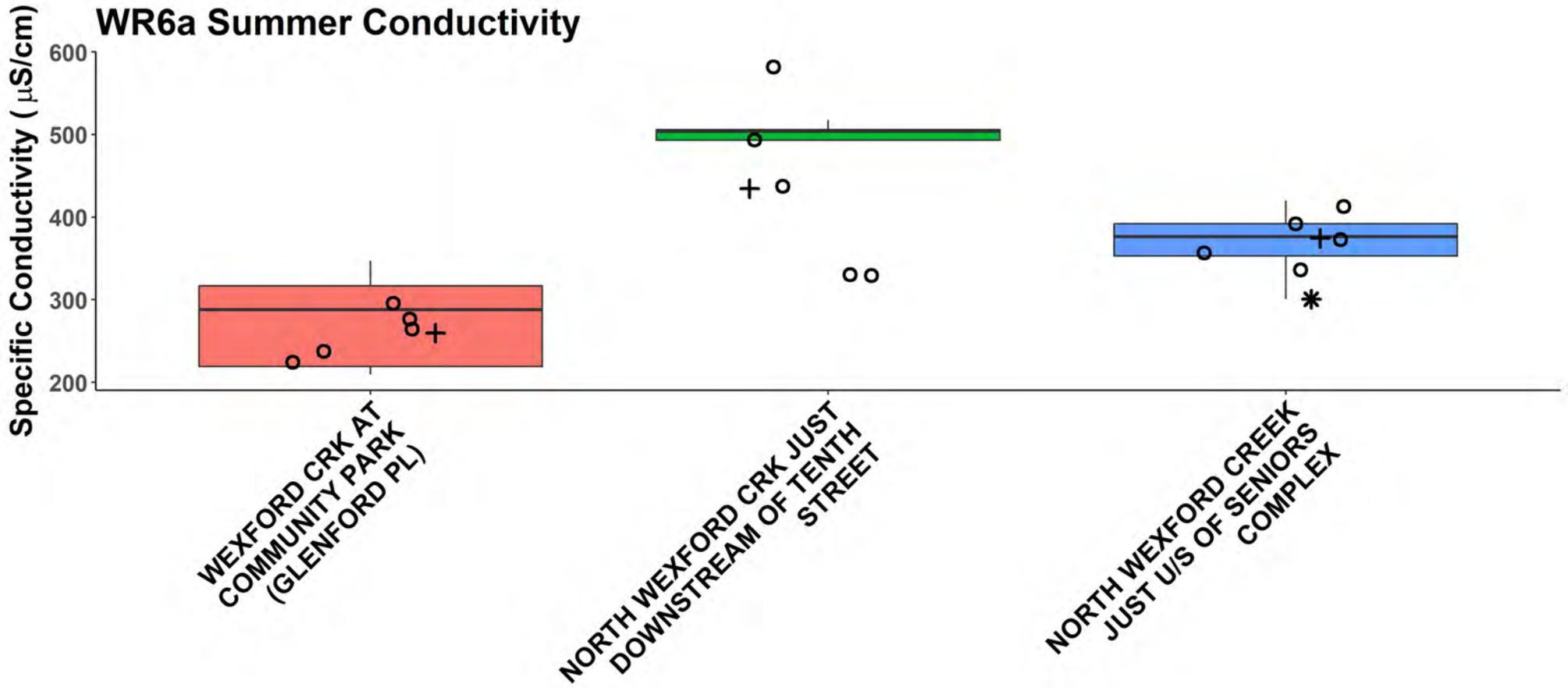


#### Guideline

-- Oct-Dec Max (5 NTU)

- 2020 Samples
- \* Outlier 2011-2019
- + 2020 30 Day Avg

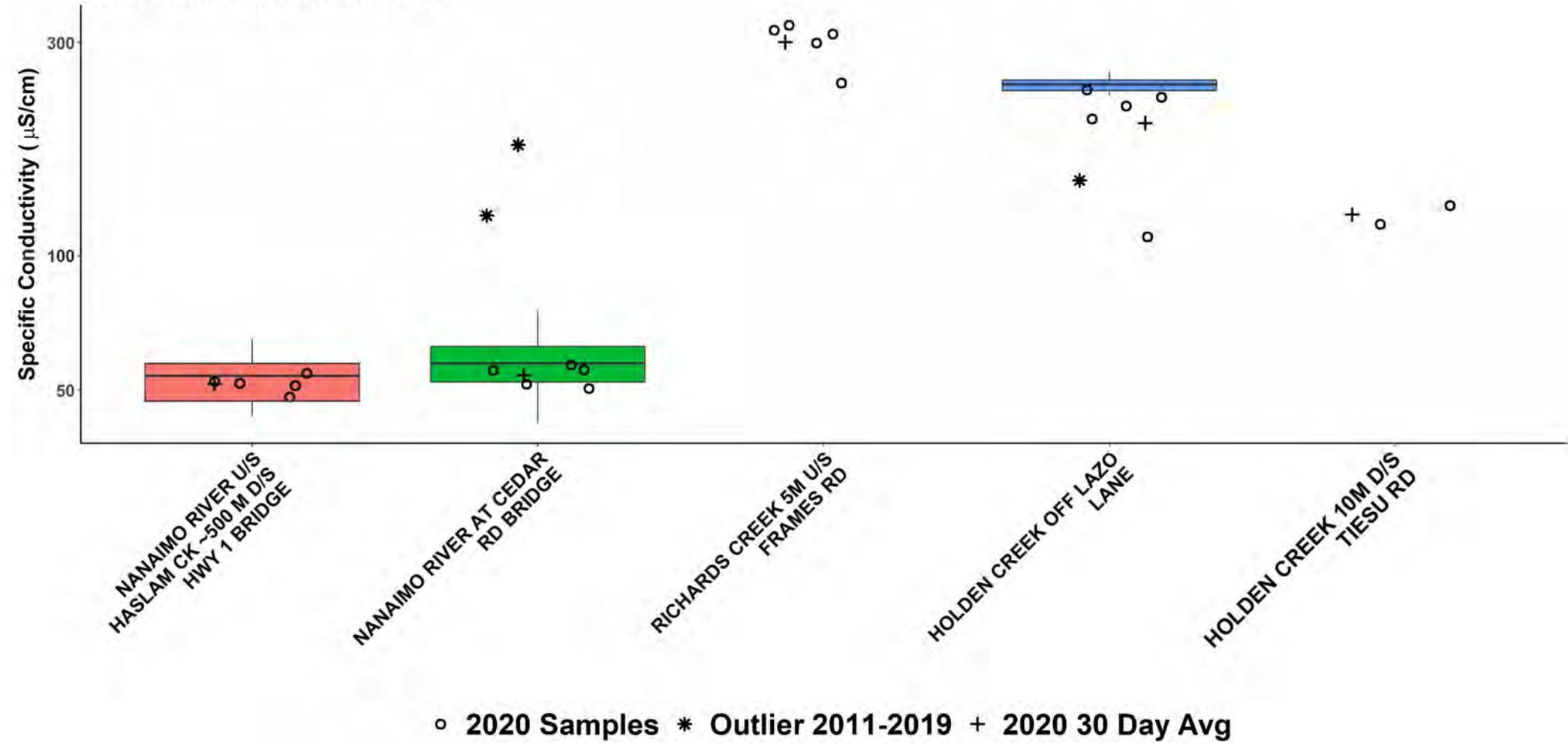




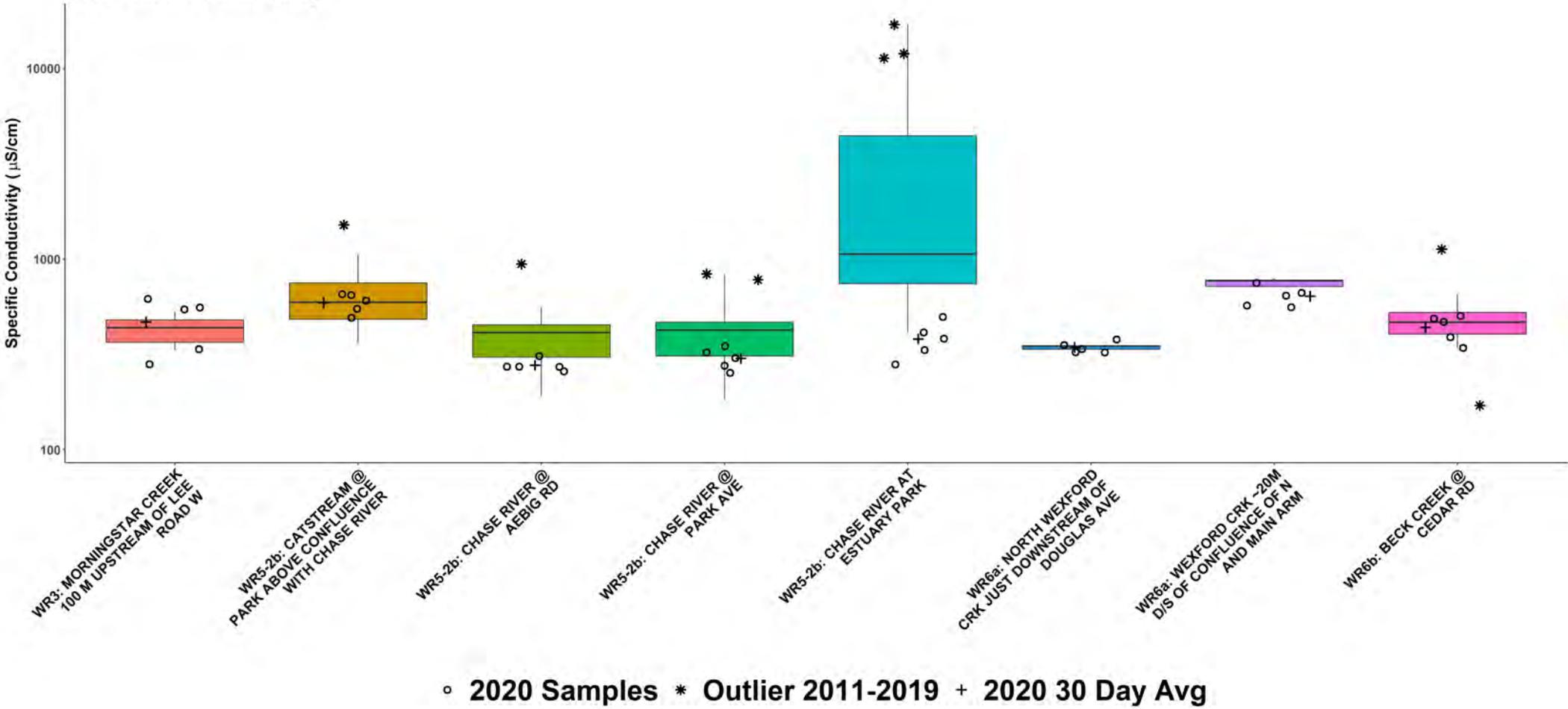
○ 2020 Samples \* Outlier 2019-2019 + 2020 30 Day Avg



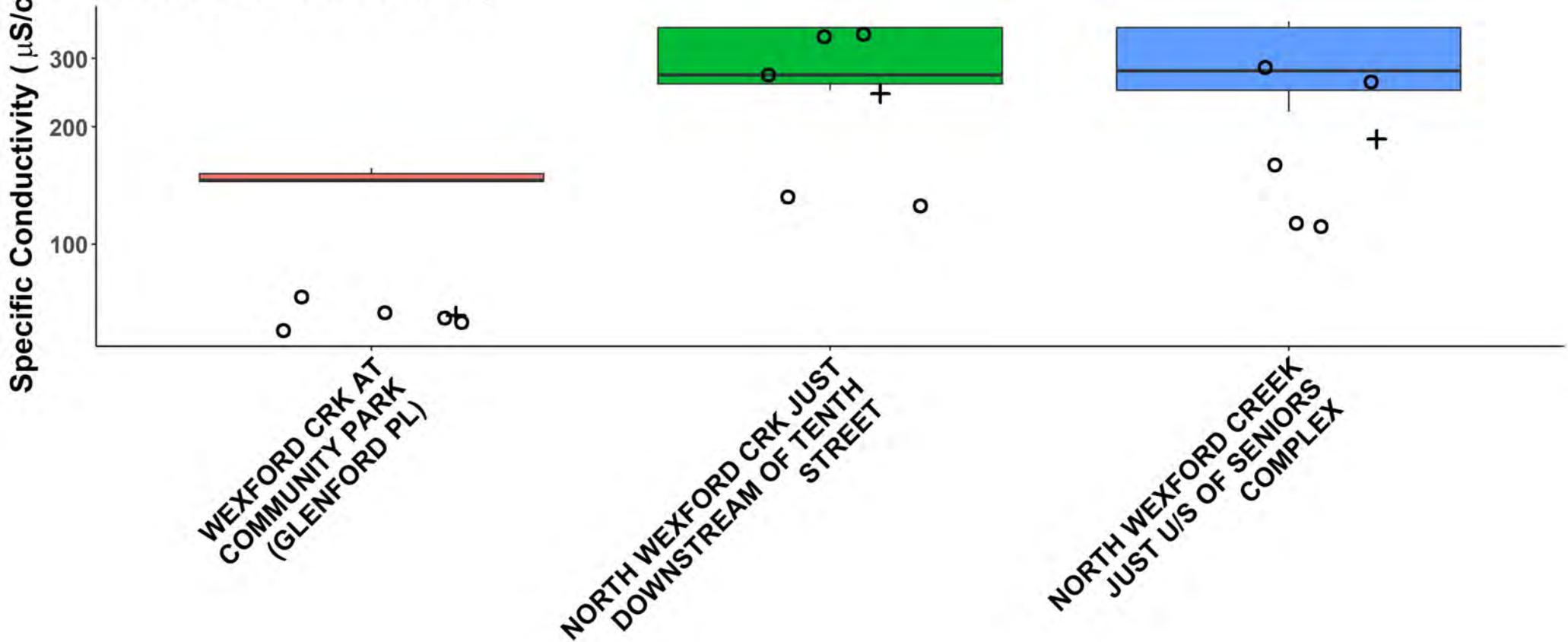
# WR6b Summer Conductivity



# CWMN Sites with High Summer Conductivity



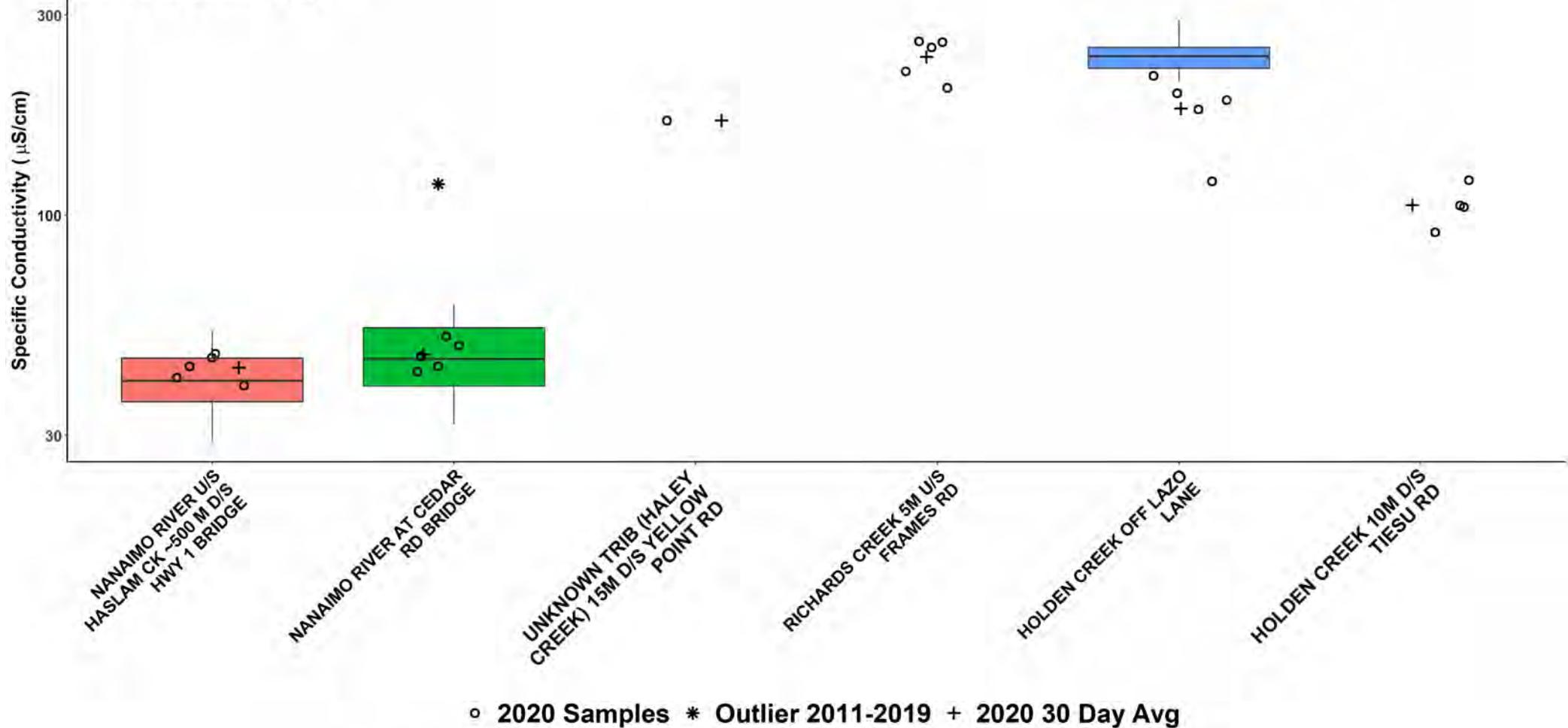
# WR6a Fall Conductivity



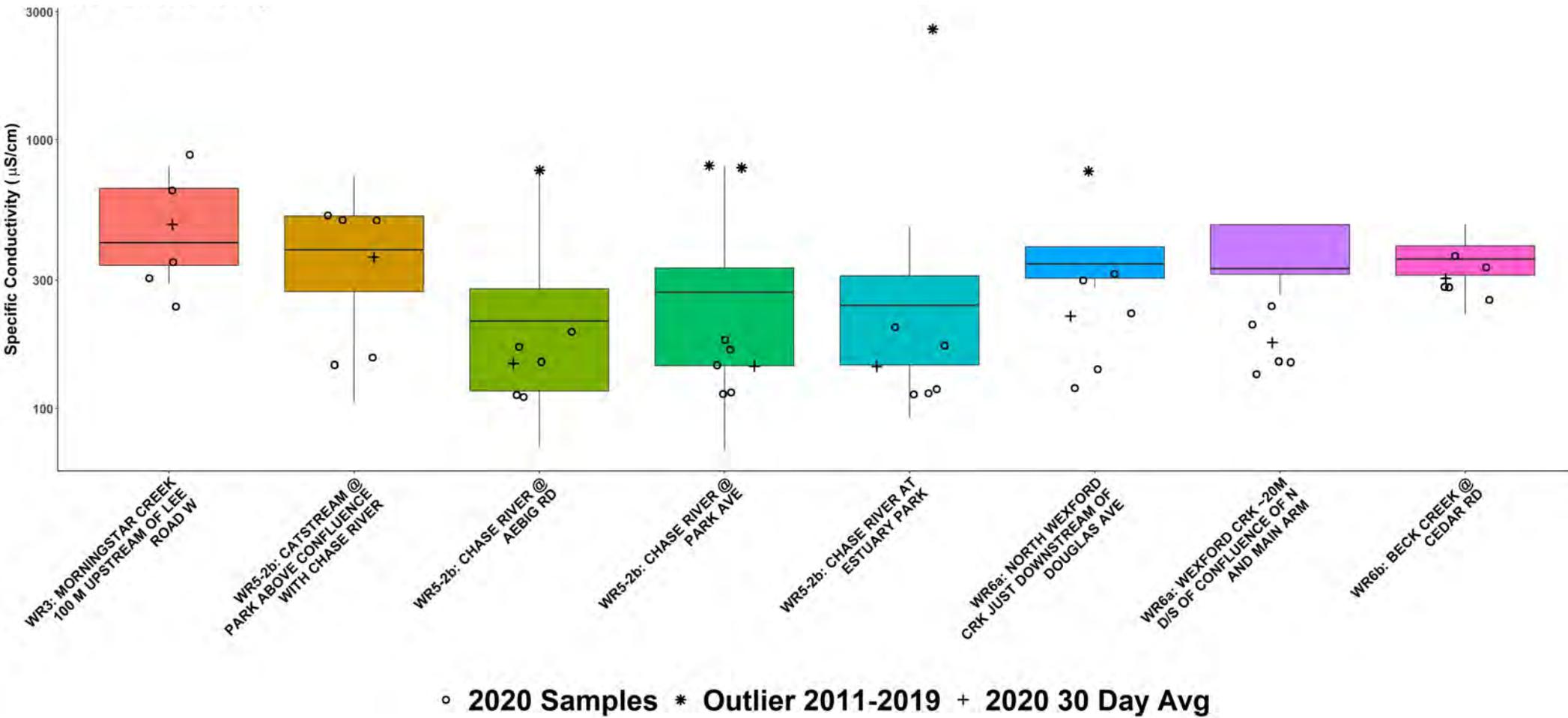
○ 2020 Samples + 2020 30 Day Avg



# WR6b Fall Conductivity



## CWMN Sites with High Fall Conductivity



# Regional District of Nanaimo

## CMMN Water Quality Trend Analysis 2011-2020

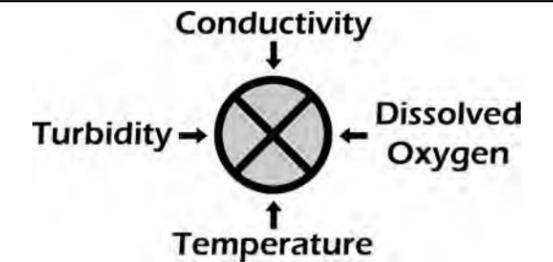
### WR6: Nanaimo River

**Location:** Nanaimo, BC  
**Project No.:** 21-3702  
**Prepared for:** Regional District of Nanaimo  
**Prepared by:** Ecoscape Environmental Consultants Ltd.  
**Coordinate System:** NAD83-UTM Zone 10  
**Imagery:** ESRI Canada

### LEGEND

- Sample Site - No Trend Assessed
- ⊗ Sample Site - Trend Assessed
- Highway
- ▭ Watershed
- ▭ Water Region
- ▭ Lake
- Trend Color Code**
  - ▭ Improving
  - ▭ Stable
  - ▭ Degrading

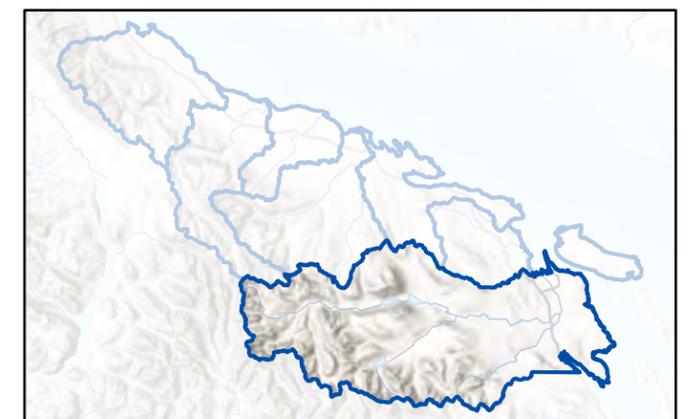
### SAMPLE SITE KEY



Conductivity can be influenced by factors such as groundwater and ocean spray that are not necessarily indicative of a degrading condition. For simplicity, an increase in conductivity is categorized here as degrading.

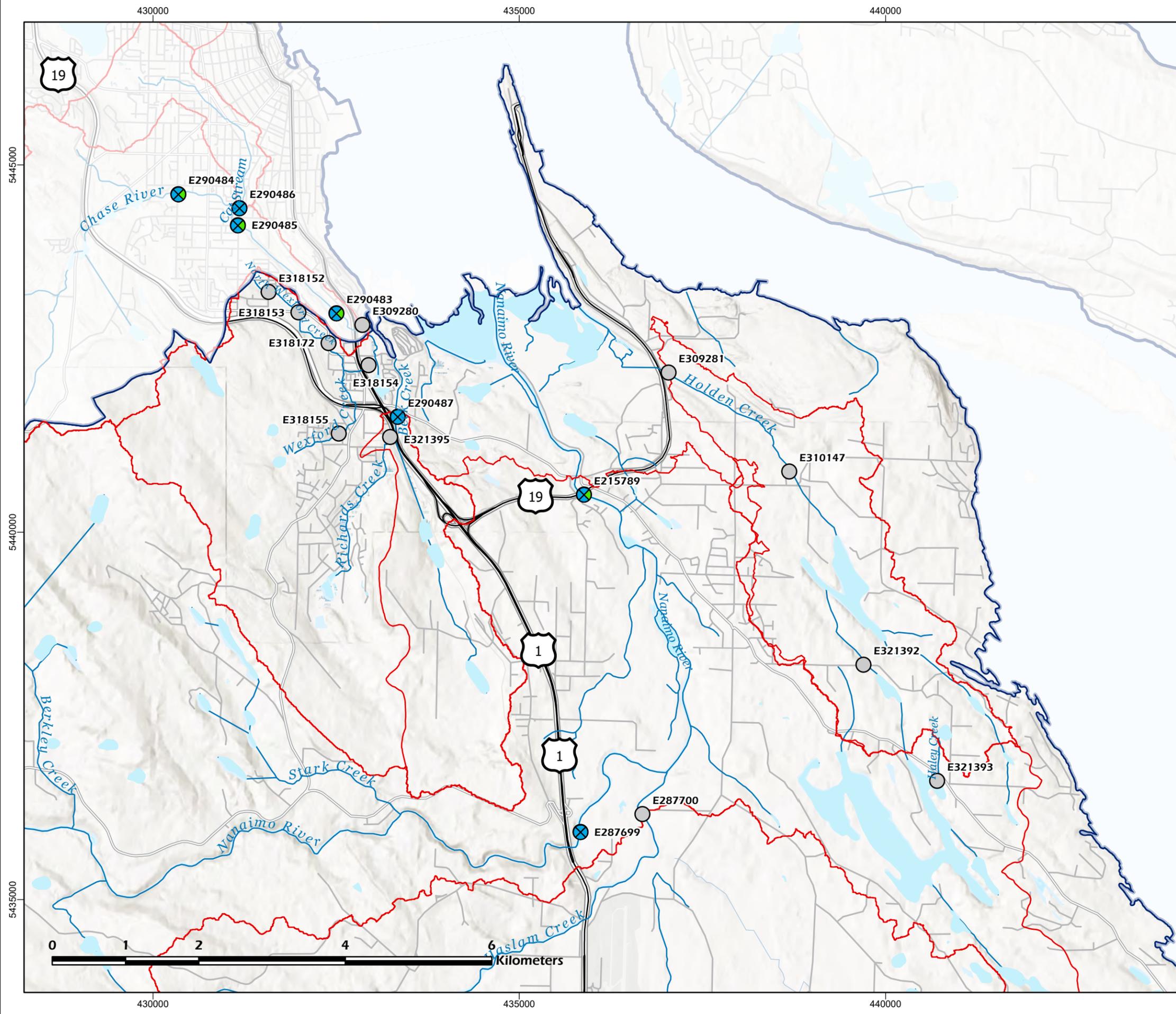
### MAP INDEX

Solid blue lines indicate entire water region; extent of main view map may be scaled to better visualize sample -site-dense regions.



### DISCLAIMER

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# Regional District of Nanaimo

CMMN 2011-2020 Summer Exceedance Assessment

## WR6: Nanaimo River

Location: Nanaimo, BC  
 Project No.: 21-3702  
 Prepared for: Regional District of Nanaimo  
 Prepared by: Ecoscape Environmental Consultants Ltd.  
 Coordinate System: NAD83-UTM Zone 10  
 Imagery: ESRI Canada

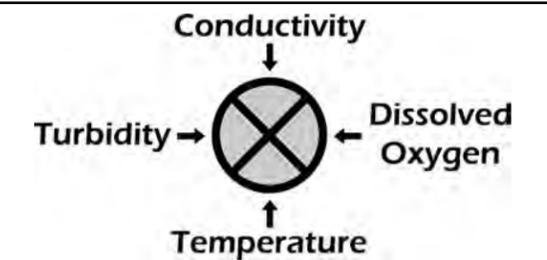
### LEGEND

- Sample Site
  - Highway
  - Stream
  - Watershed
  - Water Region
  - Lake
- Note the exceedance frequency categories are reflective of the number of sample periods with exceedances, not the number or values of the exceedances.*

### Exceedance colour key

- No exceedance recorded
- Low exceedance frequency
- Moderate exceedance frequency
- High exceedance frequency

### SAMPLE SITE KEY

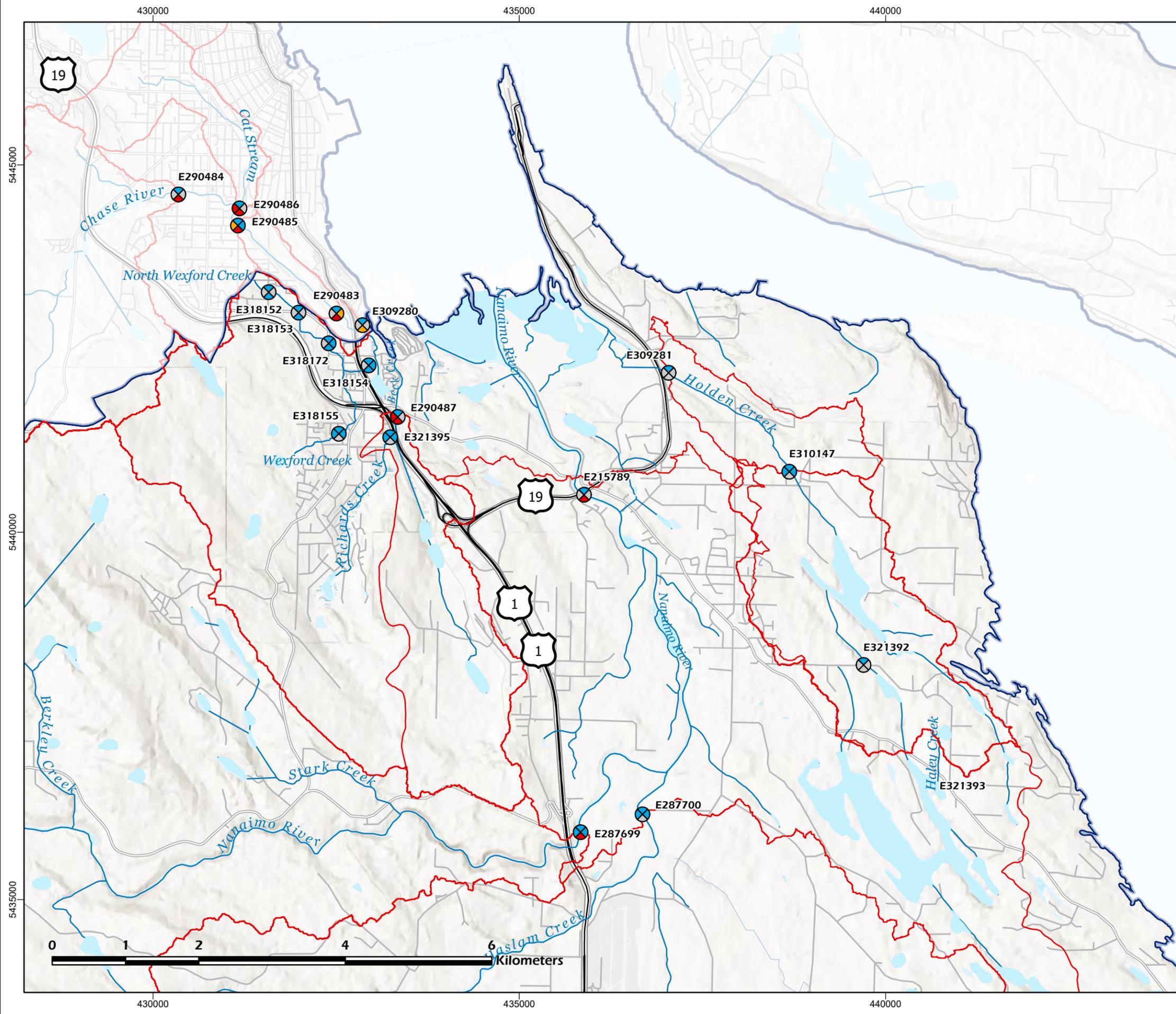


### MAP INDEX



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# Regional District of Nanaimo

## CMMN 2011-2020 Fall Exceedance Assessment

### WR6: Nanaimo River

Location: Nanaimo, BC  
Project No.: 21-3702  
Prepared for: Regional District of Nanaimo  
Prepared by: Ecoscape Environmental Consultants Ltd.  
Coordinate System: NAD83-UTM Zone 10  
Imagery: ESRI Canada

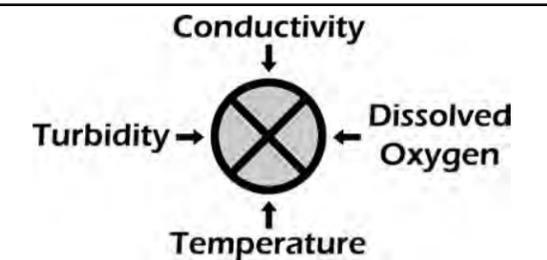
#### LEGEND

- ⊗ Sample Site
  - Stream
  - Highway
  - ▭ Watershed
  - ▭ Water Region
  - ▭ Lake
- Note the exceedance frequency categories are reflective of the number of sample periods with exceedances, not the number or values of the exceedances.*

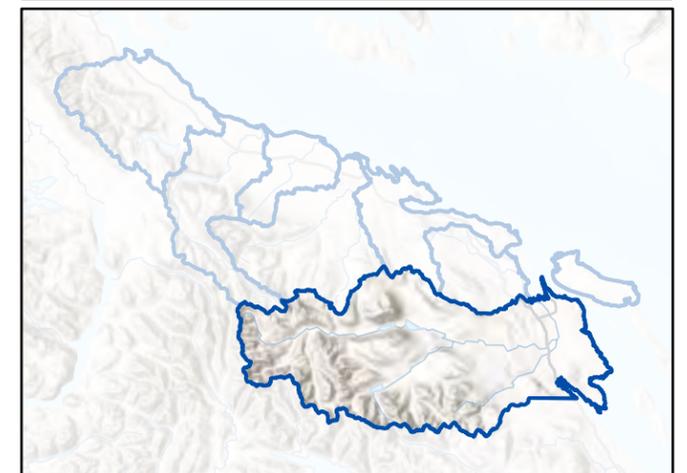
#### Exceedance colour key

- ▭ No exceedance recorded
- ▭ Low exceedance frequency
- ▭ Moderate exceedance frequency
- ▭ High exceedance frequency

#### SAMPLE SITE KEY

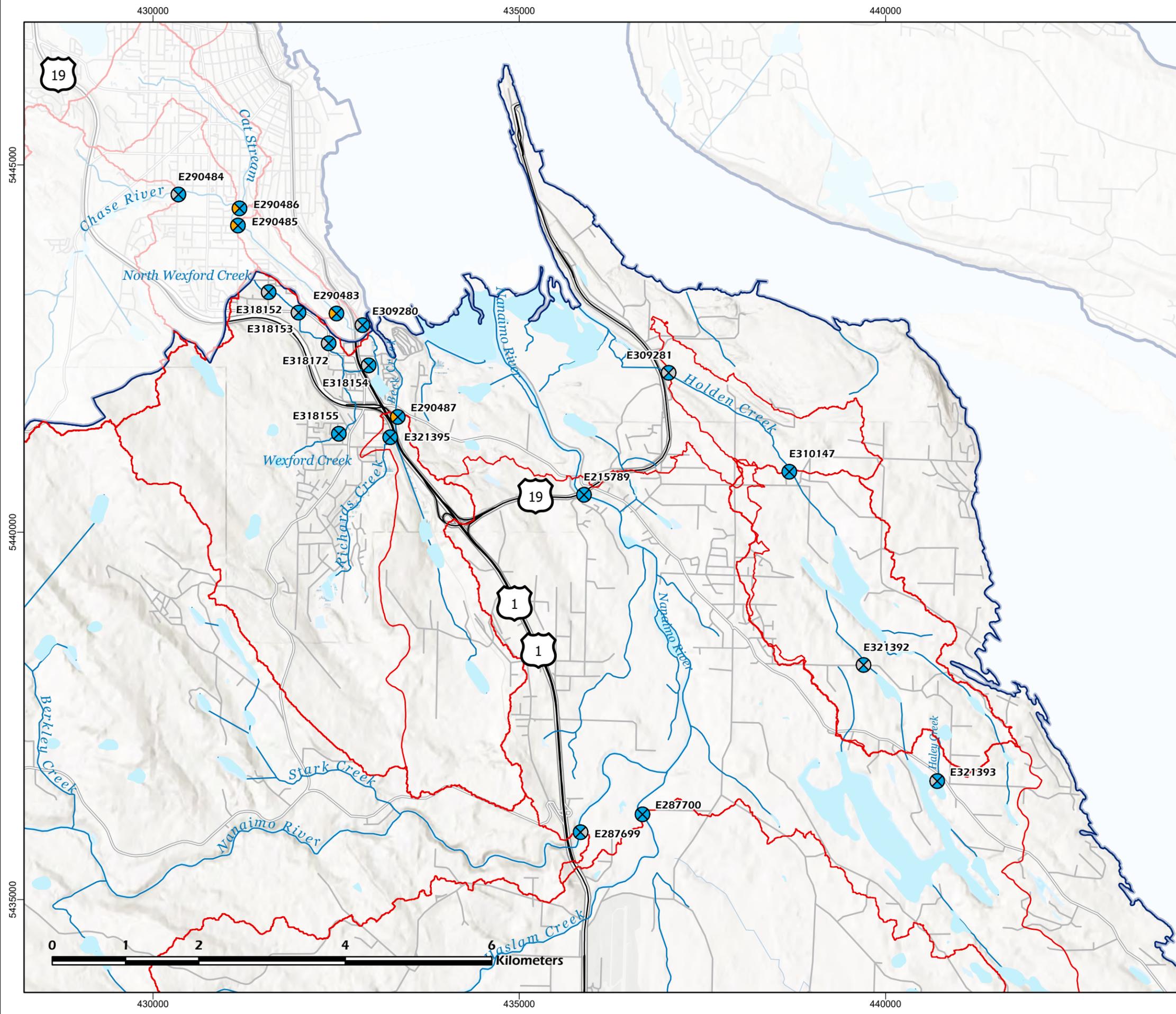


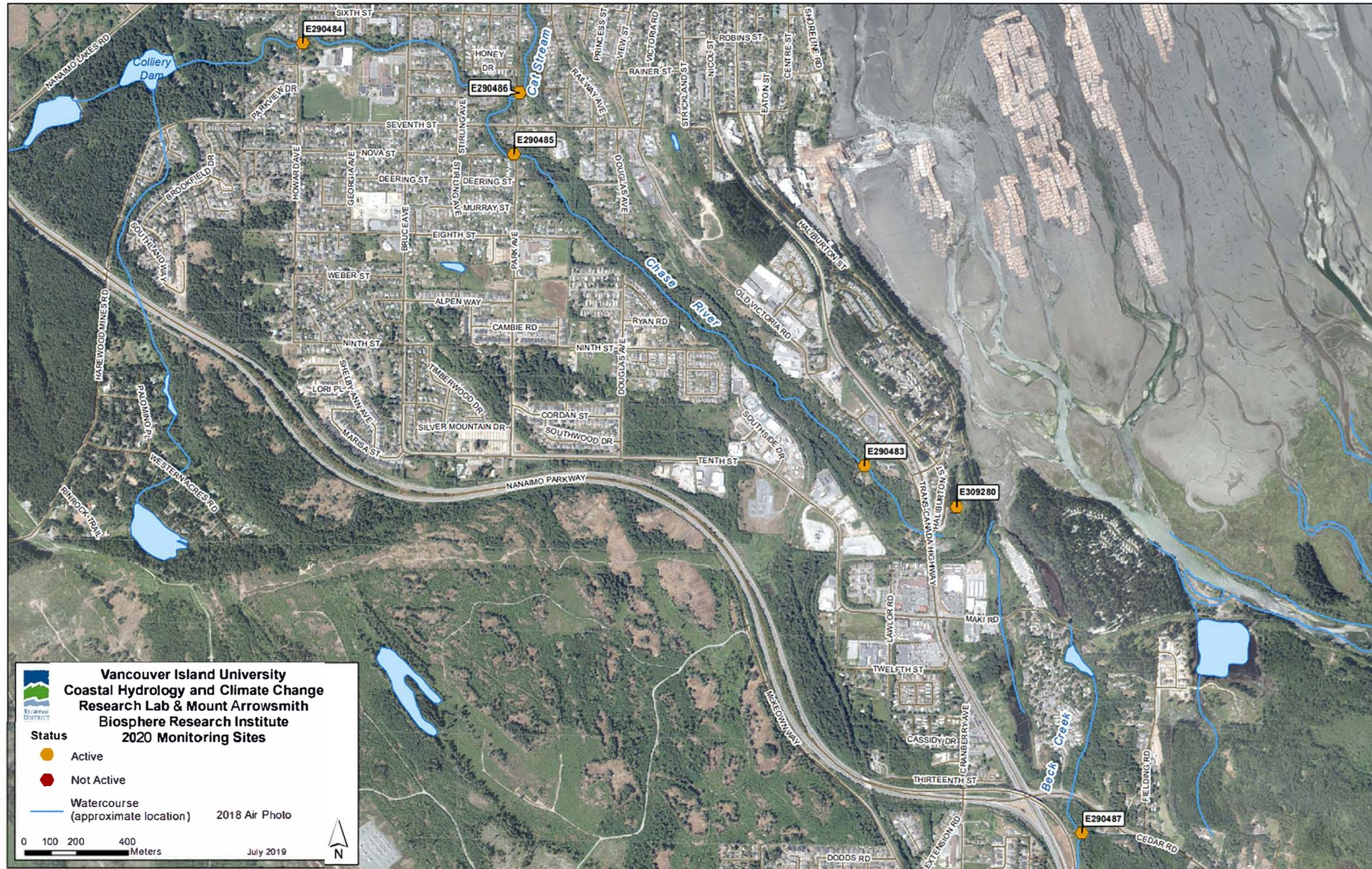
#### MAP INDEX

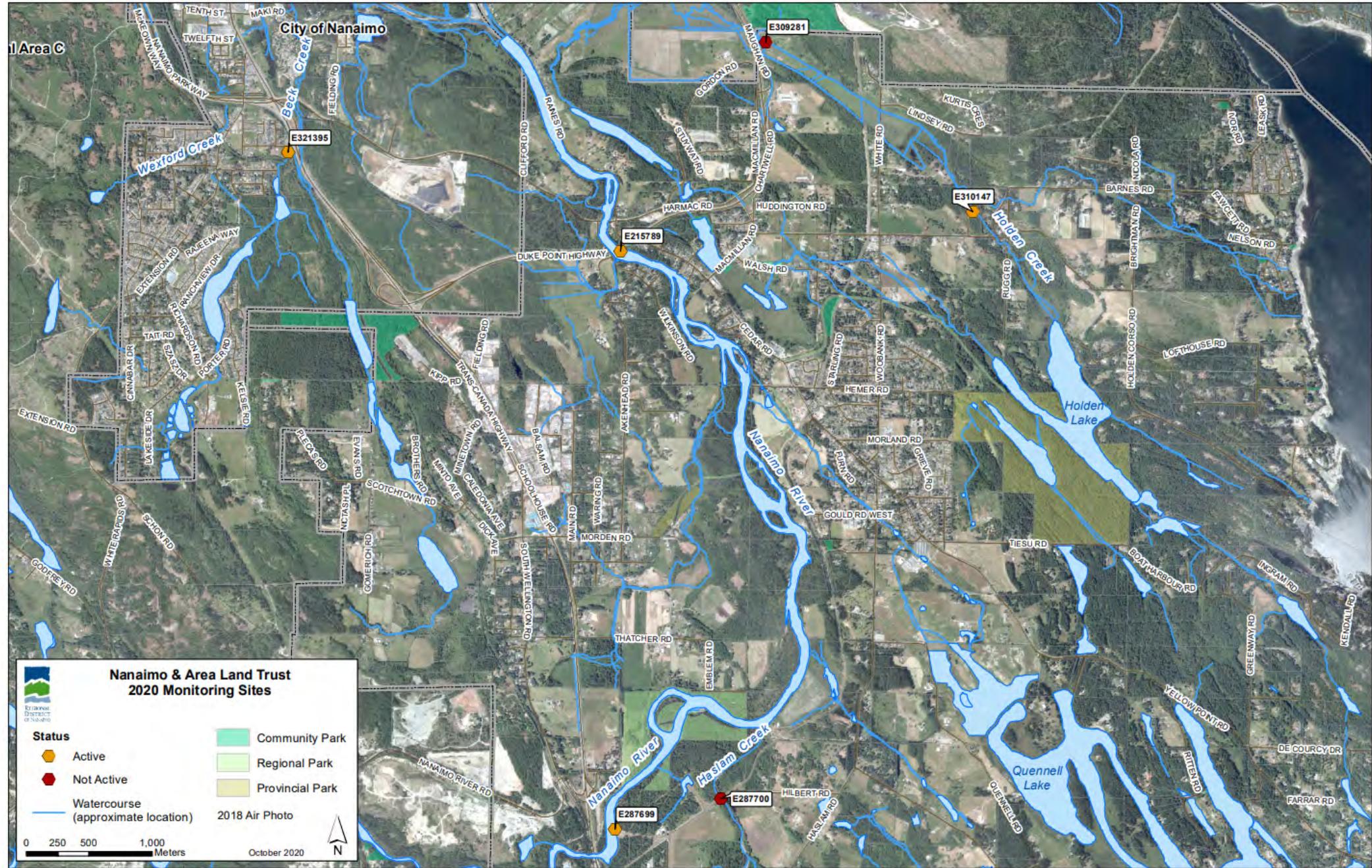


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**Wexford Creek Streamkeepers  
2020 Monitoring Sites**

**Status**

- Active
- Not Active

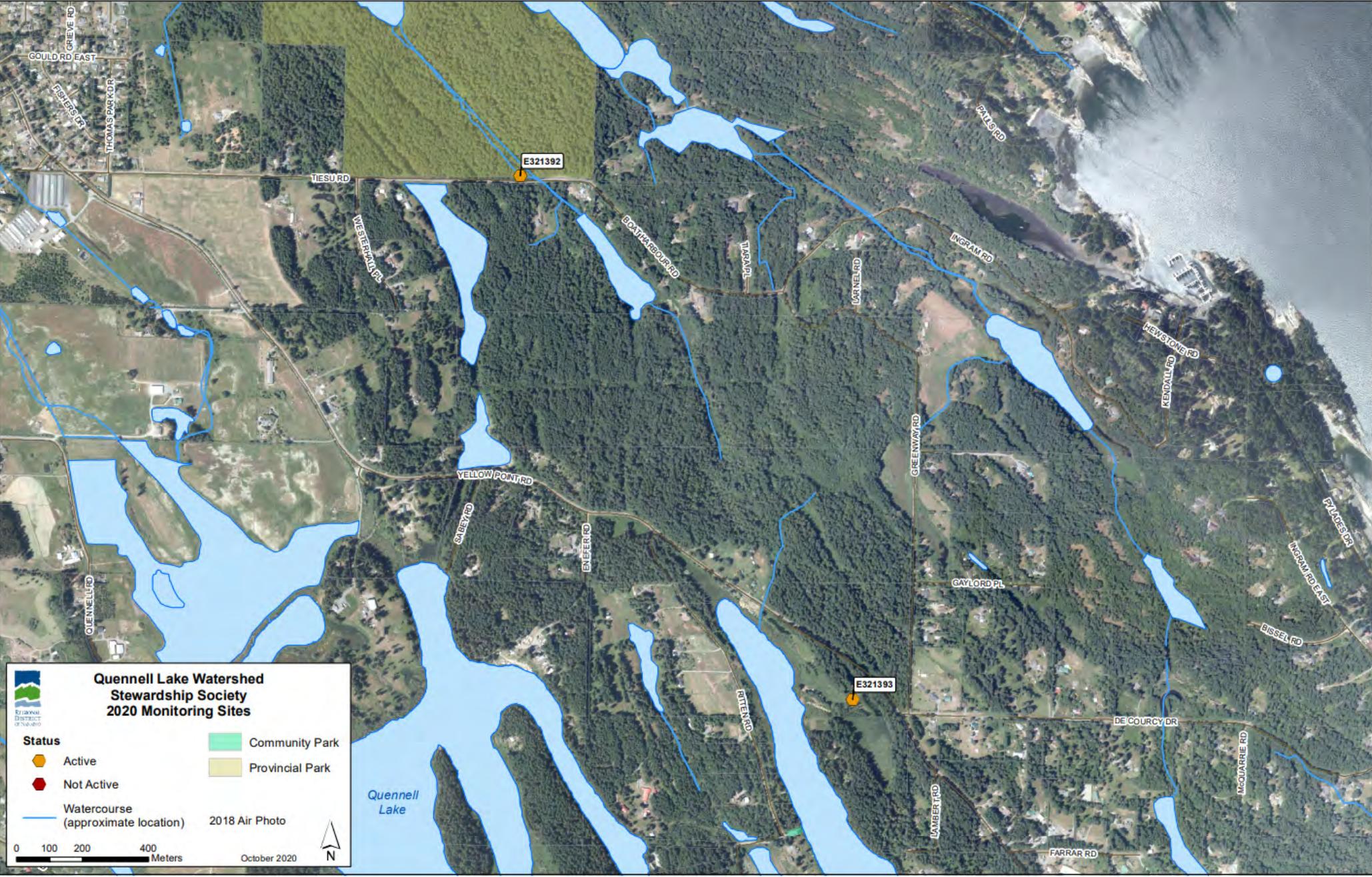
— Watercourse (approximate location)    2018 Air Photo

0 100 200 400 Meters    Feb 2020

Electoral Area C

City of Nanaimo

Map labels include: NINTH ST, CAMBIE RD, LORI PL, SHELBY AVENUE, BRUCE AVE, BRAMBLEWOOD LANE, SILVER MOUNTAIN DR, CORDAN ST, SOUTHWOOD DR, SOUTHIDE DR, TENTH ST, NANAIMO PARKWAY, Wexford Creek, CHASE RIVER, HALBURTON ST, LAWLOR RD, MAKI RD, TWELFTH ST, TRANS CANADA HIGHWAY, BECK CREEK, THIRTEENTH ST, CASSIDY DR, CRANBERRY AVE, ALBERTA RD, DODDS RD, MARION RD, WEXFORD CREEK, ROBERTA RD WEST, GENTLEMAN DR, LENWOOD RD, CRANBERRY AVE, STERLING RD, COULSON RD, WILSON RD, FOURS TEENTH ST, BEAULIEU RD, TROFTON RD, LEBARZ RD, CEDAR RD, FIELDING RD, and FREW RD.



**Quennell Lake Watershed Stewardship Society 2020 Monitoring Sites**

REGIONAL DISTRICT OF HALIFAX

**Status**

- Active
- Not Active

Watercourse (approximate location)

Community Park

Provincial Park

2018 Air Photo

0 100 200 400 Meters

October 2020

N