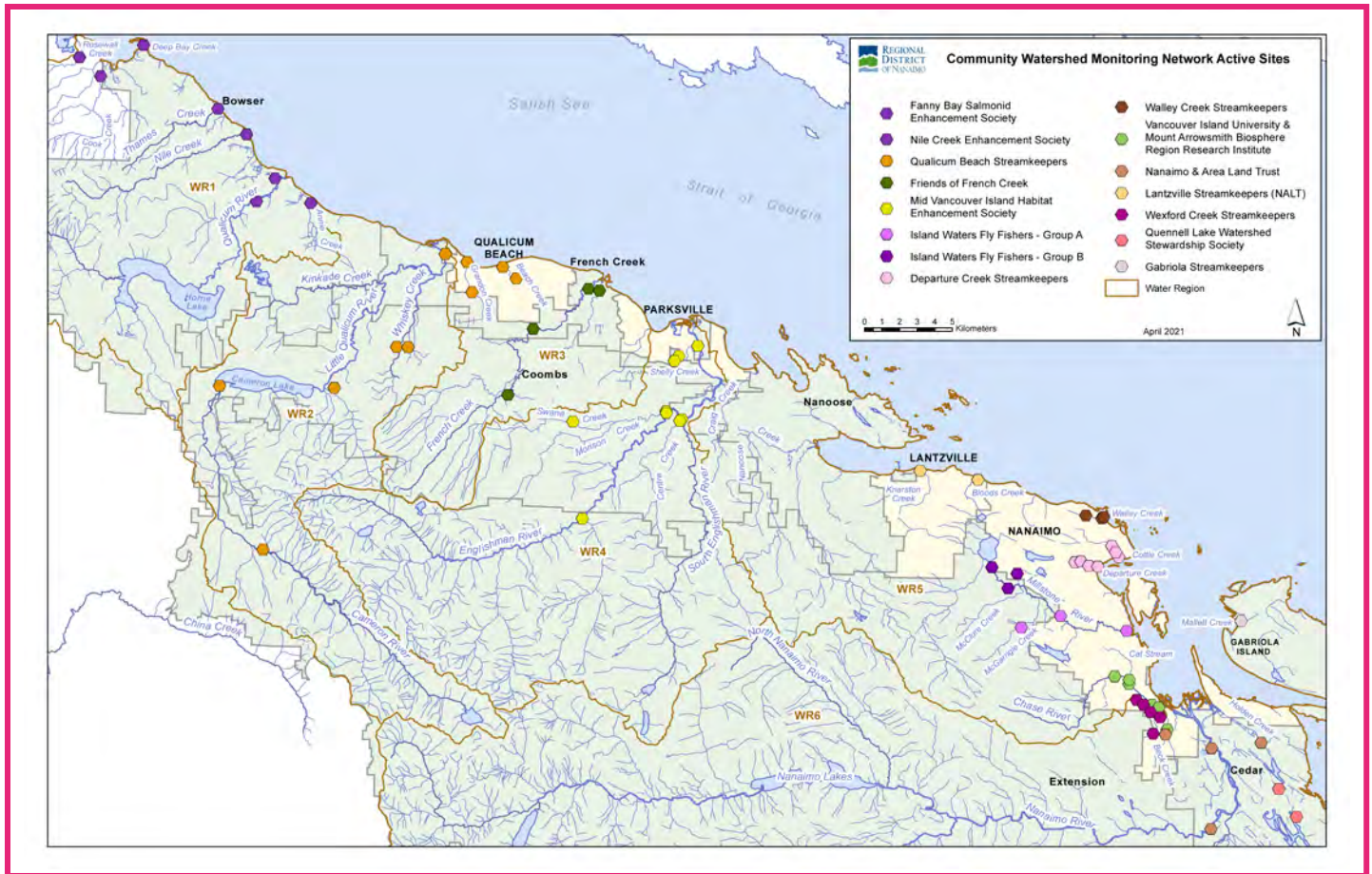


Community Watershed Monitoring Network 2020

Results by Water Region



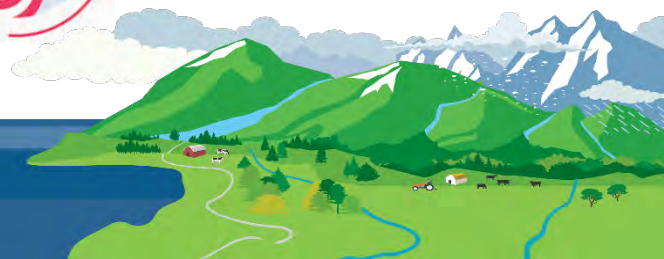
Included in your Water Region package:

1. CWMN Sample sites in Water Region (WR) 5-2
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. IWFF Site Map
8. VIU Site Map



Water Region 5-2
sampled by:

Island Waters Fly Fishers (IWFF)
&
**Vancouver Island University
Coastal Hydrology & Climate
Change Research Lab and
Mount Arrowsmith Region
Research Institute (VIU)**



CWMN Sample Sites in WR 5-2:

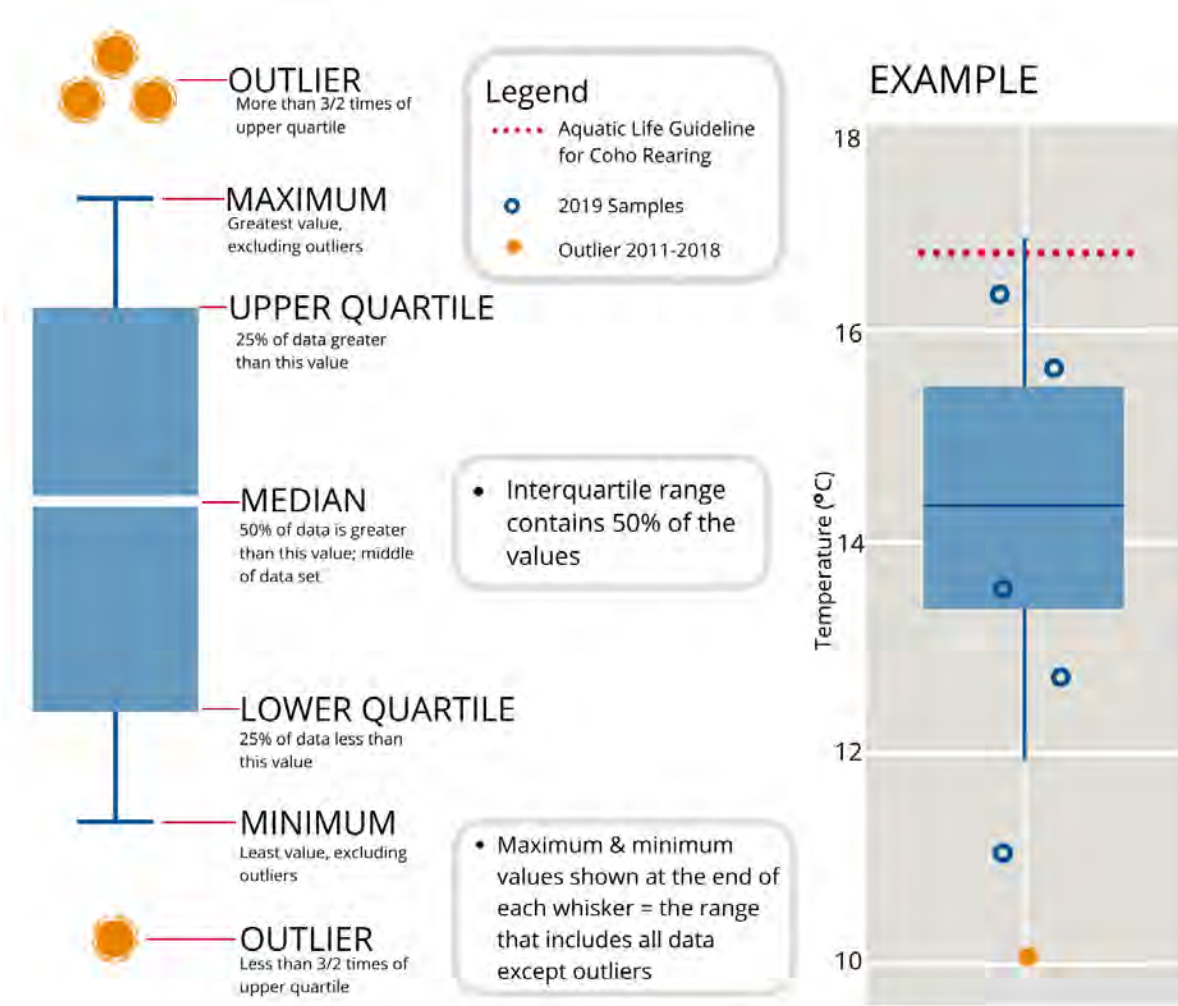
The table below shows the groups and sites monitored, as well as the number of years and which years a site was sampled. The number of years is important to keep in mind when interpreting the box plots as the plot for each site may contain a slightly different temporal range.

Group	EMS ID	Geographic Description	Years Sampled*	Years Monitored
IWFF	E321394	Beaver Creek d/s Avonlea Rd bridge	1	2020 - present
IWFF	E290478	Millstone River @ Biggs Road	9	2012 - present
IWFF	E306294	Millstone River @ Jingle Pot Road	5	2016 - present
IWFF	E290479	McGarrigle Ck @ Jingle Pot Rd	9	2012 - present
IWFF	E290480	Millstone River @ East Wellington	9	2012 - present
IWFF	E290481	Millstone River in Barsby Park	9	2012 - present
VIU	E290486	Cat Stream @ Park above confluence with Chase River	9	2012 - present
VIU	E290484	Chase River @Howard below colliery dam	9	2012 - present
VIU	E290485	Chase River @ Park Ave	9	2012 - present
VIU	E290483	Chase River @ Aebig	9	2012 - present
VIU	E309280	Chase River @ Estuary Park	4	2017 - present

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



How to Interpret a Box Plot:

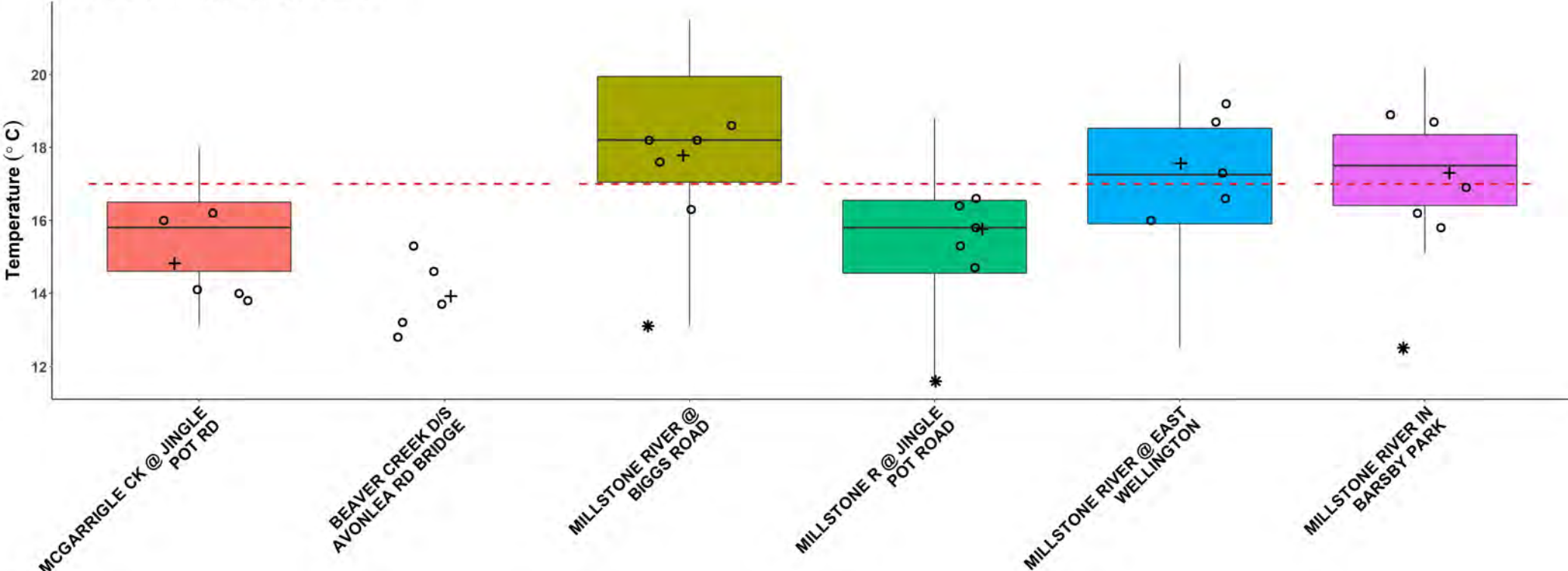


How to Interpret a Box Plot:

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 $\geq 5\text{NTU}$.



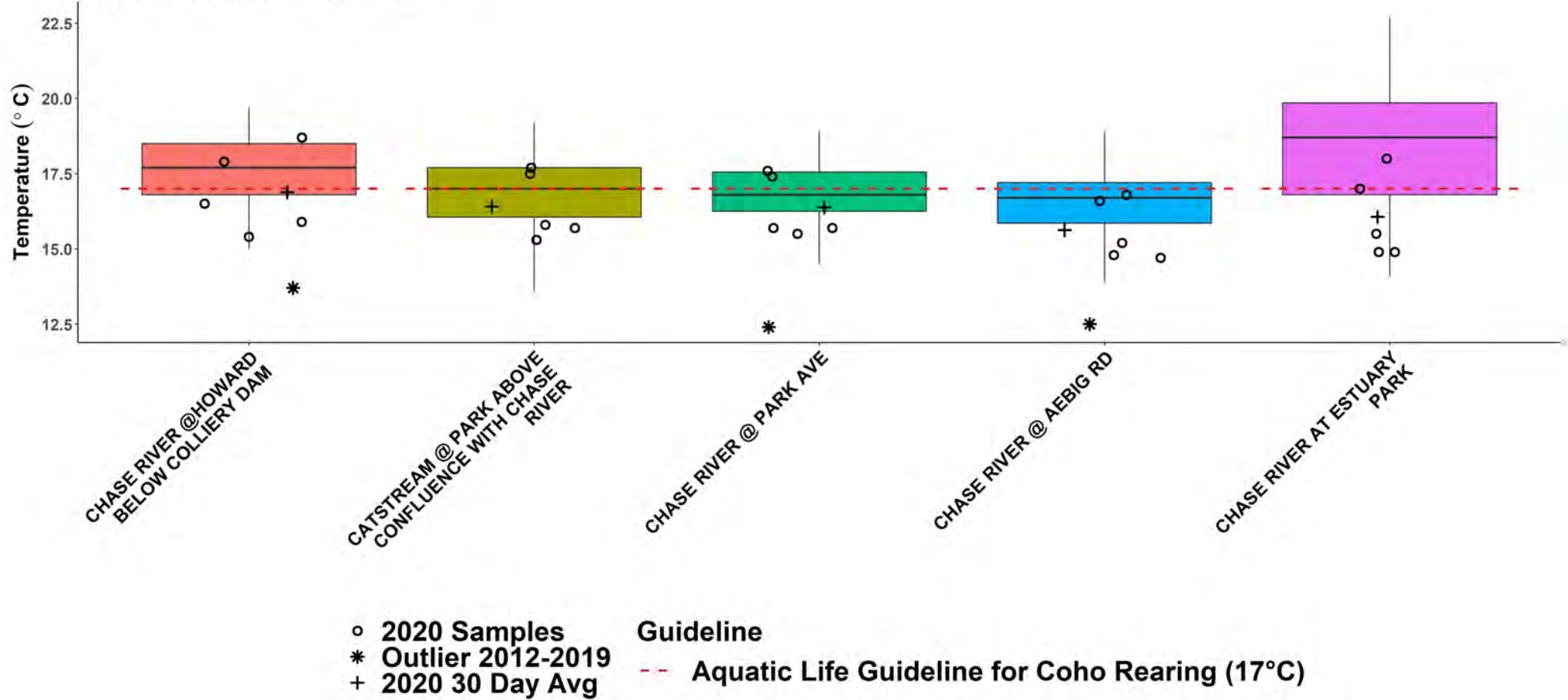
WR5-2a Summer Temperature



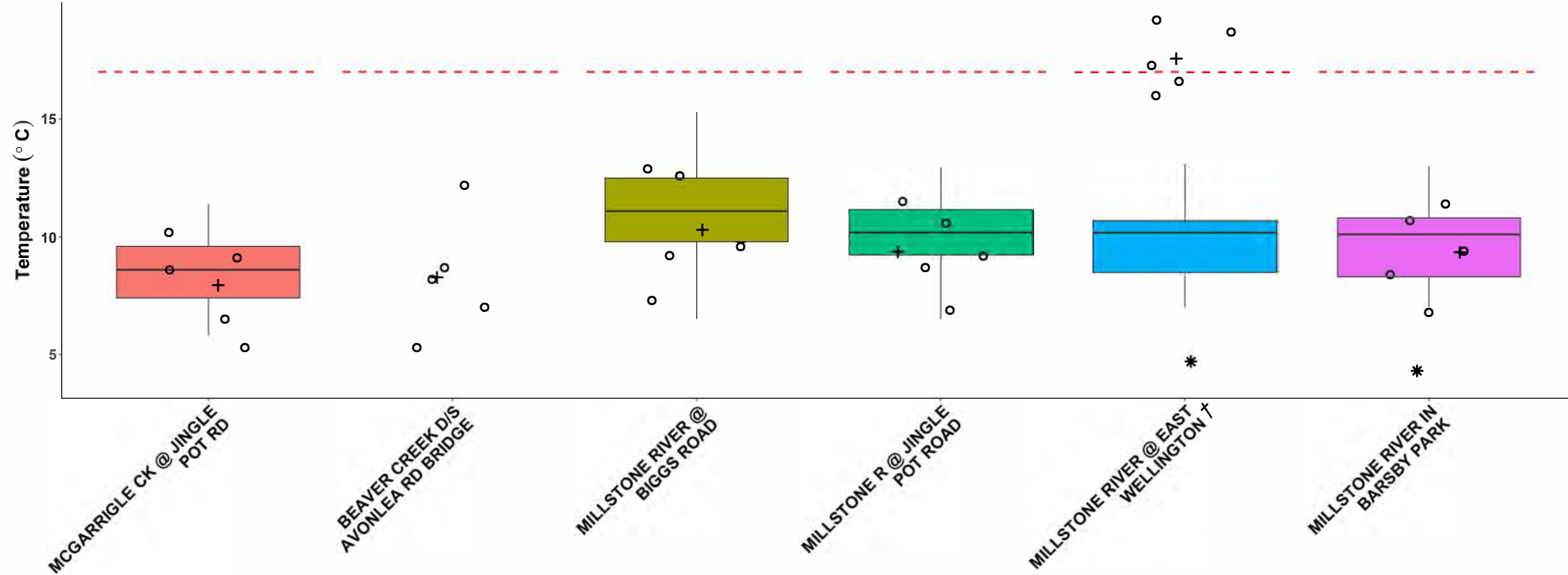
o 2020 Samples
* Outlier 2012-2019
+ 2020 30 Day Avg
-- Guideline Aquatic Life Guideline for Coho Rearing (17°C)



WR5-2b Summer Temperature



WR5-2a Fall Temperature

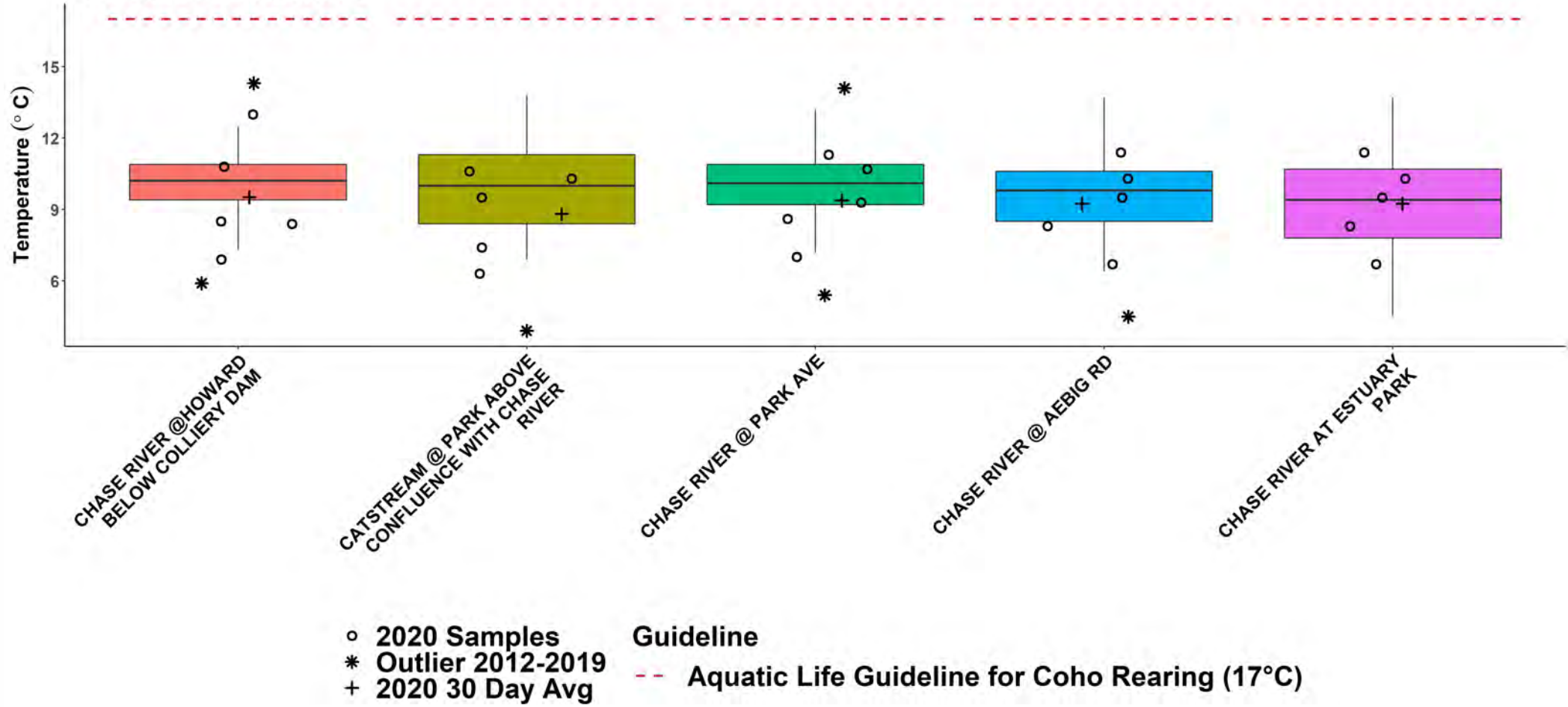


- 2020 Samples
- * Outlier 2012-2019
- + 2020 30 Day Avg
- Guideline
- Aquatic Life Guideline for Coho Rearing (17°C)

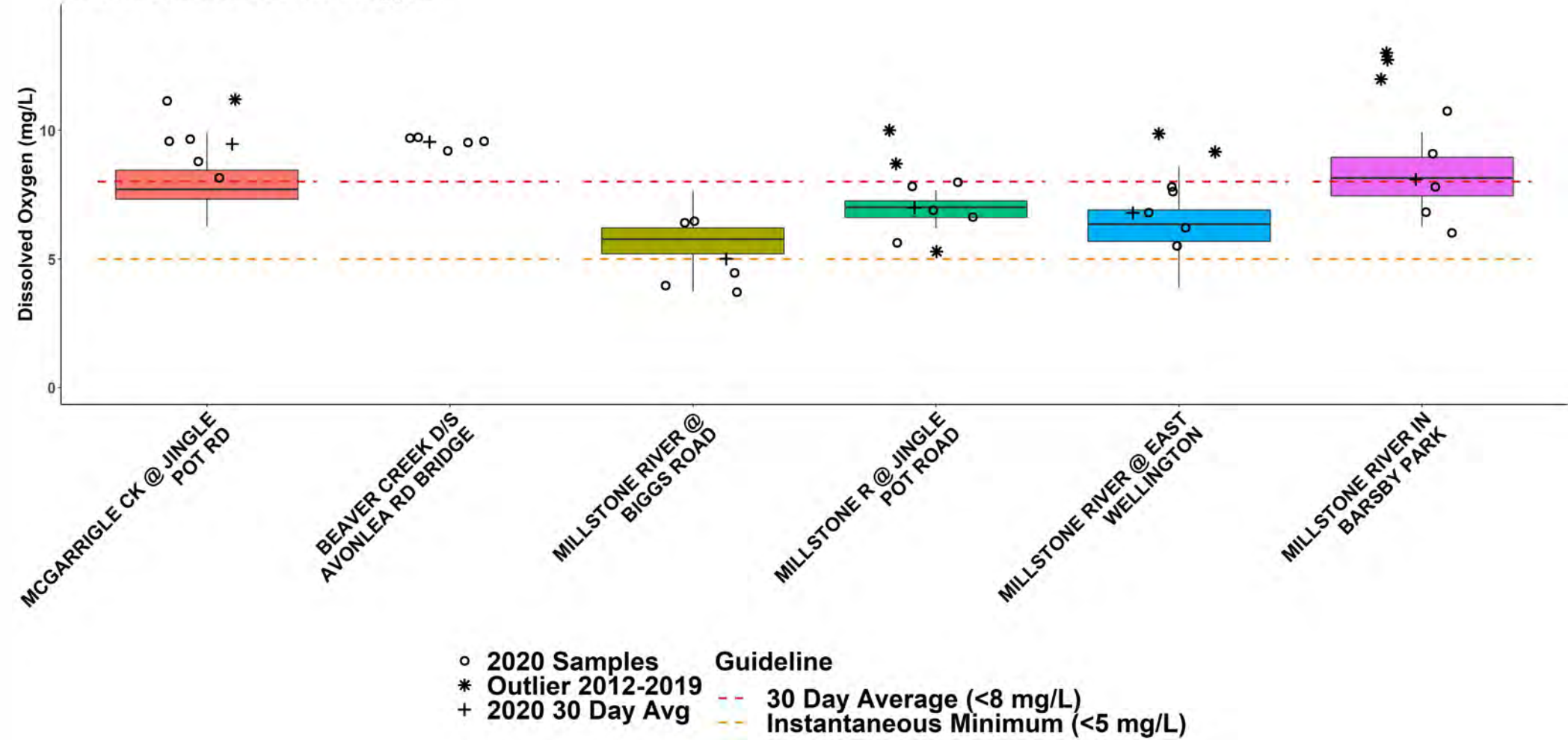
† Fall 2020 data for Millstone River at East Wellington was entered into the Environmental Monitoring System (EMS) database incorrectly prior to graph production, it has been corrected in the EMS database and the 2021 CWMN Data Analysis (2011 - 2020) Report.



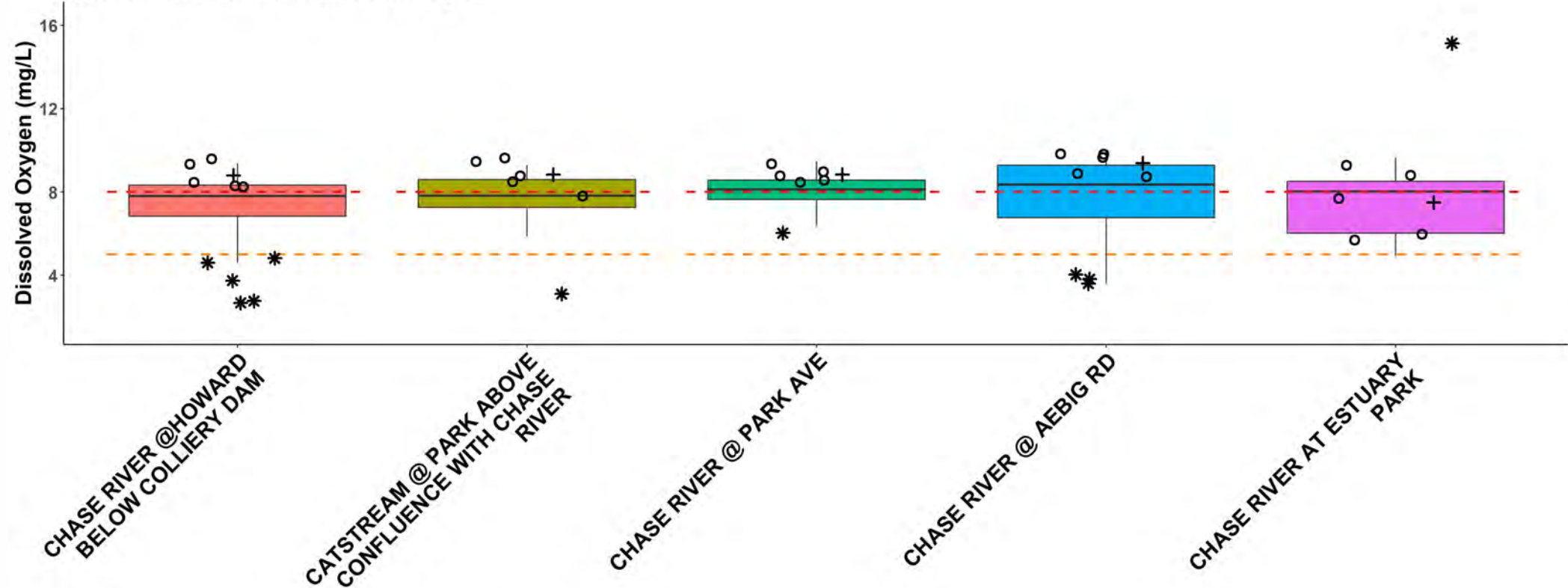
WR5-2b Fall Temperature



WR5-2a Summer Dissolved Oxygen



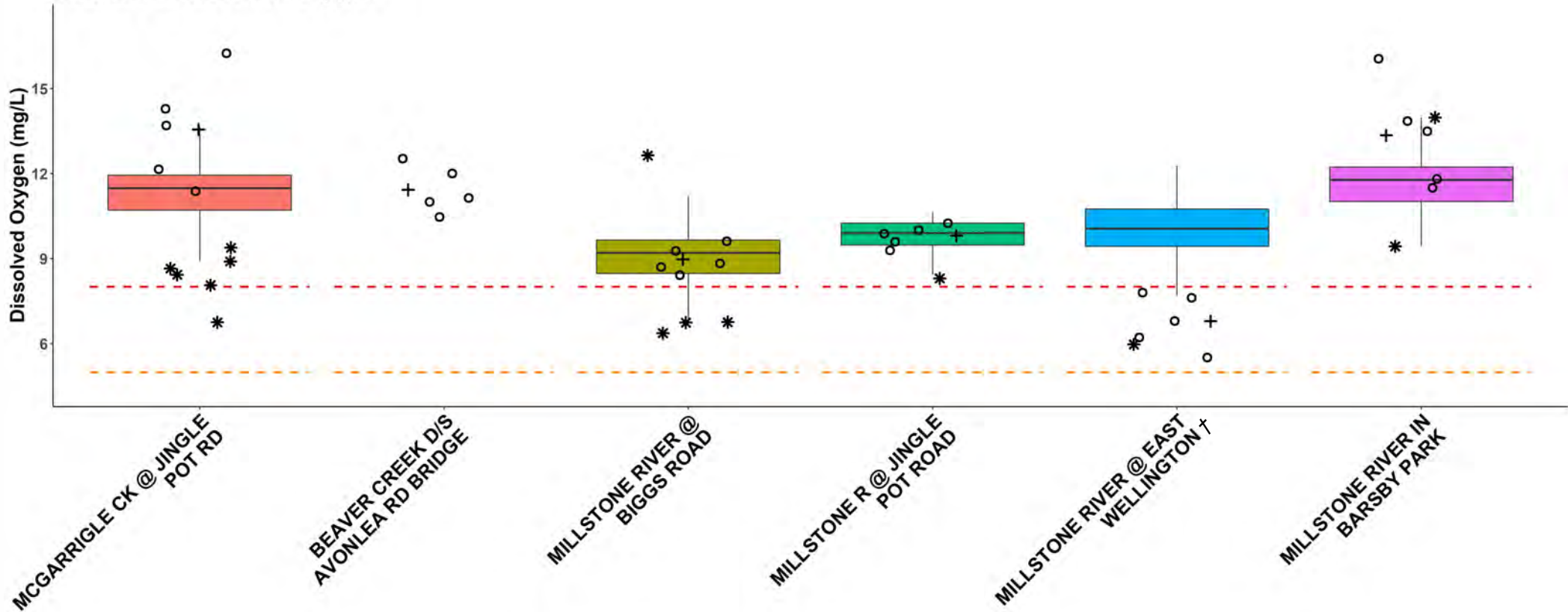
WR5-2b Summer Dissolved Oxygen



- 2020 Samples
 - * Outlier 2012-2019
 - + 2020 30 Day Avg
- Guideline**
- 30 Day Average (<8 mg/L)
 - Instantaneous Minimum (<5 mg/L)



WR5-2a Fall Dissolved Oxygen

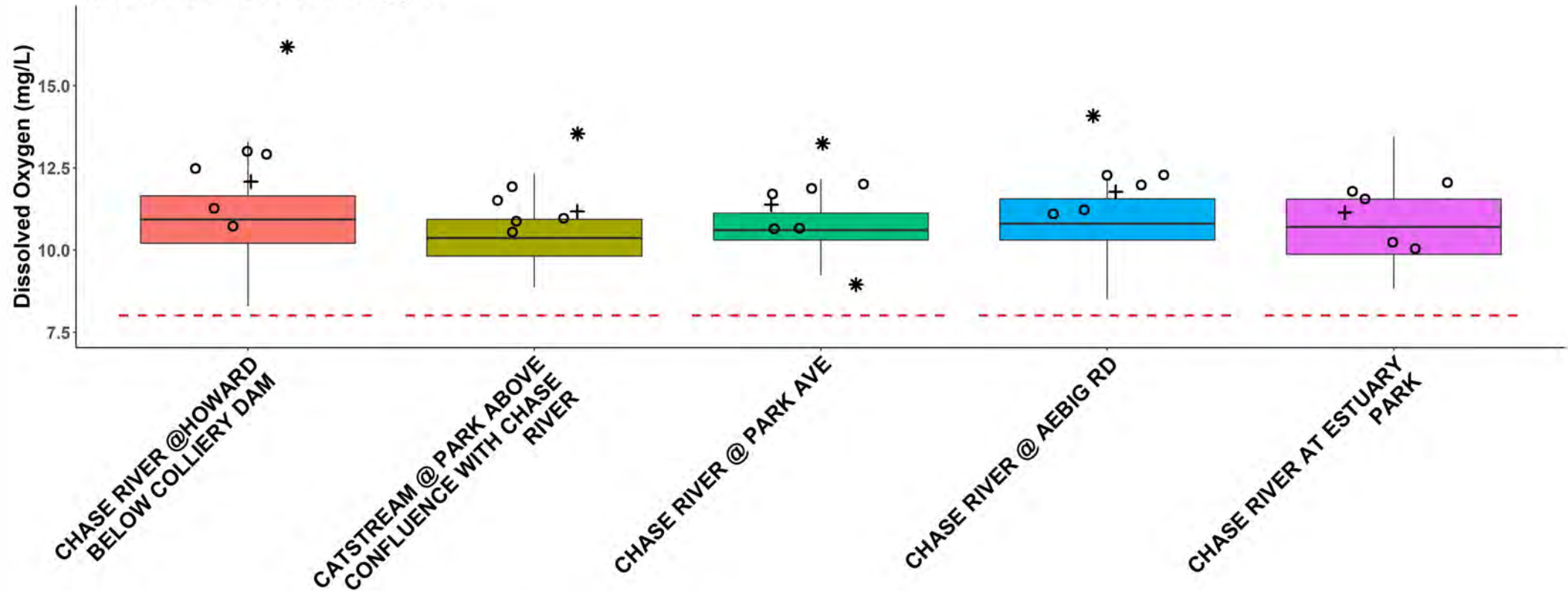


- 2020 Samples
- * Outlier 2012-2019
- + 2020 30 Day Avg
- Guideline
- - 30 Day Average (<8 mg/L)
- - Instantaneous Minimum (<5 mg/L)

†Fall 2020 data for Millstone River at East Wellington was entered into the Environmental Monitoring System (EMS) database incorrectly prior to graph production, it has been corrected in the EMS database and the 2021 CWMN Data Analysis (2011 - 2020) Report.



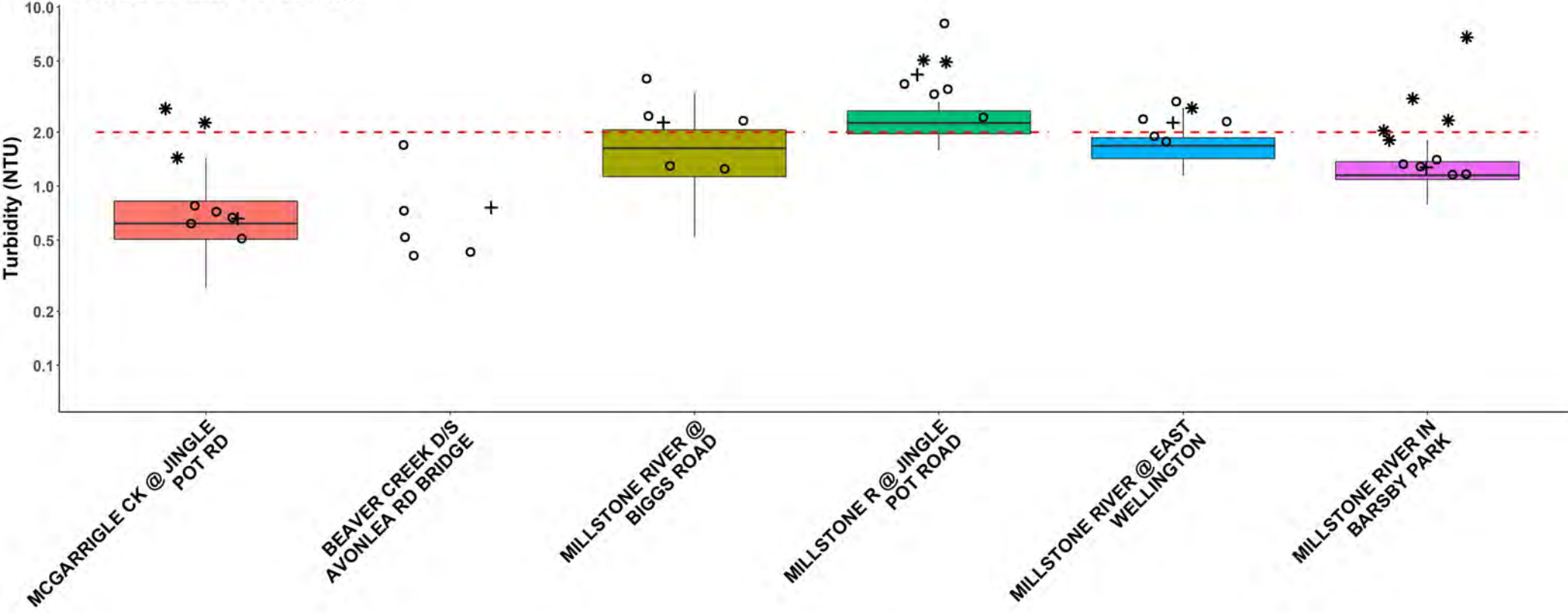
WR5-2b Fall Dissolved Oxygen



○ 2020 Samples
 * Outlier 2012-2019
 + 2020 30 Day Avg
 --- Guideline
 - - - 30 Day Average (<8 mg/L)
 - - - Instantaneous Minimum (<5 mg/L)



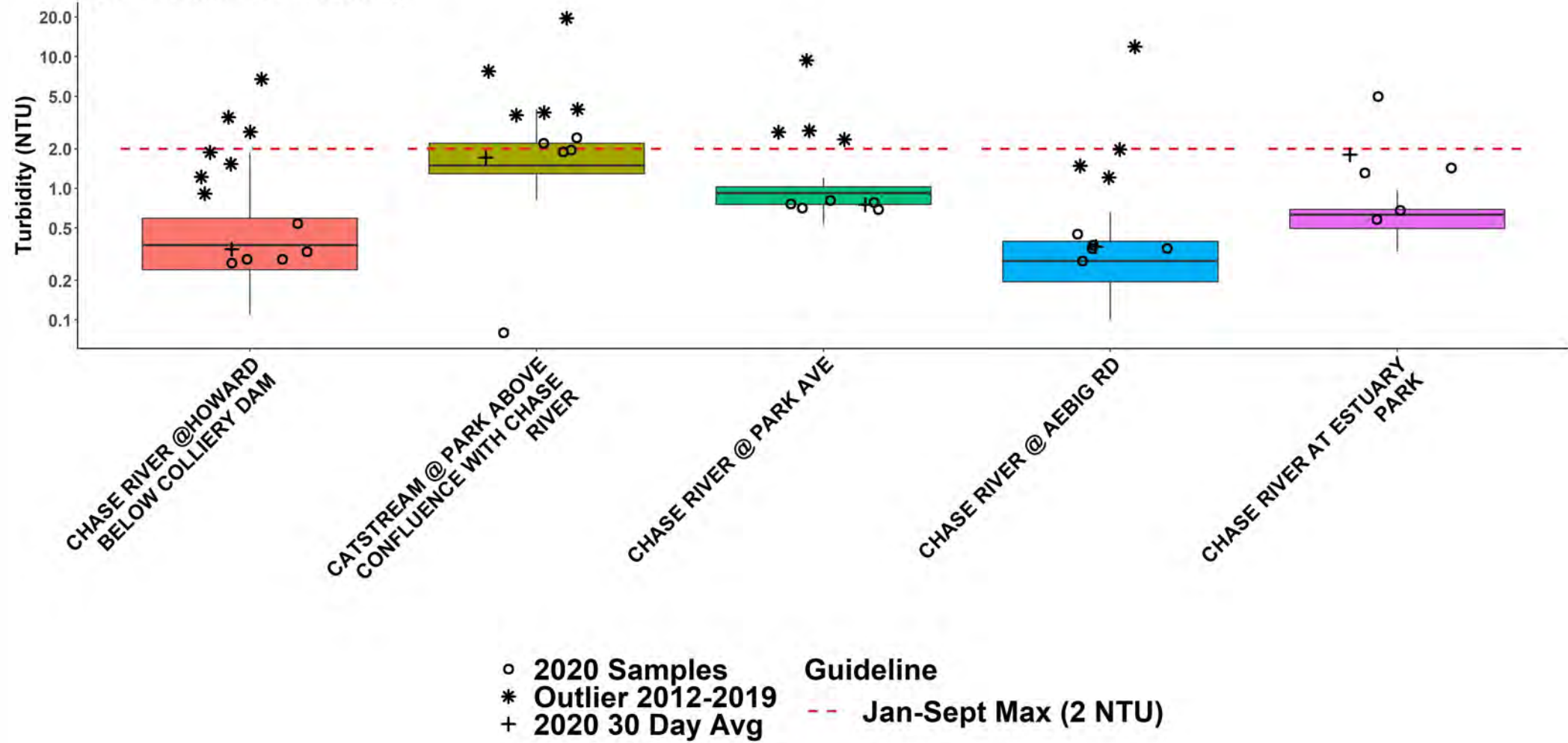
WR5-2a Summer Turbidity



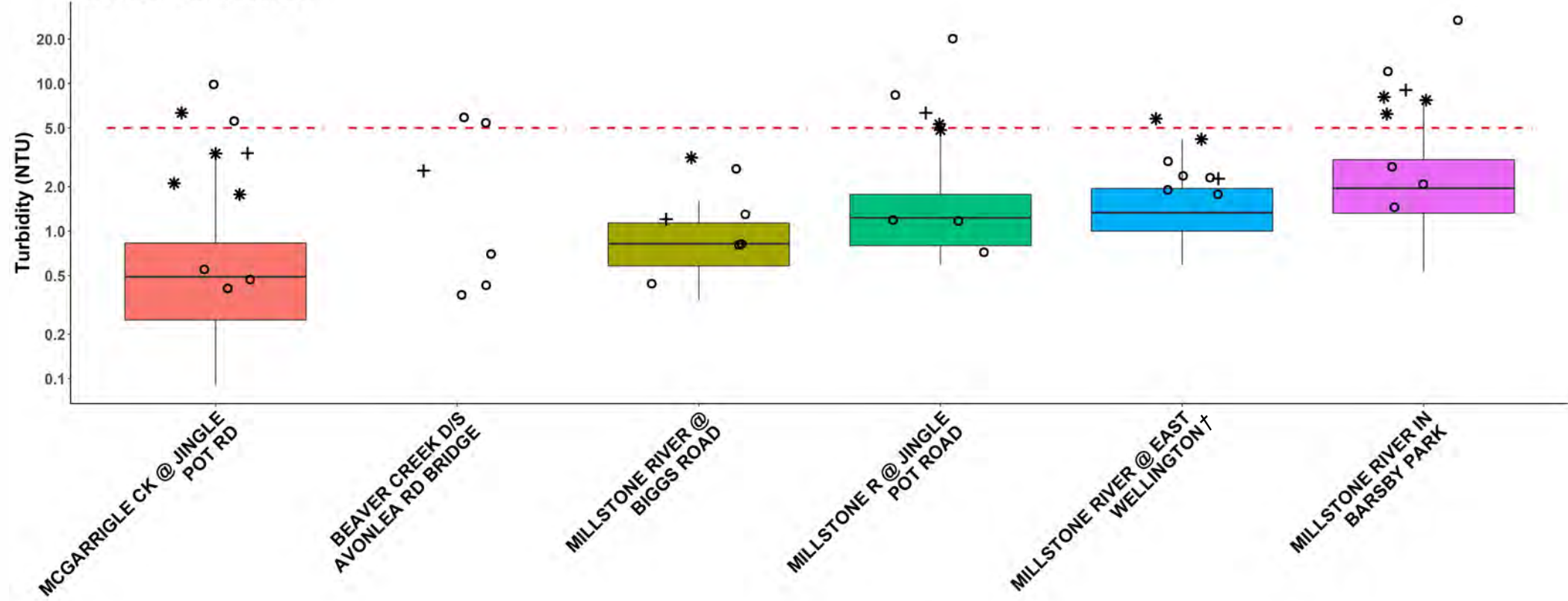
○ 2020 Samples
 * Outlier 2012-2019
 + 2020 30 Day Avg
 --- Guideline
 --- Jan-Sept Max (2 NTU)



WR5-2b Summer Turbidity



WR5-2a Fall Turbidity

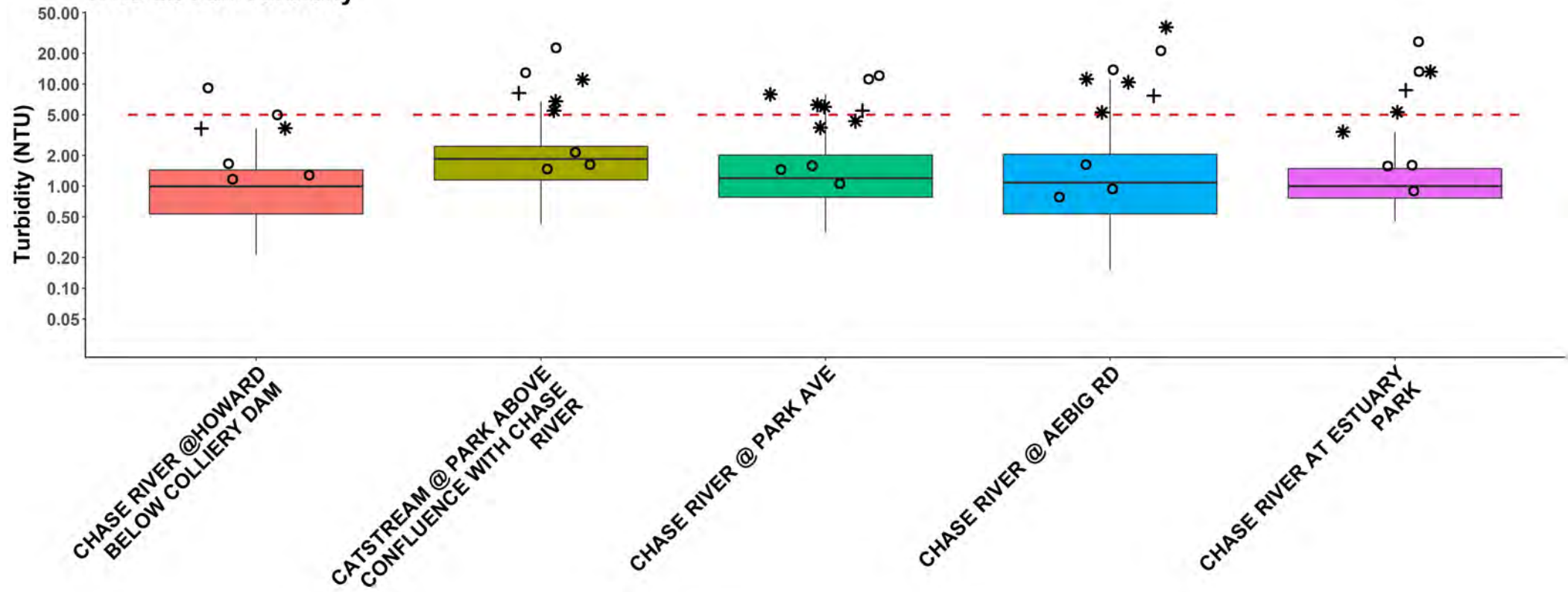


○ 2020 Samples
 * Outlier 2012-2019
 + 2020 30 Day Avg
Guideline
 - - Oct-Dec Max (5 NTU)

†Fall 2020 data for Millstone River at East Wellington was entered into the Environmental Monitoring System (EMS) database incorrectly prior to graph production, it has been corrected in the EMS database and the 2021 CWMN Data Analysis (2011 - 2020) Report.



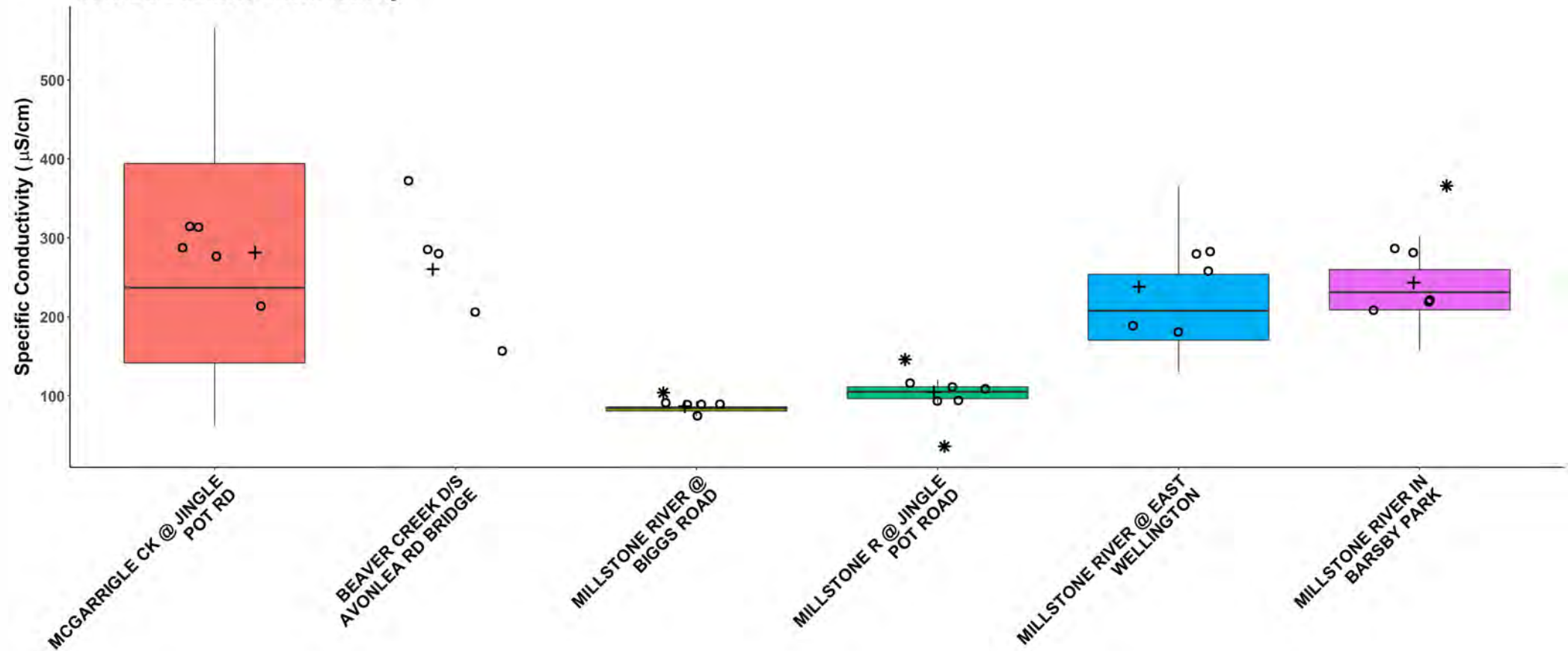
WR5-2b Fall Turbidity



- 2020 Samples
- * Outlier 2012-2019
- + 2020 30 Day Avg
- Guideline
- - Oct-Dec Max (5 NTU)



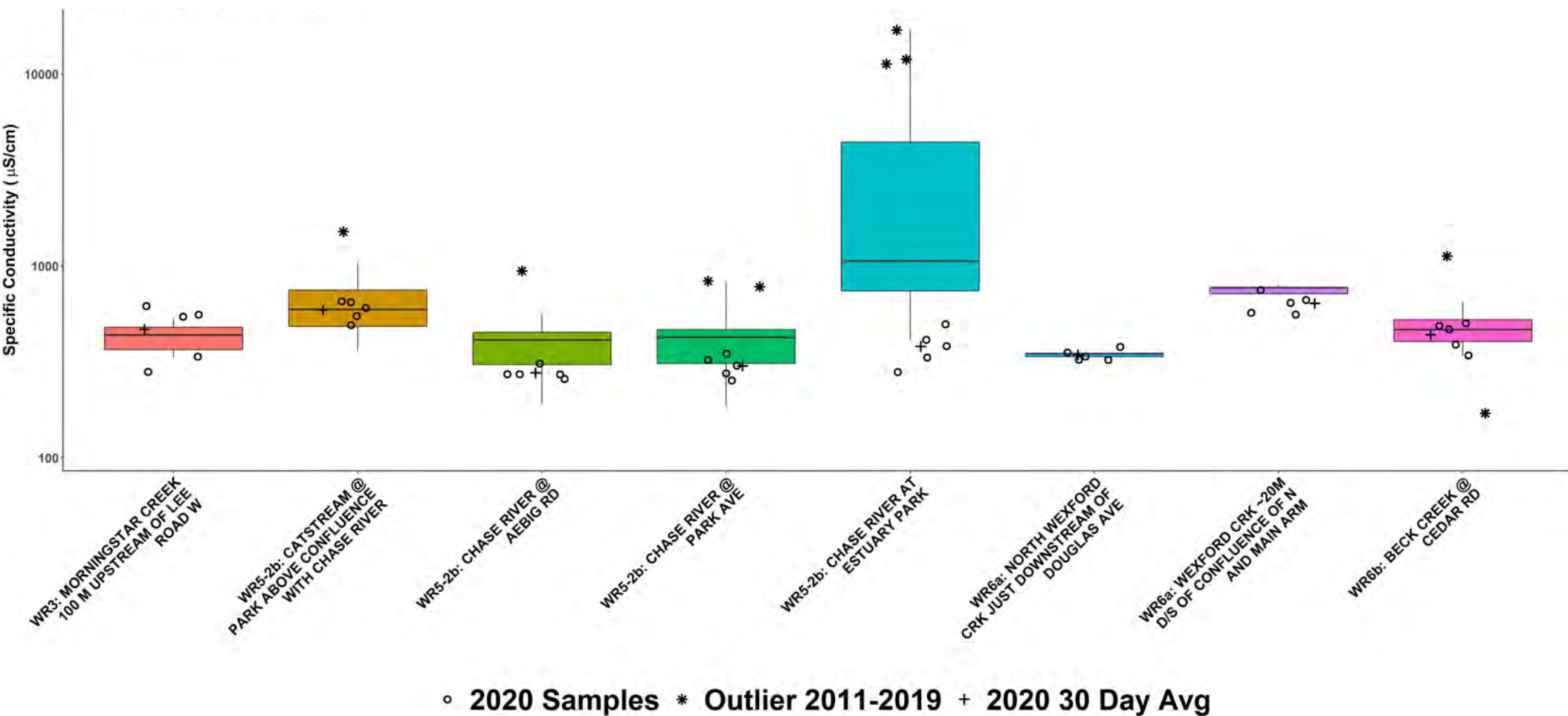
WR5-2a Summer Conductivity



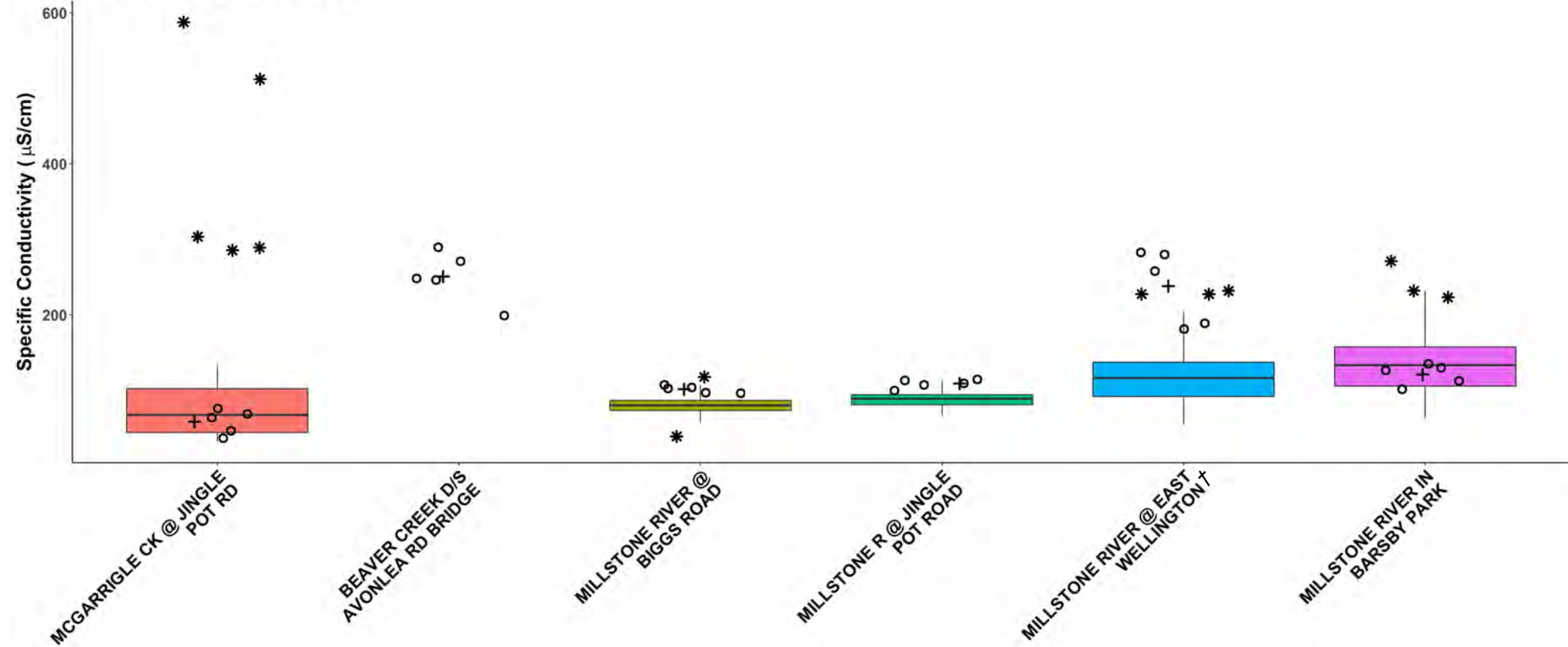
○ 2020 Samples * Outlier 2012-2019 + 2020 30 Day Avg



CWMN Sites with High Summer Conductivity



WR5-2a Fall Conductivity

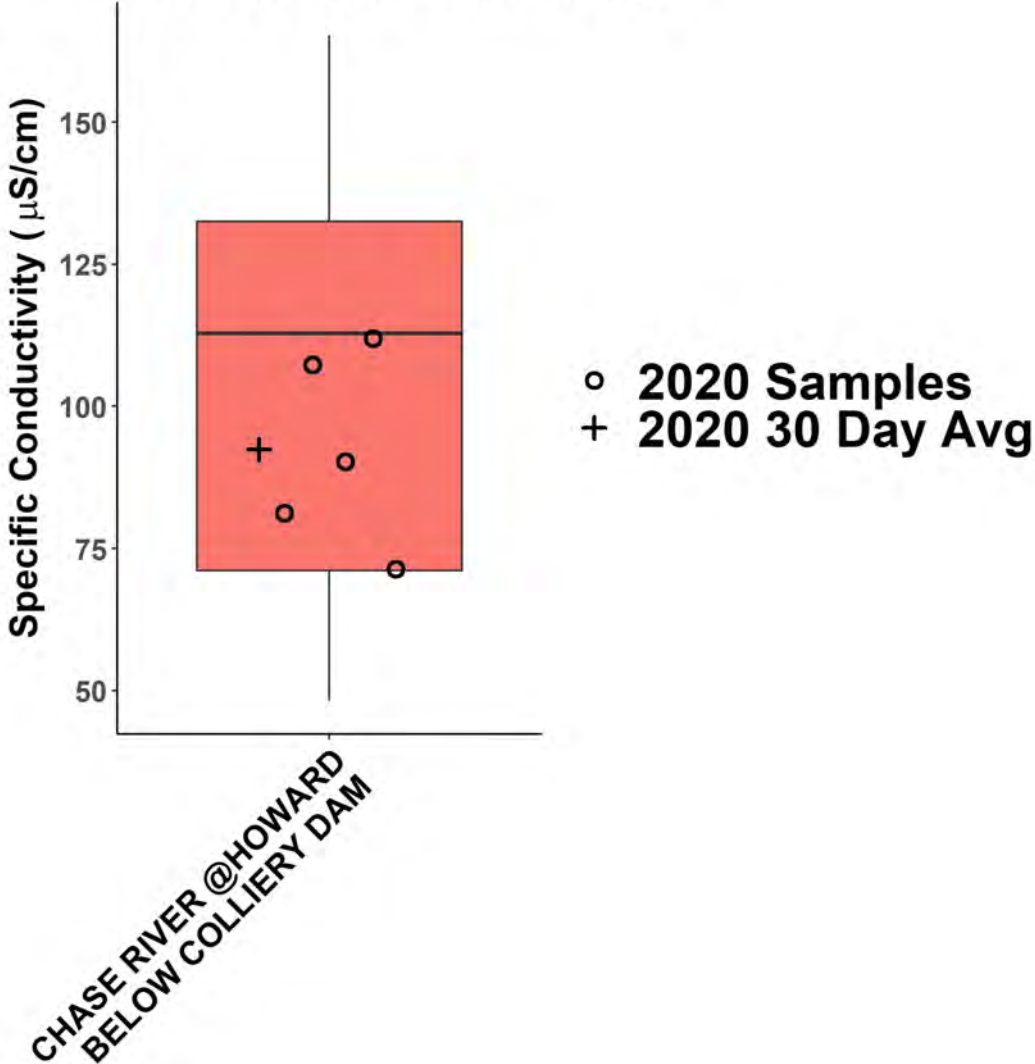


○ 2020 Samples * Outlier 2012-2019 + 2020 30 Day Avg

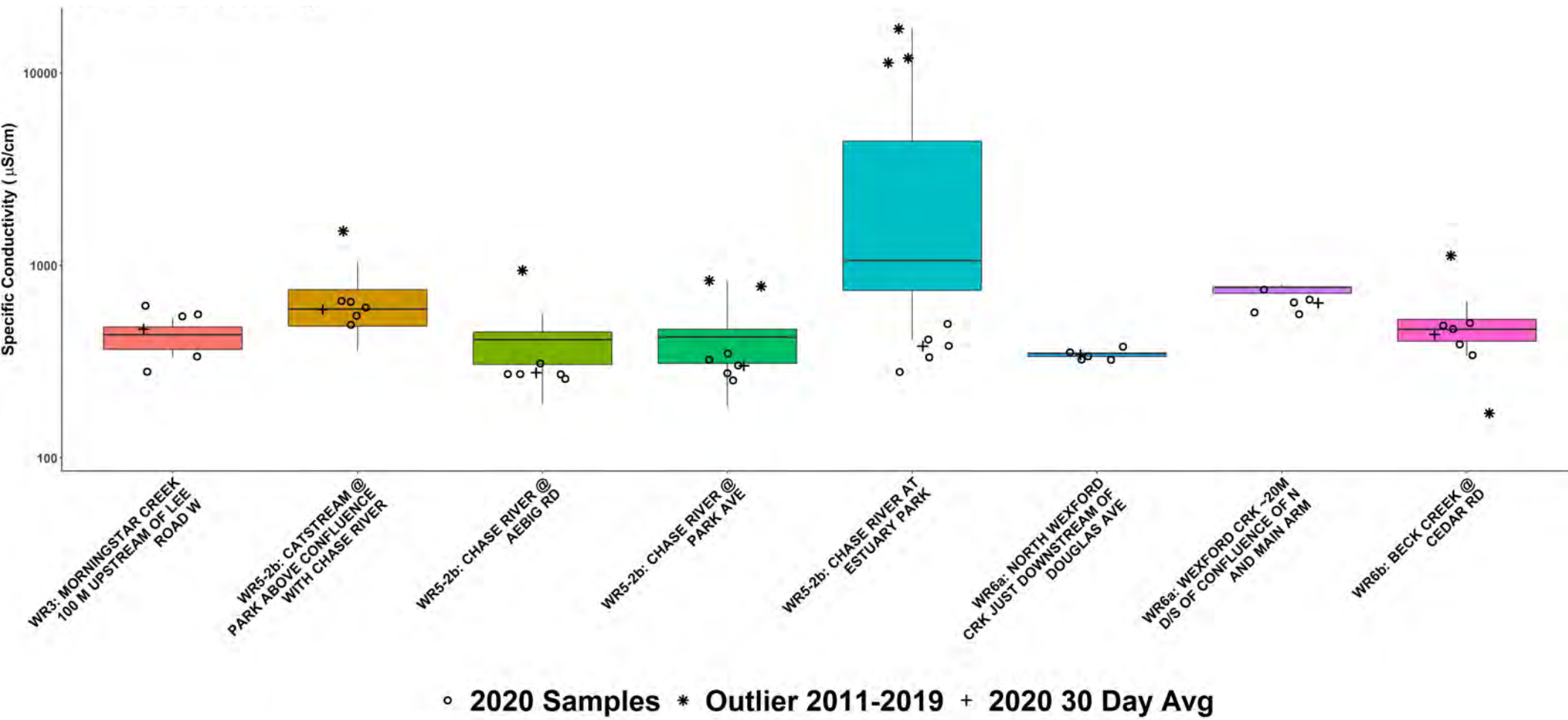
†Fall 2020 data for Millstone River at East Wellington was entered into the Environmental Monitoring Sysytem (EMS) database incorrectly prior to graph production, it has been corrected in the EMS database and the 2021 CWMN Data Analysis (2011 - 2020) Report.



WR5-2b Fall Conductivity



CWMN Sites with High Fall Conductivity












Regional District of Nanaimo

CMMN Water Quality Trend Analysis 2011-2020

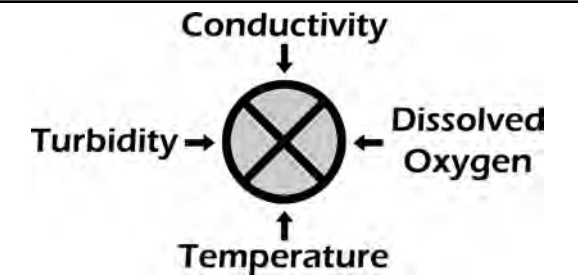
WR5-2: South Wellington to Nanoose

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

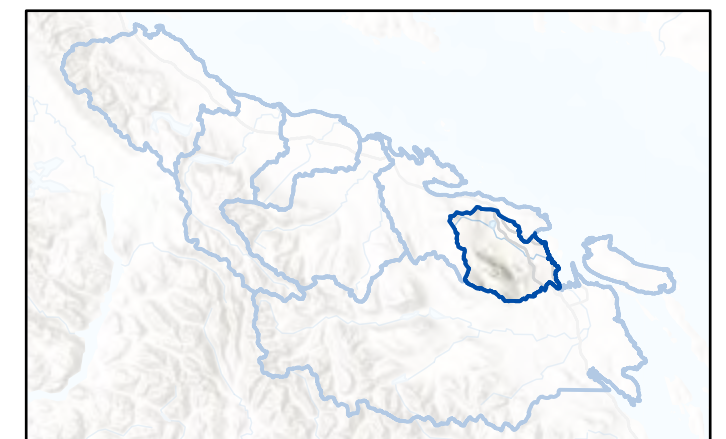
SAMPLE SITE KEY



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.

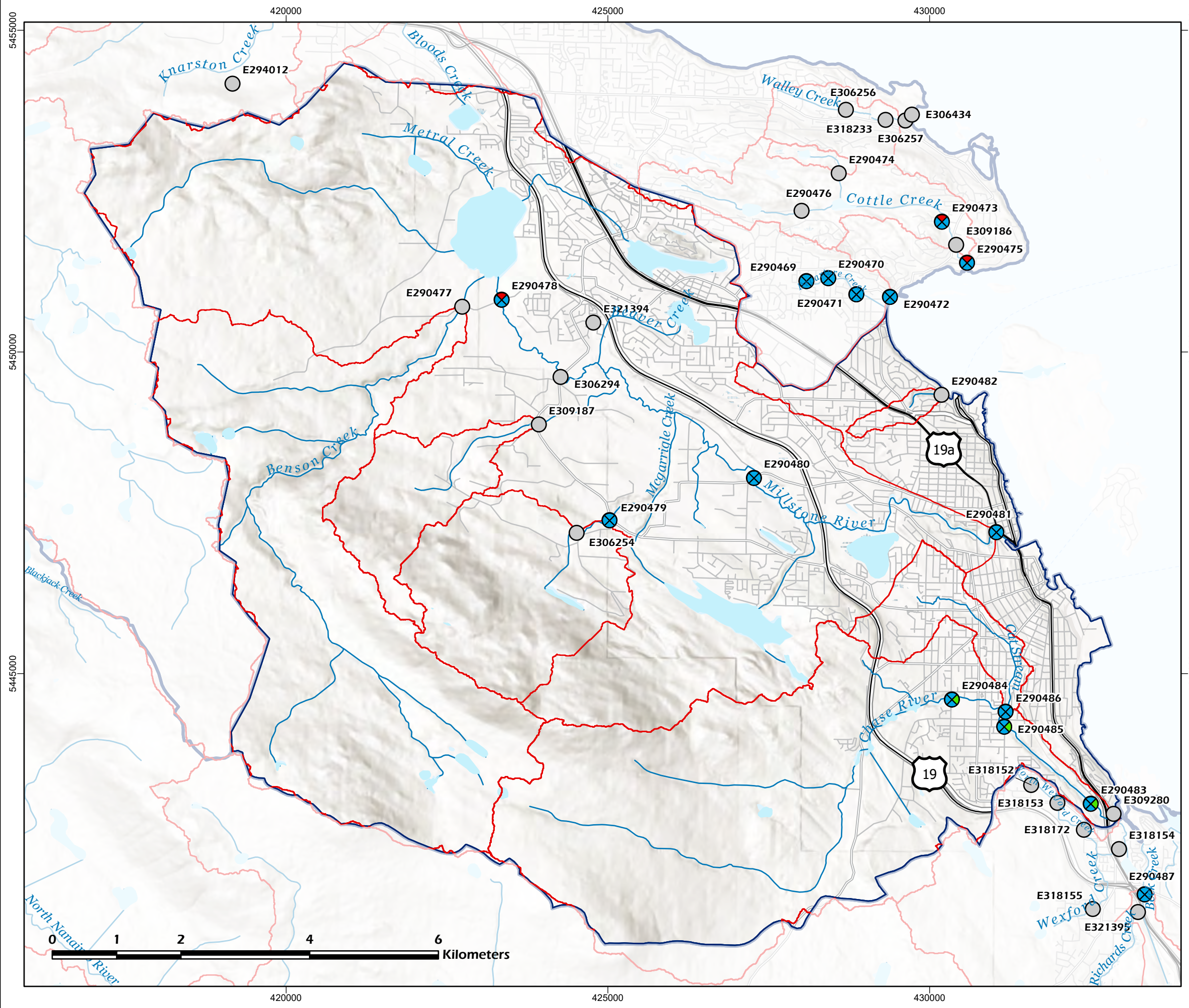
MAP INDEX

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



DISCLAIMER

The data displayed is for conceptual purposes only and should not be interpreted as a legal survey or for legal purposes. If discrepancies are found between the data portrayed in this report and that of a legal survey, the legal survey will superseded any data presented herein.



Regional District of Nanaimo

CMMN 2011-2020 Summer Exceedance Assessment

WR5-2: South Wellington to Nanoose

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

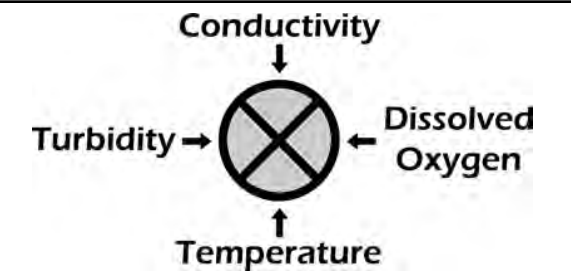
LEGEND

- 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.*

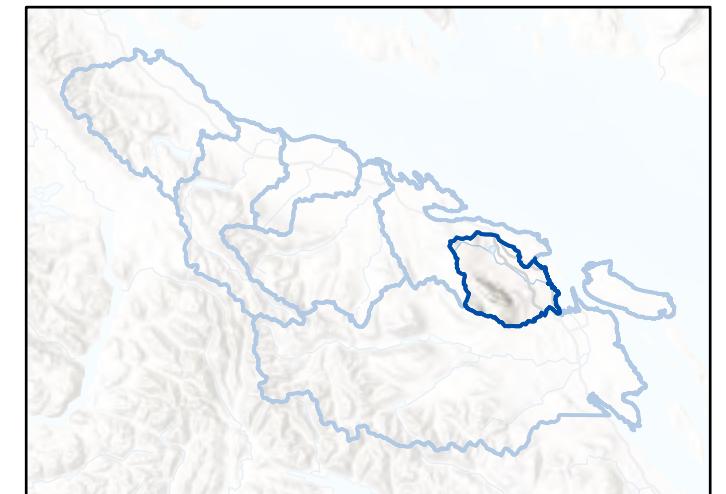
Exceedance colour key

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

SAMPLE SITE KEY

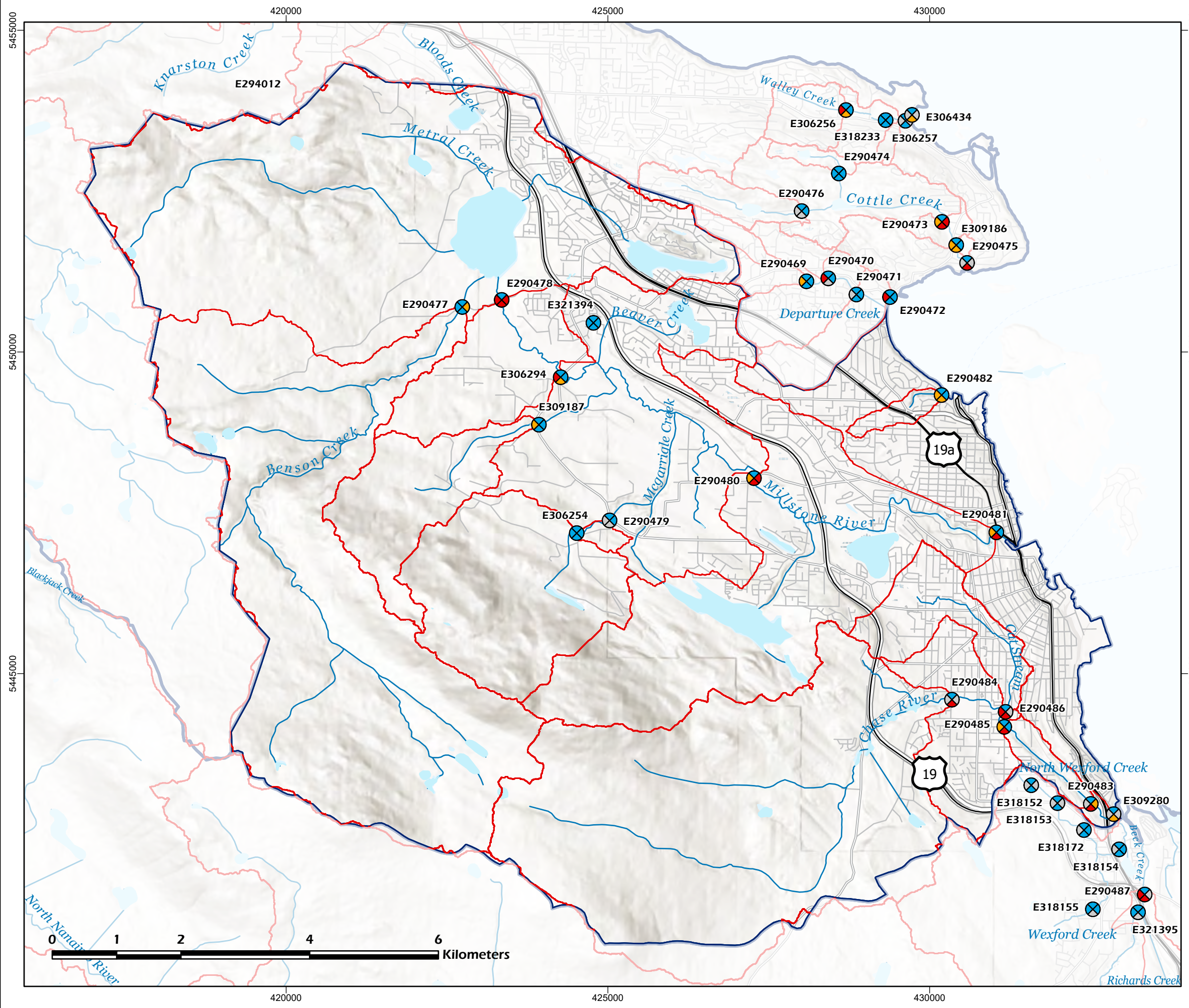


MAP INDEX



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Regional District of Nanaimo

CMMN 2011-2020 Fall Exceedance Assessment





WR5-2: South Wellington to Nanoose

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

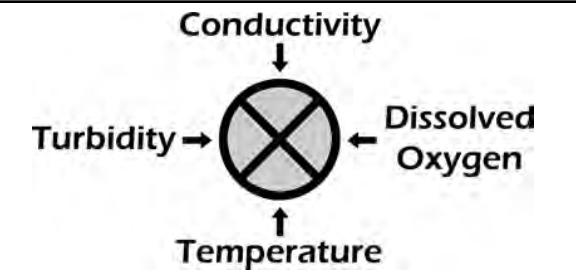
LEGEND

-  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

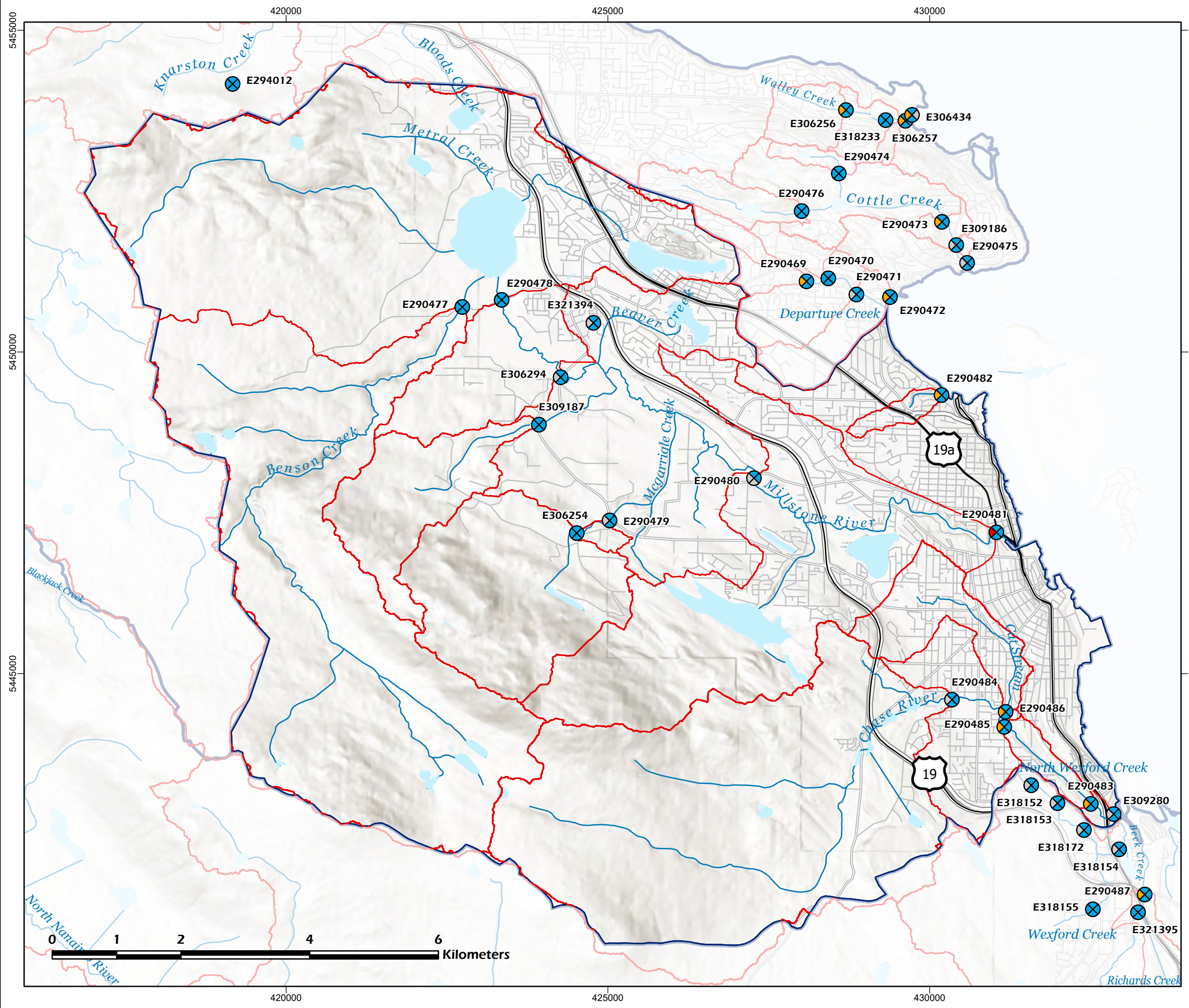


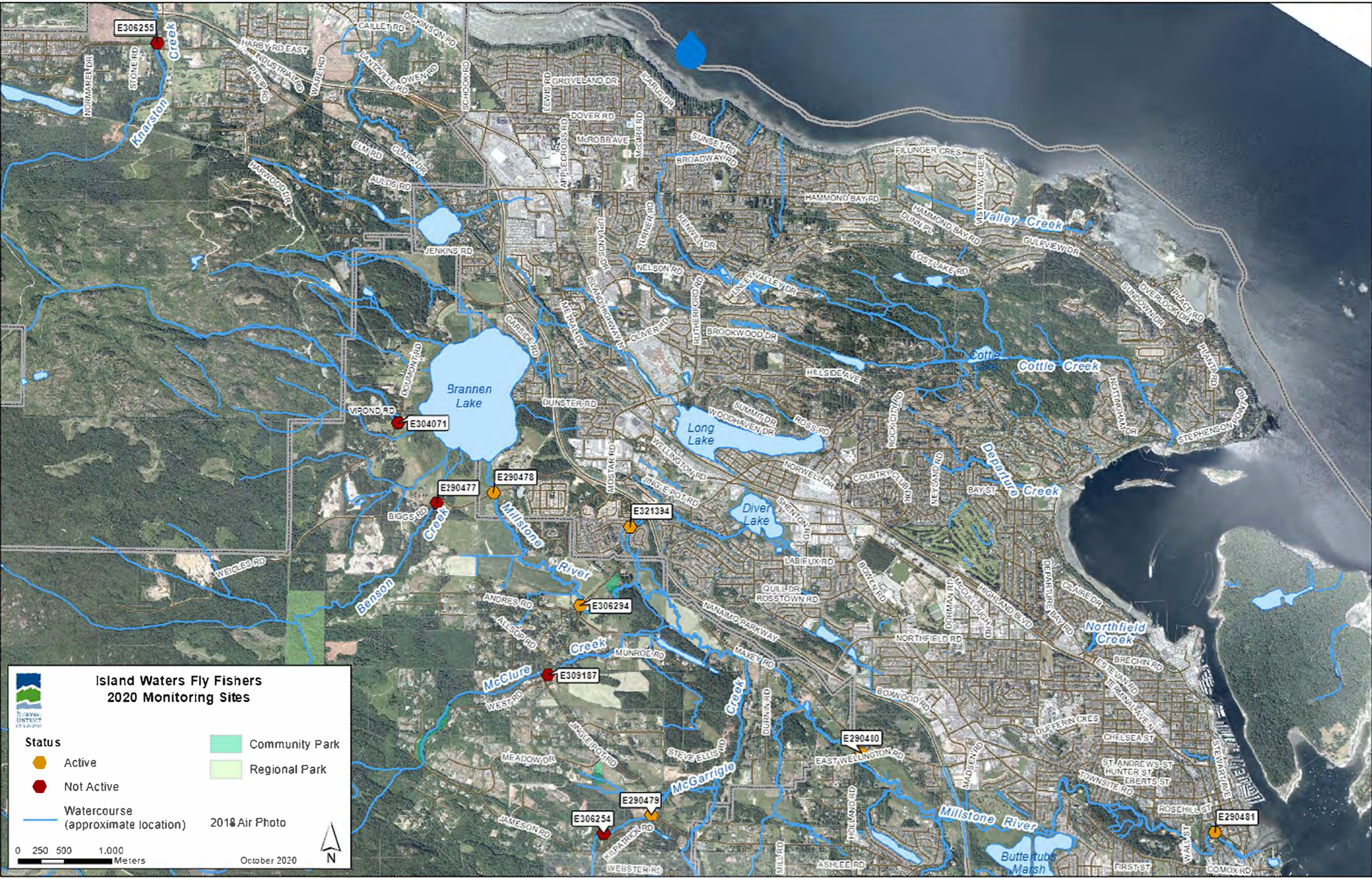
MAP INDEX



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**Island Waters Fly Fishers
2020 Monitoring Sites**

Status

- Active
- Not Active

Watercourse
(approximate location)

Community Park (light green)

Regional Park (medium green)


2019 Air Photo

0 250 500 1,000 Meters

October 2020

N




Vancouver Island University
 Coastal Hydrology and Climate Change
 Research Lab
 2020 Monitoring Sites

Status
● Active
● Not Active

— Watercourse
 (approximate location)

0 100 200 400 Meters
 July 2019

