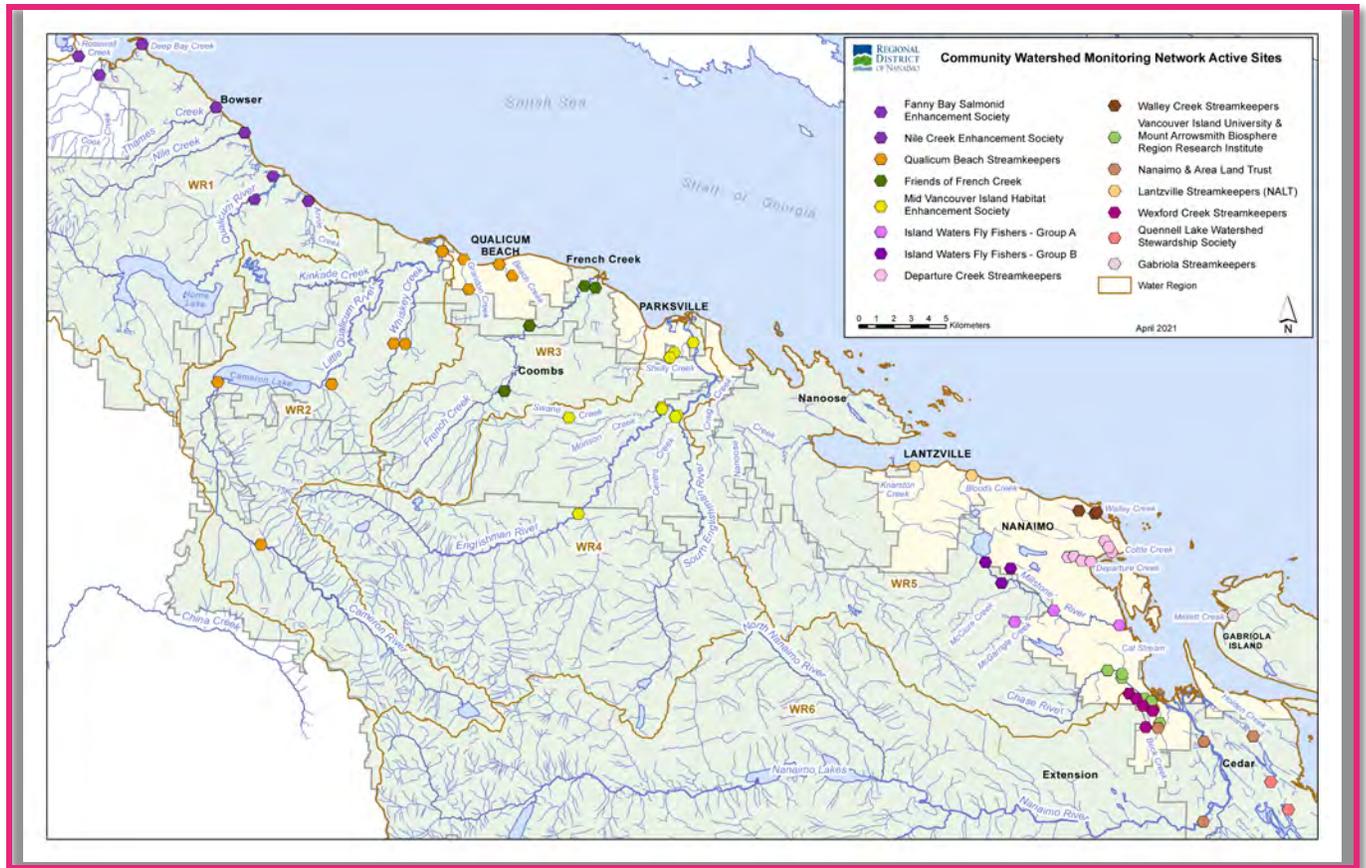


Community Watershed Monitoring Network 2020

Results by Water Region



Included in your Water Region Package:

1. CWMN Sample Sites in Water Region (WR) 4
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. MVIHES Site Map



Water Region 4
sampled by:
**Mid Vancouver Island
Habitat Enhancement Society
(MVIHES)**



CWMN Sample Sites in WR 4:

The table below shows the group 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.

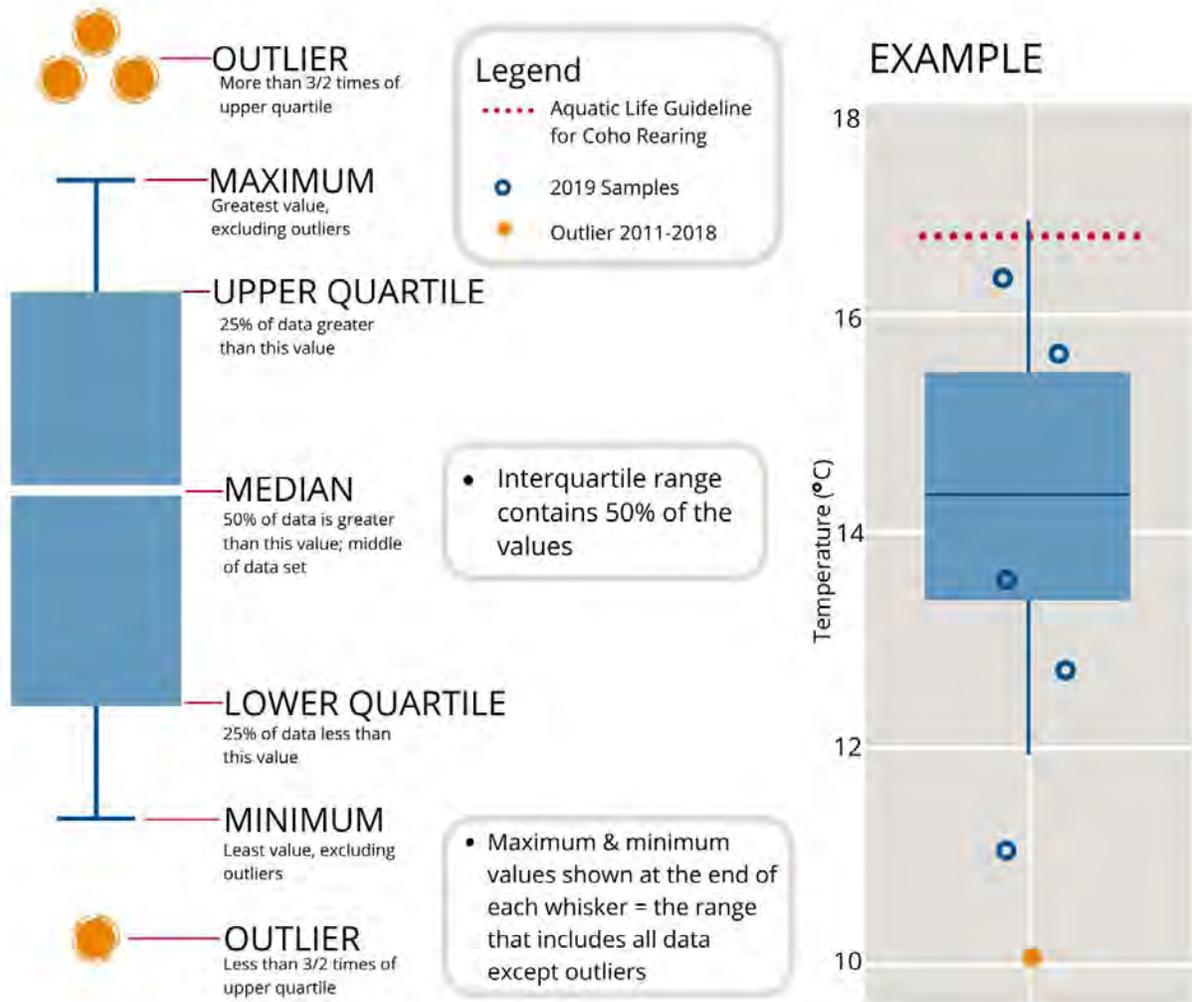
Group	EMS ID	Geographic Description	Years Sampled*	Years Monitored
MVIHES	E282969	Upper Englishman River u/s Centre Fork Creek	10	2011 - present
MVIHES	E308186	Swayne Creek d/s of Errington Road	7	2014 - present
MVIHES	E248835	Morison Creek U/S from Englishman River	10	2011 - present
MVIHES	E248834	Englishman River U/S from Morison Creek	10	2011 - present
MVIHES	E299852	Centre Creek, just upstream of the confluence with S Englishman	7	2014 - present
MVIHES	E248836	South Englishman River u/s from Englishman River	10	2011 - present
MVIHES	E287131	Shelly Creek @ Hamilton Road	7	2014 - present
MVIHES	0121580	Englishman River at Highway 19A	10	2011 - Present
MVIHES	E290452	Shelly Creek at end of Blower Road	6.5	2014 - present~

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

~Fall 2015 was not monitored in order to complete restoration work.



How to Interpret a Box Plot:

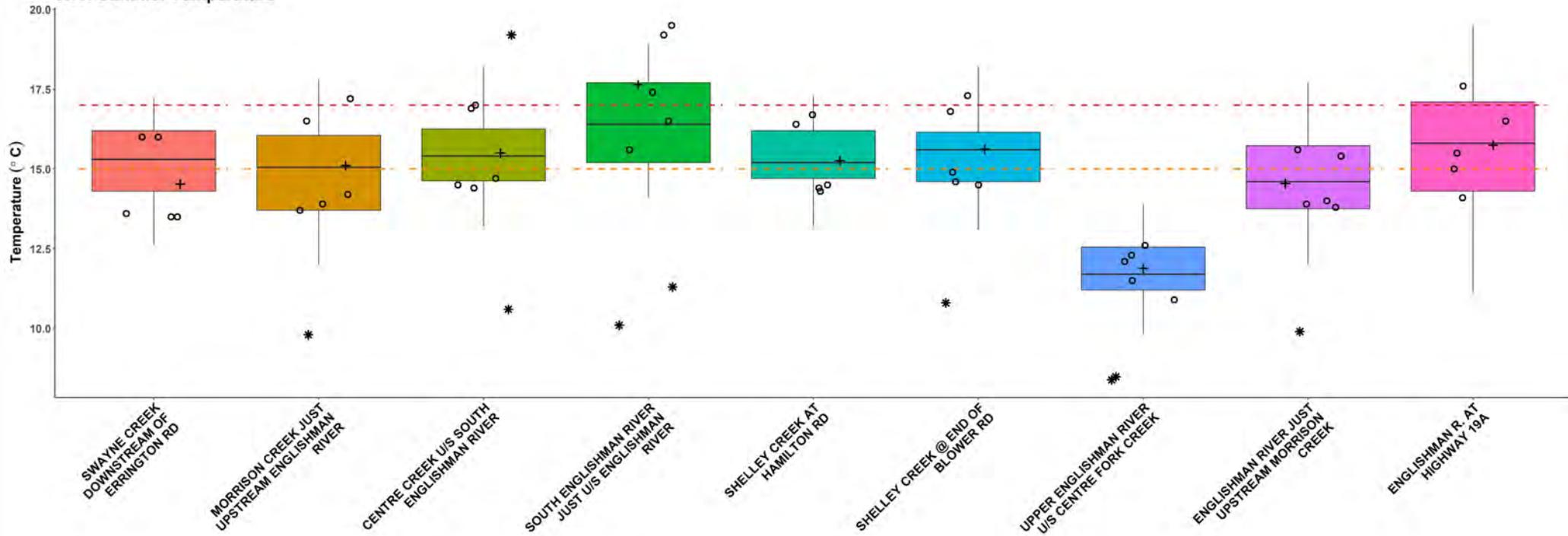


How to Interpret Summer and Fall Exceedance Maps:

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 $\geq 5\text{NTU}$.



WR4 Summer Temperature



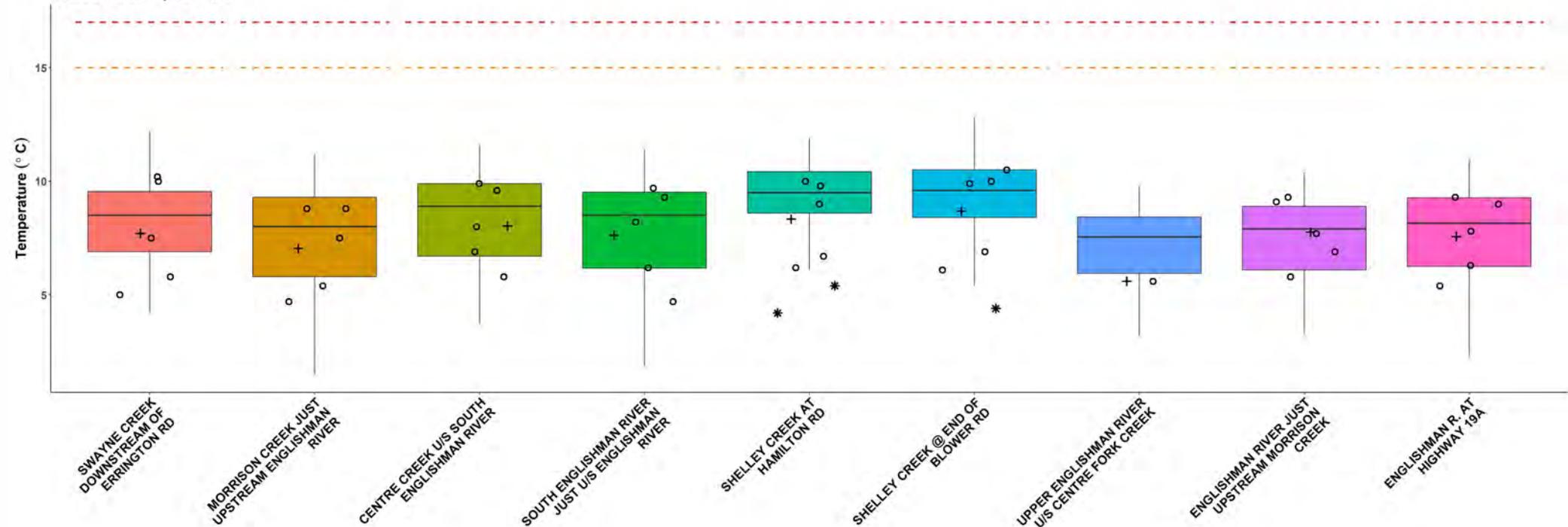
○ 2020 Samples
 * Outlier 2011-2019
 + 2020 30 Day Avg

Guideline

- - Aesthetic Drinking Water Objective (15°C)
 - - Aquatic Life Guideline for Coho Rearing (17°C)



WR4 Fall Temperature



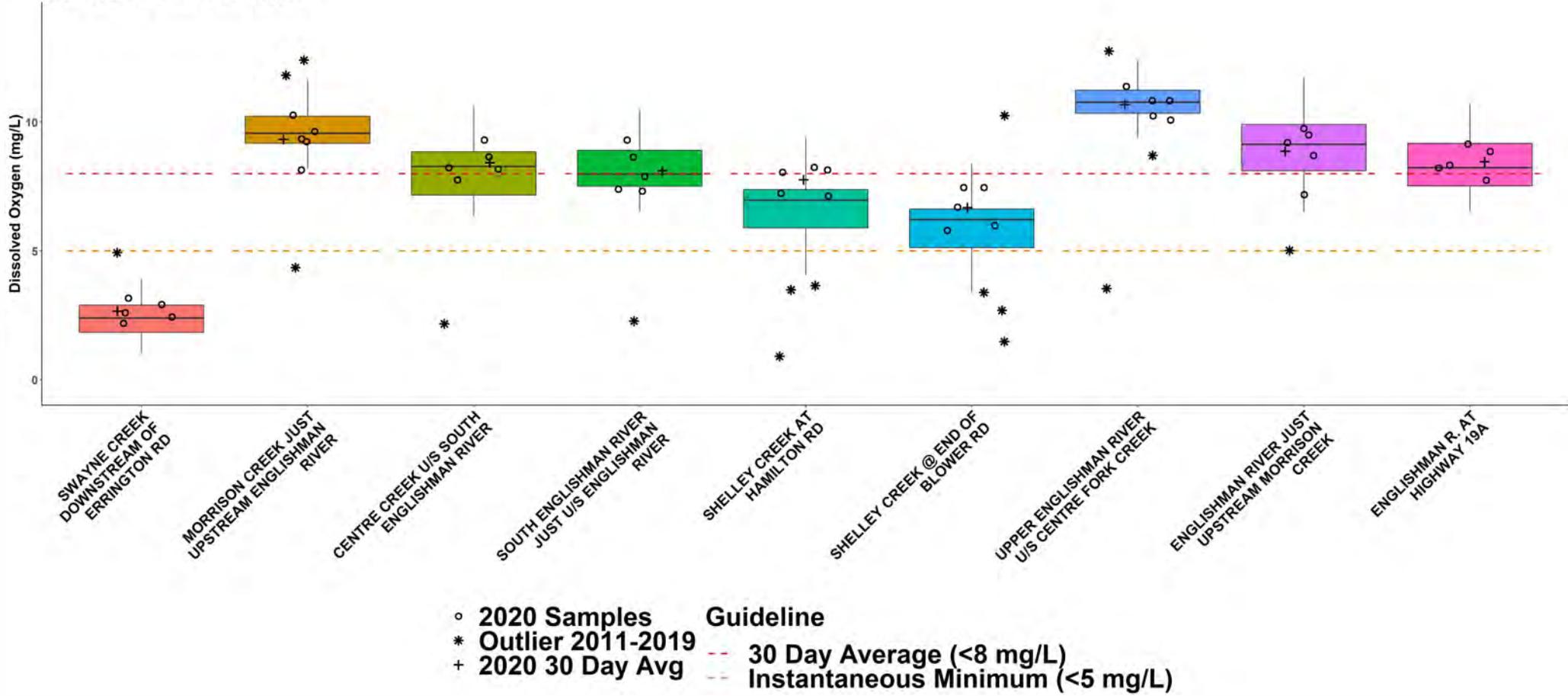
○ 2020 Samples
 * Outlier 2011-2019
 + 2020 30 Day Avg

Guideline

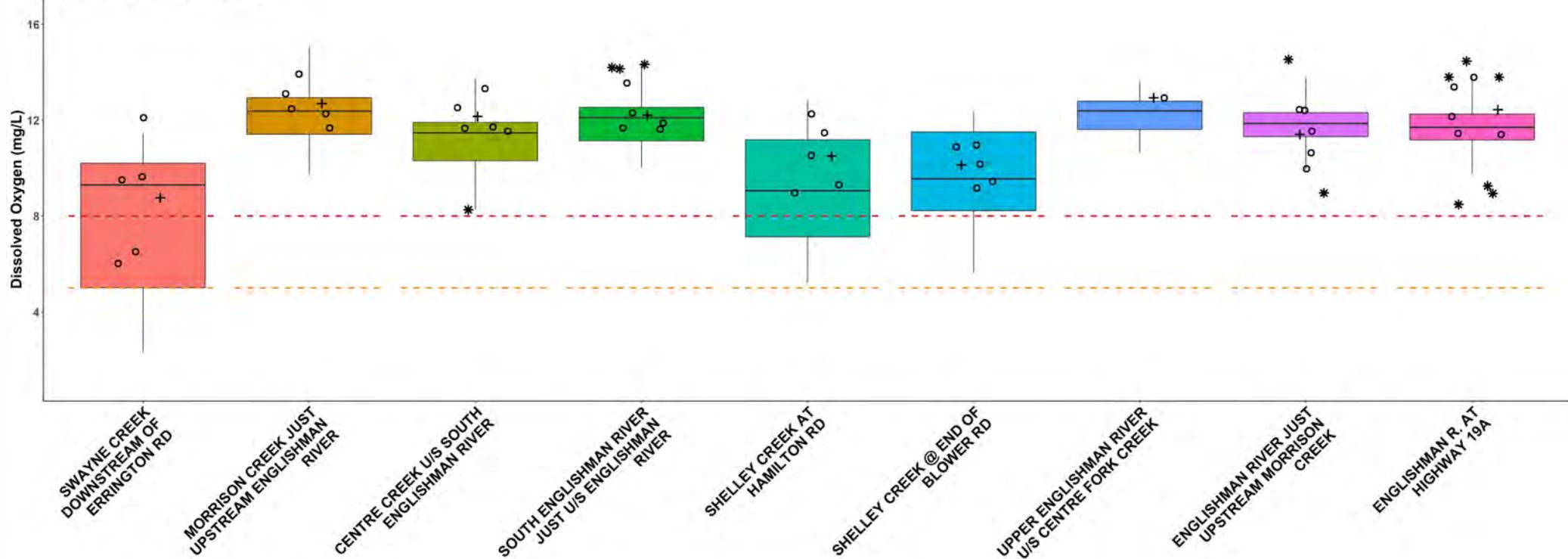
- - Aesthetic Drinking Water Objective (15°C)
 - - Aquatic Life Guideline for Coho Rearing (17°C)



WR4 Summer Dissolved Oxygen



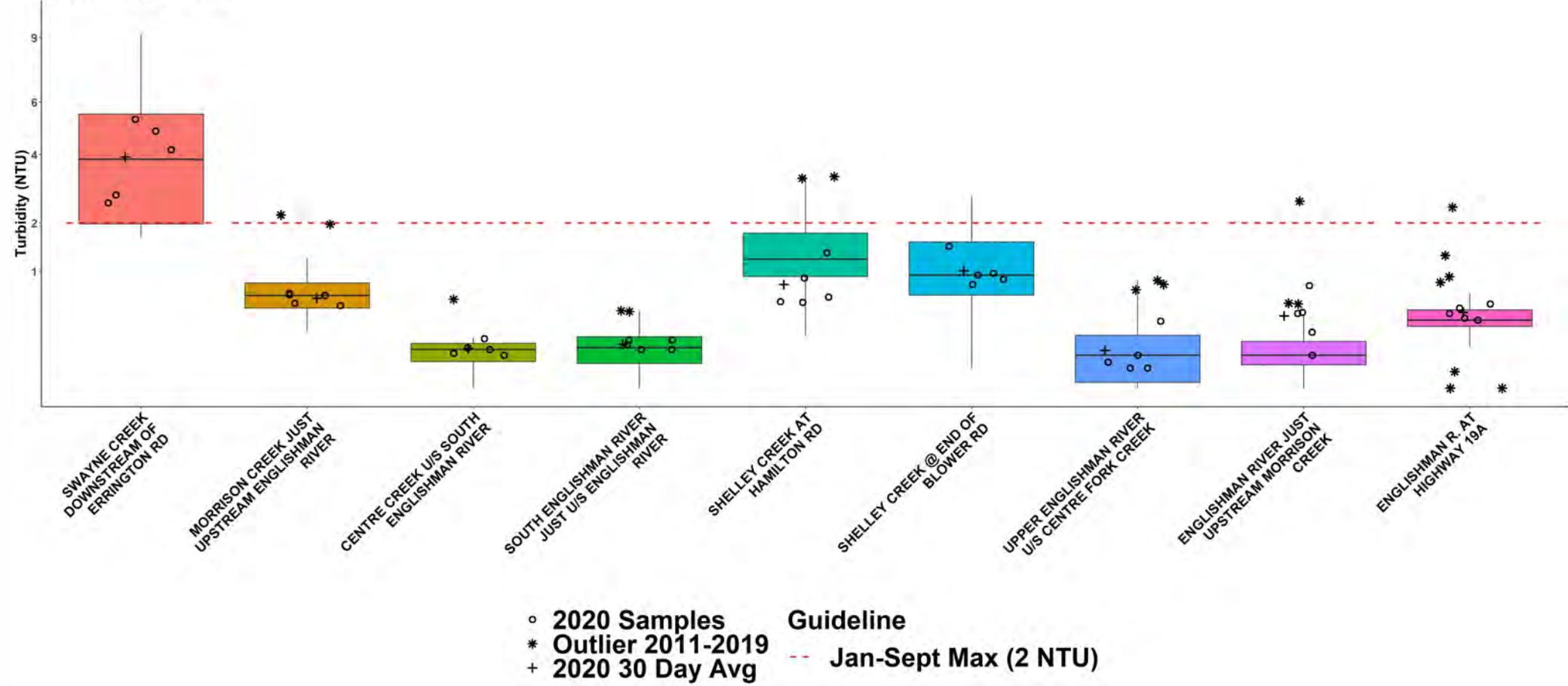
WR4 Fall Dissolved Oxygen



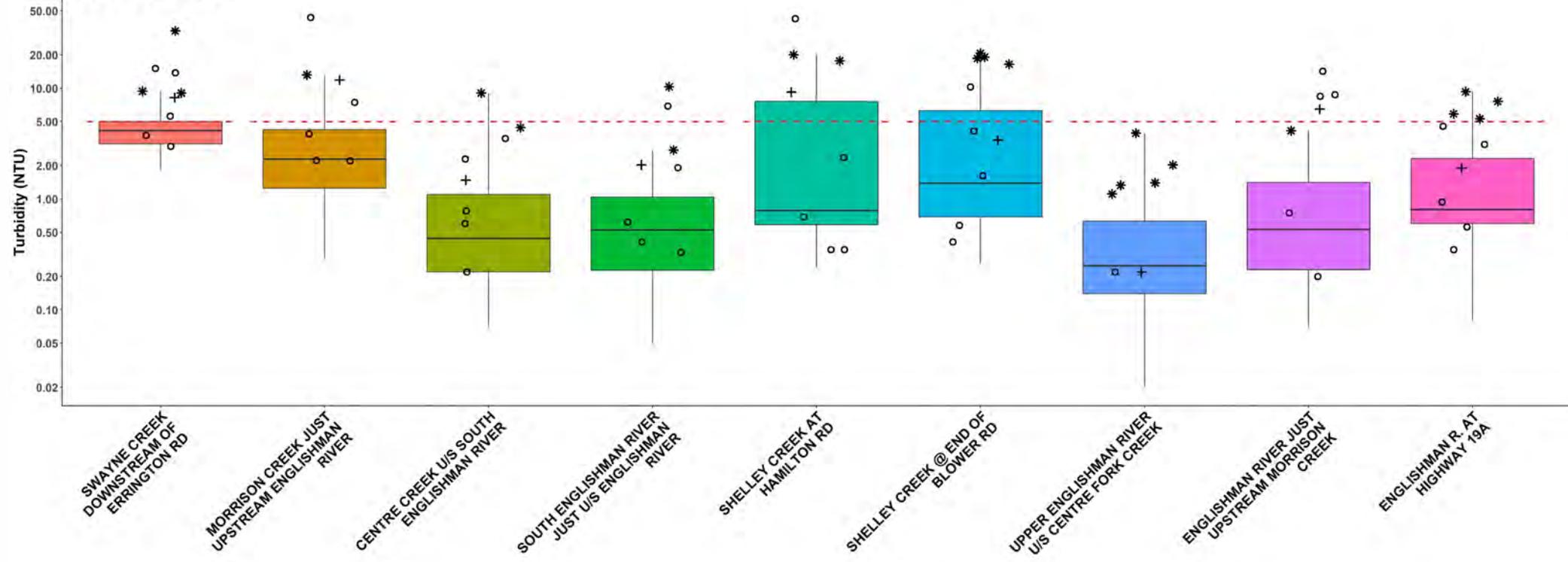
○ 2020 Samples Guideline
 * Outlier 2011-2019 - - 30 Day Average (<8 mg/L)
 + 2020 30 Day Avg - - Instantaneous Minimum (<5 mg/L)



WR4 Summer Turbidity



WR4 Fall Turbidity



Guideline

-- Oct-Dec Max (5 NTU)

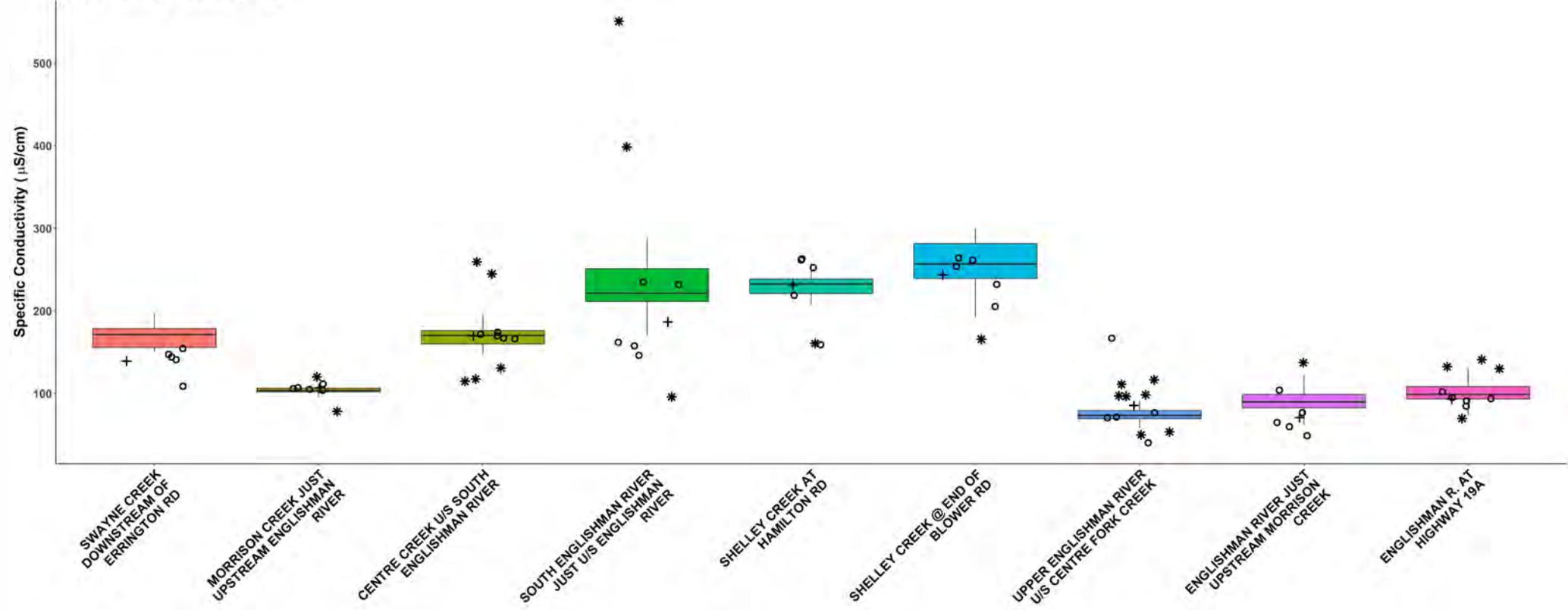
o 2020 Samples

* Outlier 2011-2019

+ 2020 30 Day Avg



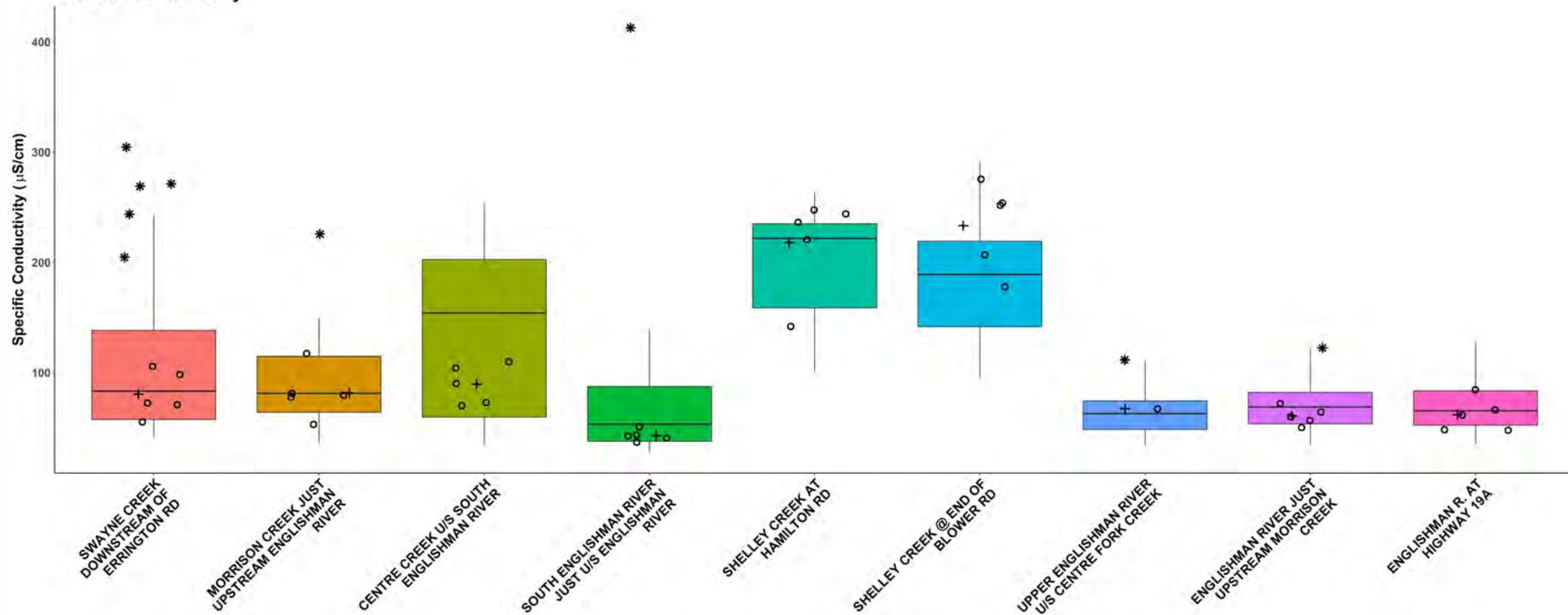
WR4 Summer Conductivity



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



WR4 Fall Conductivity



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



Regional District of Nanaimo

CMMN Water Quality Trend Analysis 2011-2020

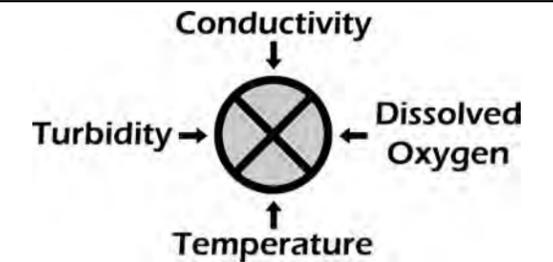
WR4a: Englishman River

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

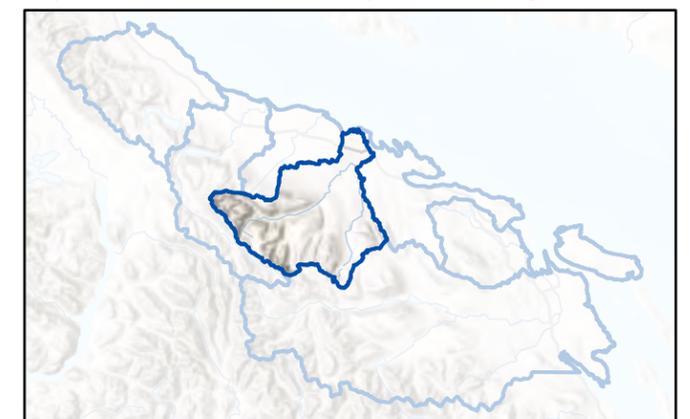
SAMPLE SITE KEY



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.

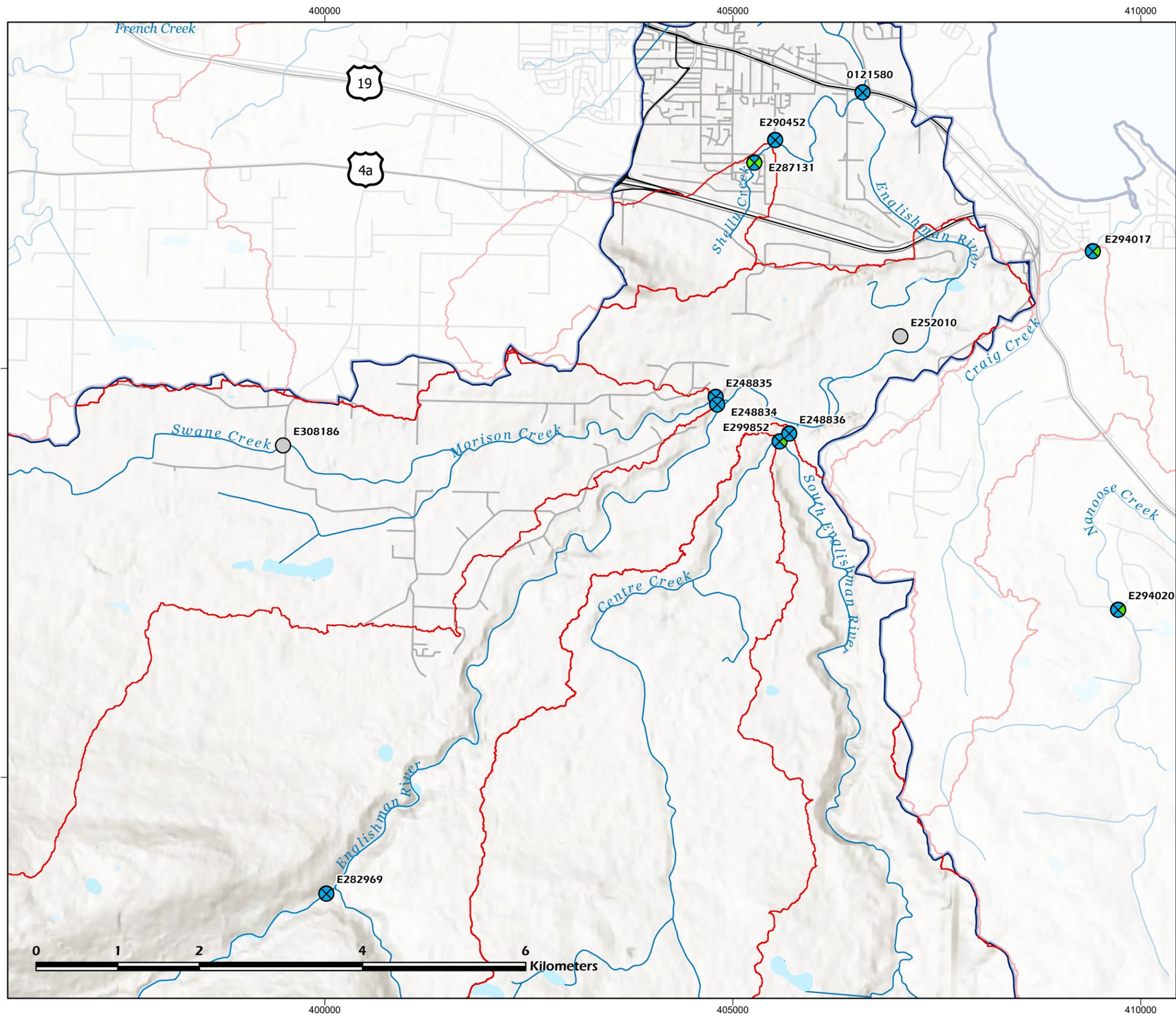
MAP INDEX

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



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Regional District of Nanaimo

CMMN Water Quality Trend Analysis 2011-2020

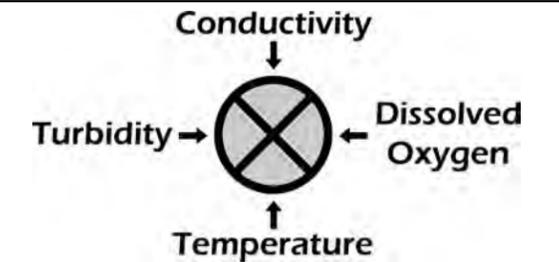
WR4b: Englishman River

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

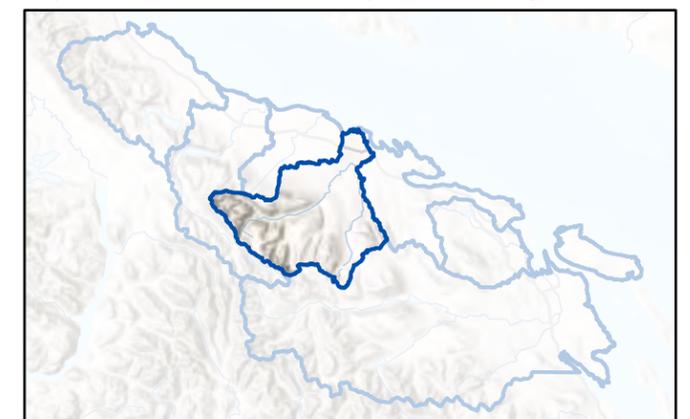
SAMPLE SITE KEY



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.

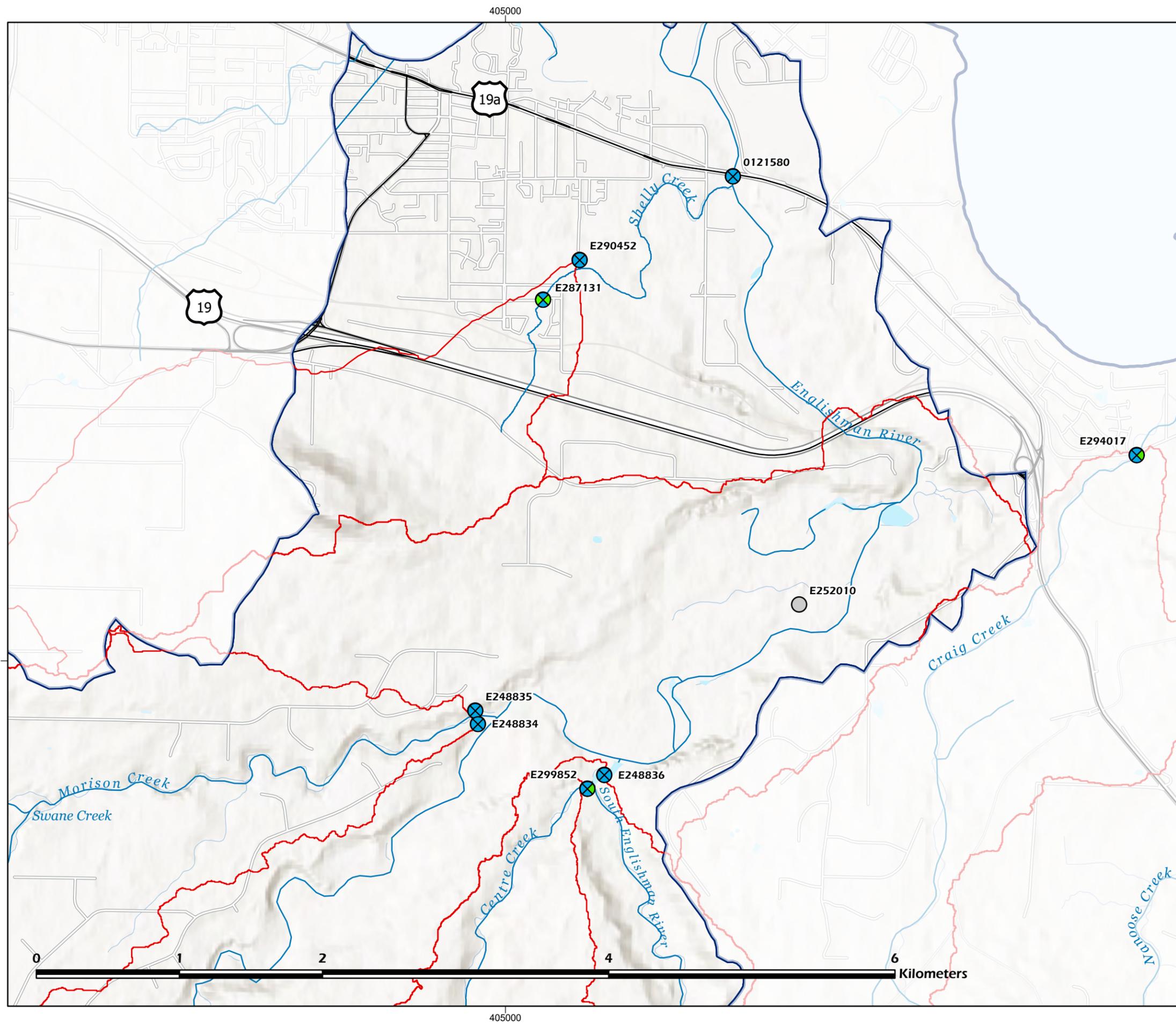
MAP INDEX

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



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Regional District of Nanaimo

CMMN 2011-2020 Summer Exceedance Assessment

WR4a: Englishman 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

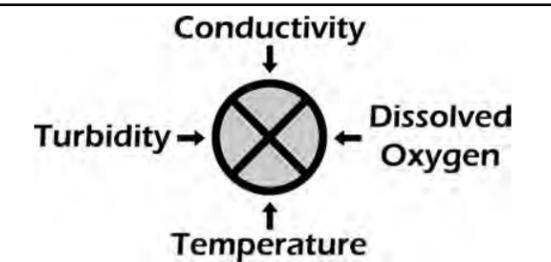
LEGEND

-  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.*

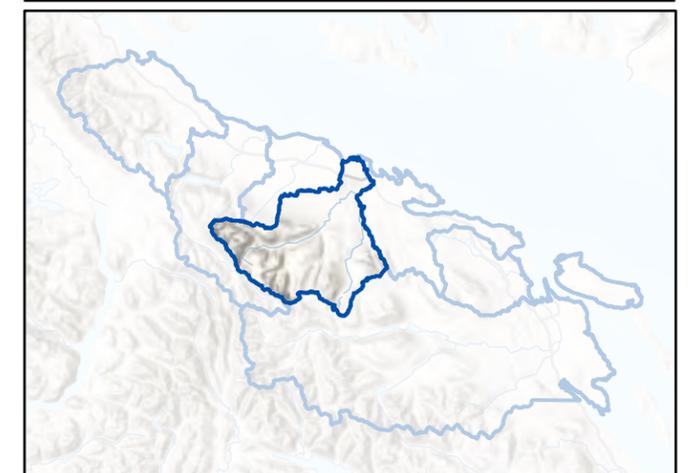
Exceedance colour key

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

SAMPLE SITE KEY

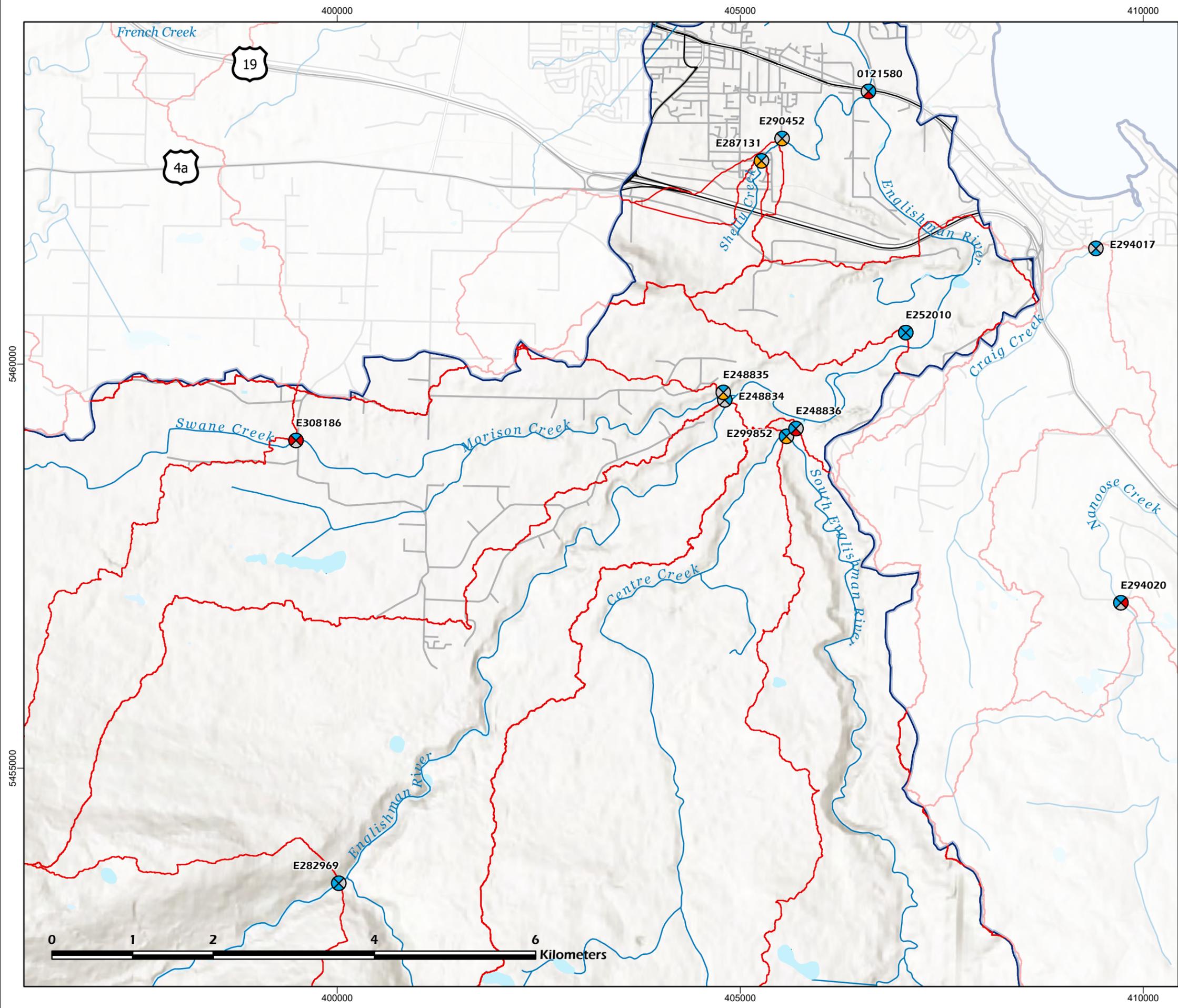


MAP INDEX



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Regional District of Nanaimo

CMMN 2011-2020 Summer Exceedance Assessment

WR4b: Englishman 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

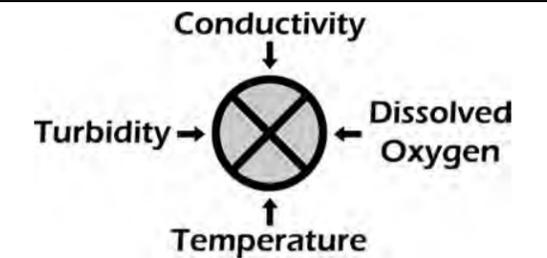
LEGEND

- ⊗ 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.*

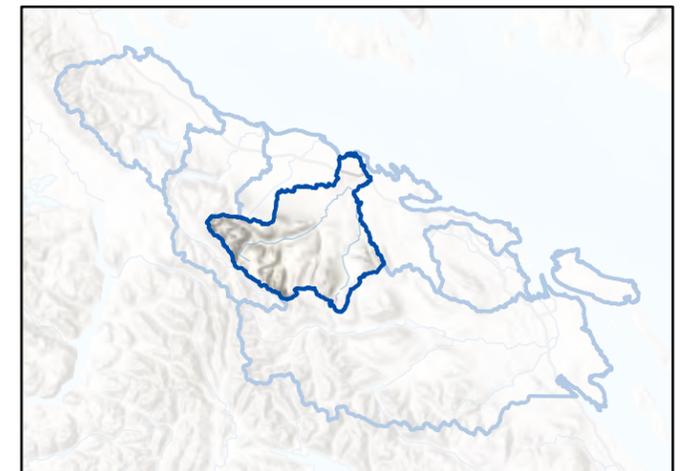
Exceedance colour key

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

SAMPLE SITE KEY

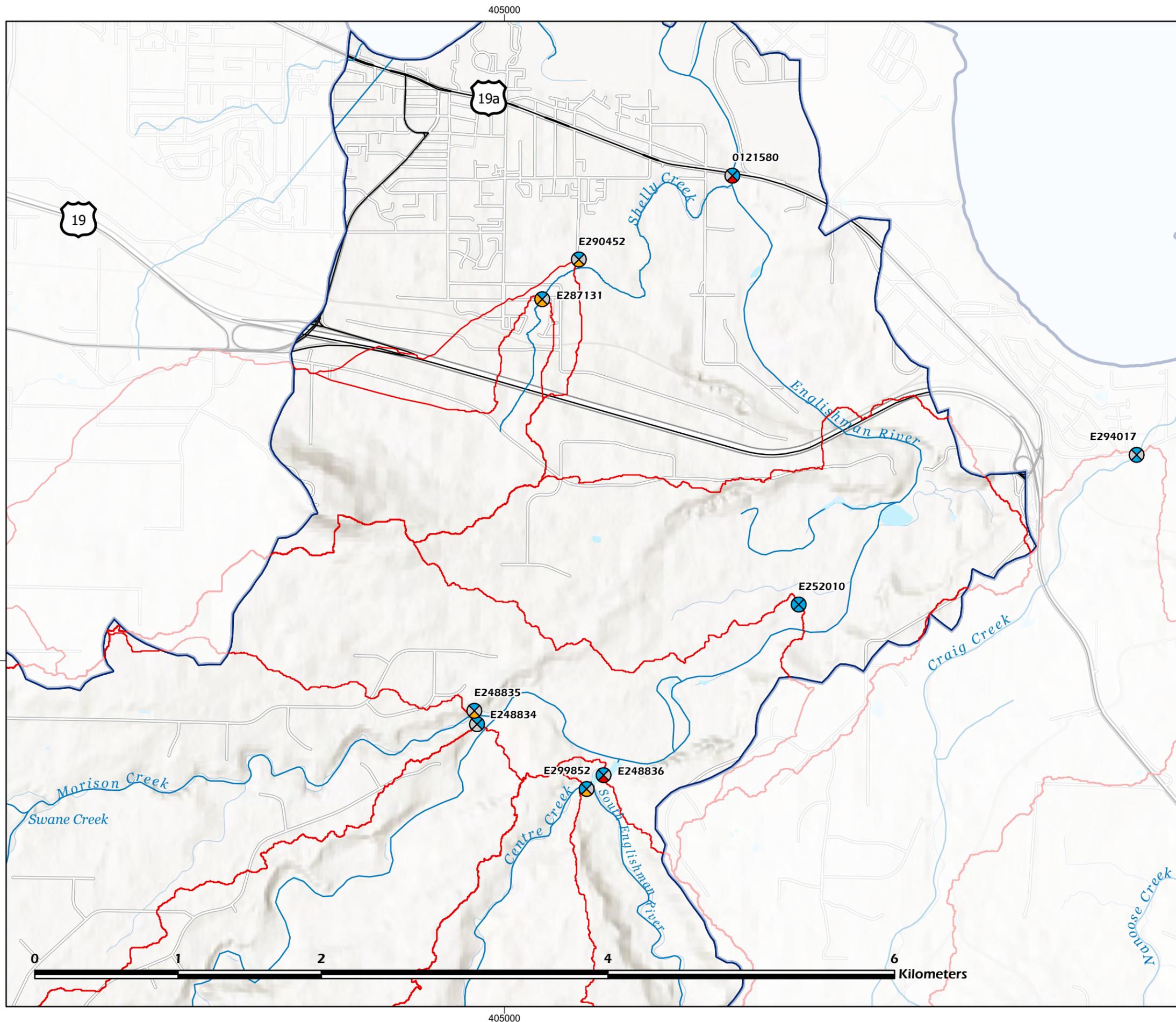


MAP INDEX



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Regional District of Nanaimo

CMMN 2011-2020 Fall Exceedance Assessment

WR4a: Englishman 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

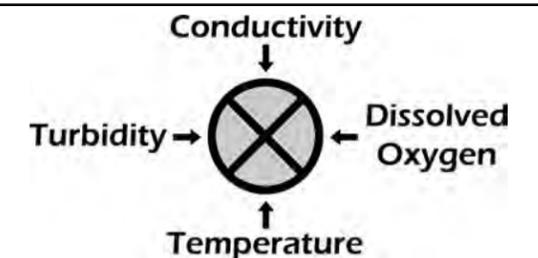
LEGEND

-  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.*

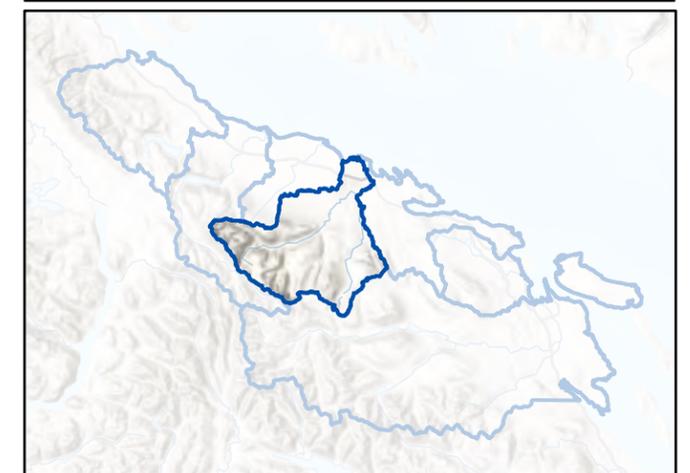
Exceedance colour key

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

SAMPLE SITE KEY

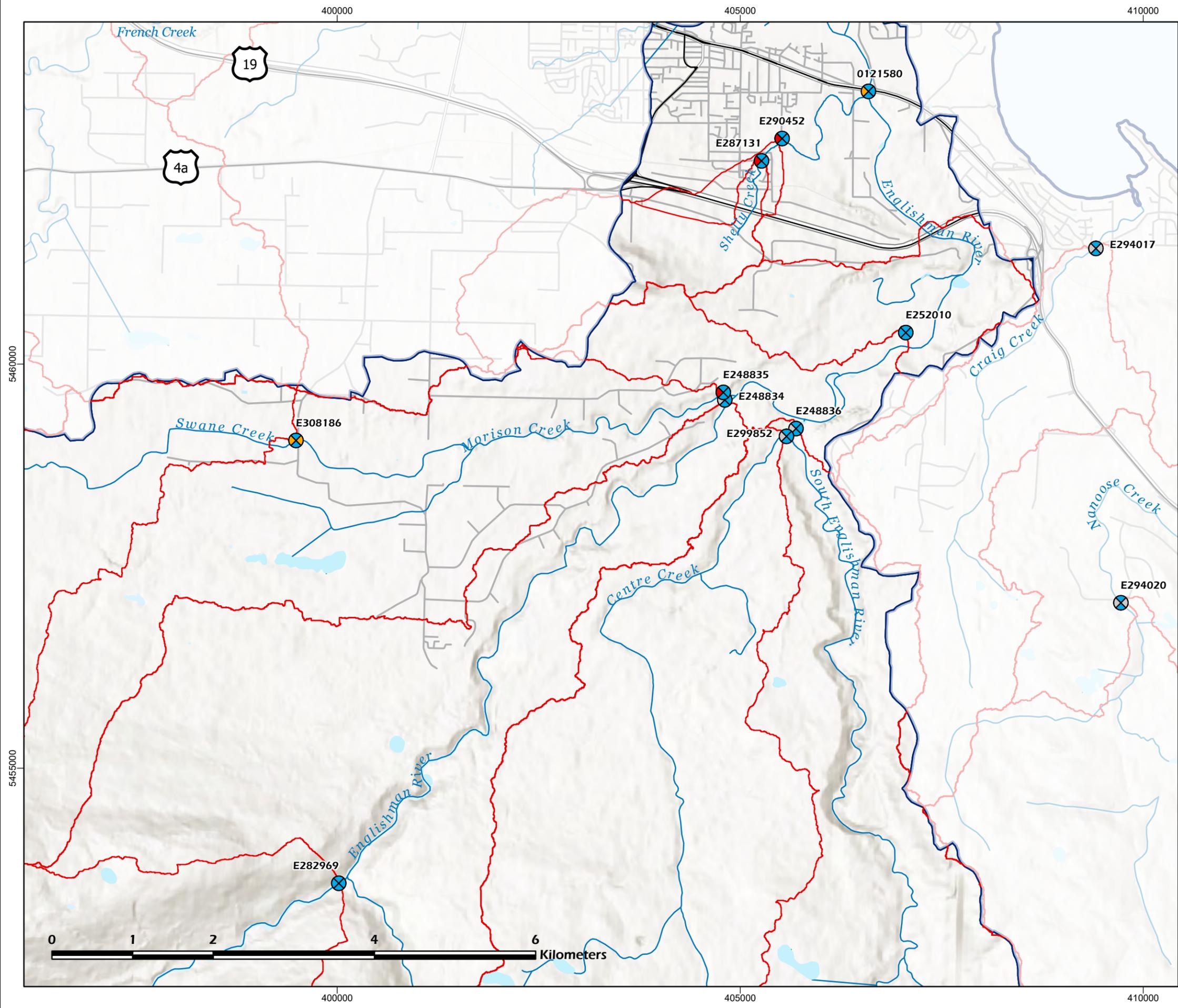


MAP INDEX



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Regional District of Nanaimo

CMMN 2011-2020 Fall Exceedance Assessment

WR4b: Englishman 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

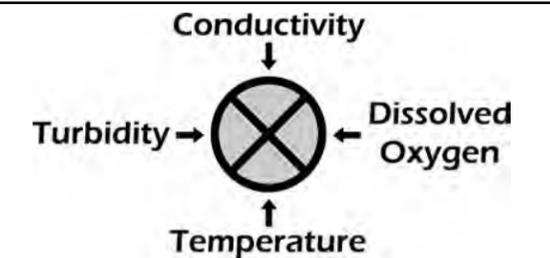
LEGEND

- ⊗ 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.*

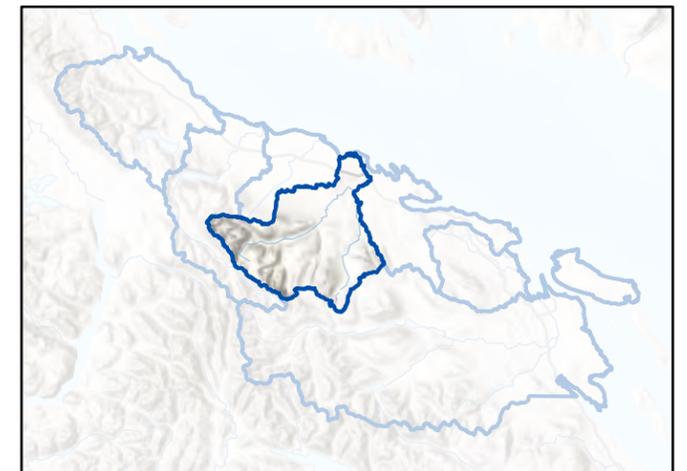
Exceedance colour key

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

SAMPLE SITE KEY

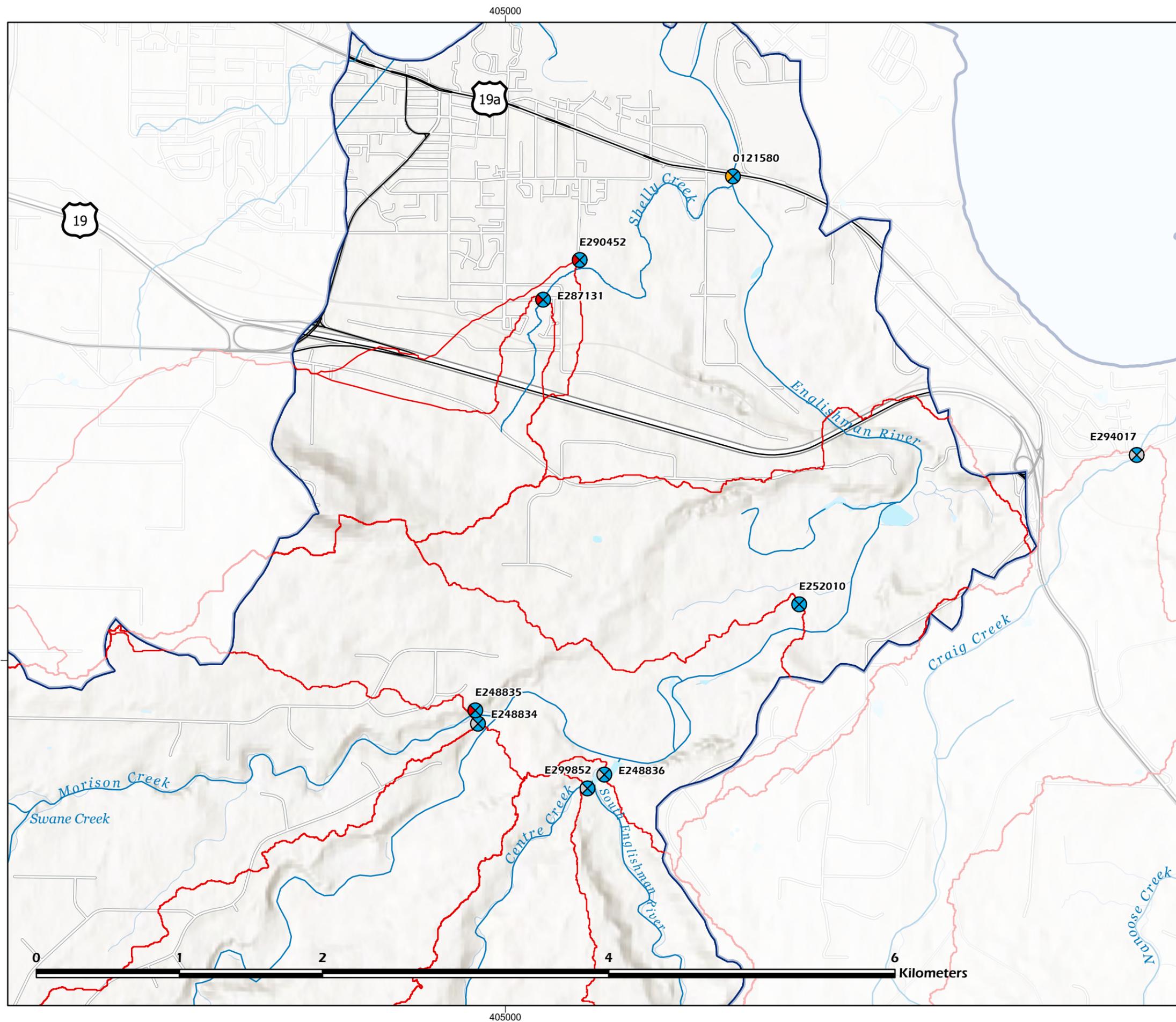


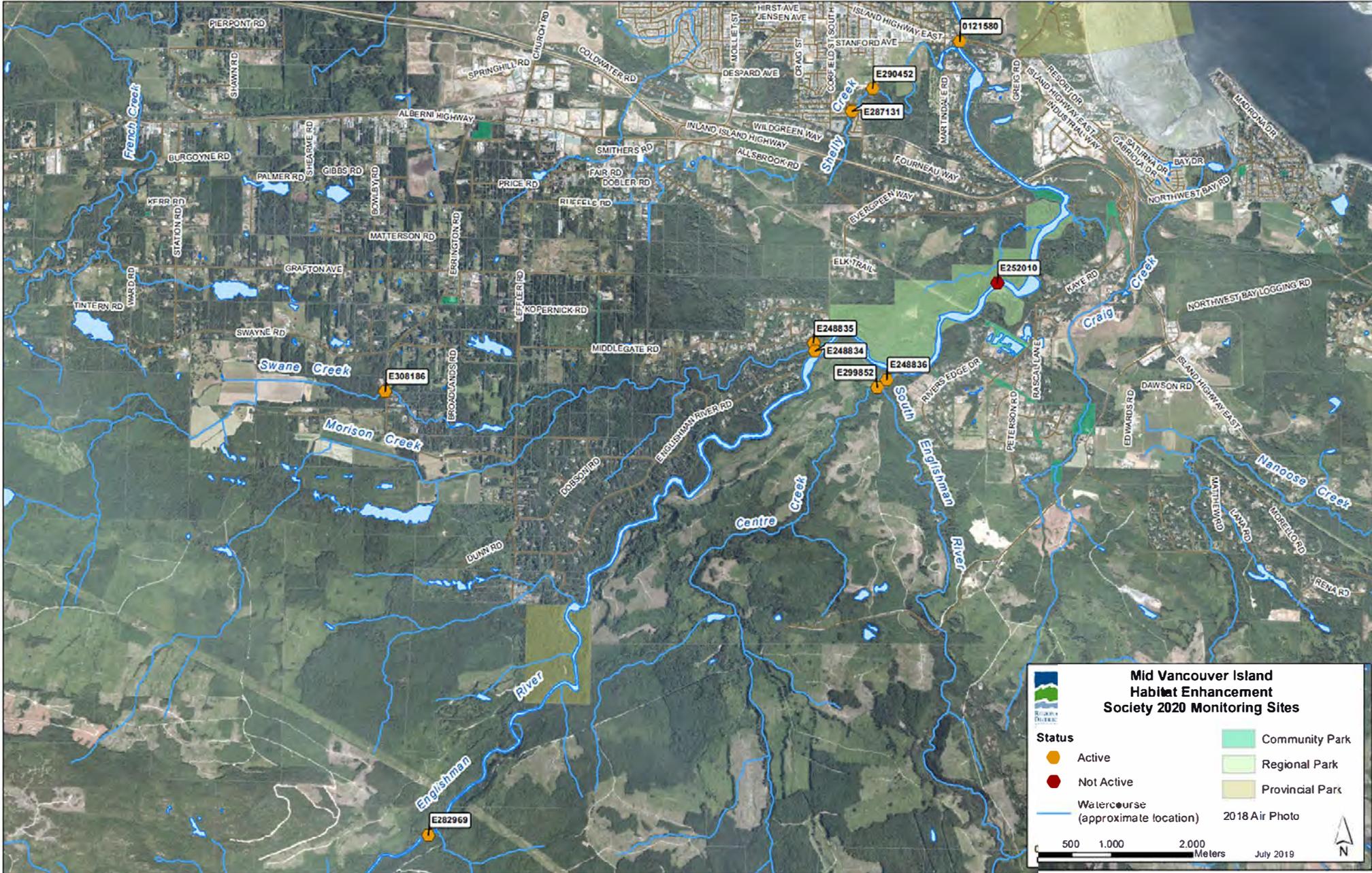
MAP INDEX



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**Mid Vancouver Island
Habitat Enhancement
Society 2020 Monitoring Sites**

Status	Community Park
Active	Regional Park
Not Active	Provincial Park
Watercourse (approximate location)	2018 Air Photo

500 1,000 2,000 Meters July 2019