

2017 Community Watershed Monitoring Network Results Session

presented by Julie Pisani & Lauren Fegan

Introduction

- Julie Pisani, Drinking Water & Watershed Protection Program Coordinator
- Lauren Fegan, Drinking Water & Watershed Protection Special Projects Assistant



DRINKING WATER
WATERSHED
PROTECTION

Results Session Outline

- Program Overview
- 2017 Results
- Trend Analysis 2011-2017
- RDN Stewardship Group Support
- 2018 Monitoring Season Update
- Questions?

Thank you!

Community Stewardship Groups

- Fanny Bay Salmonid Enhancement Society (FBSES)
- 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)
- Walley Creek Streamkeepers (WCS)
- Departure Creek Streamkeepers (DCS)
- Vancouver Island University (VIU)
- Nanaimo and Area Land Trust (NALT)
- Gabriola Streamkeepers (GSk)

Other Partners

- Ministry of Environment and Climate Change Strategy
- Island Timberlands LP

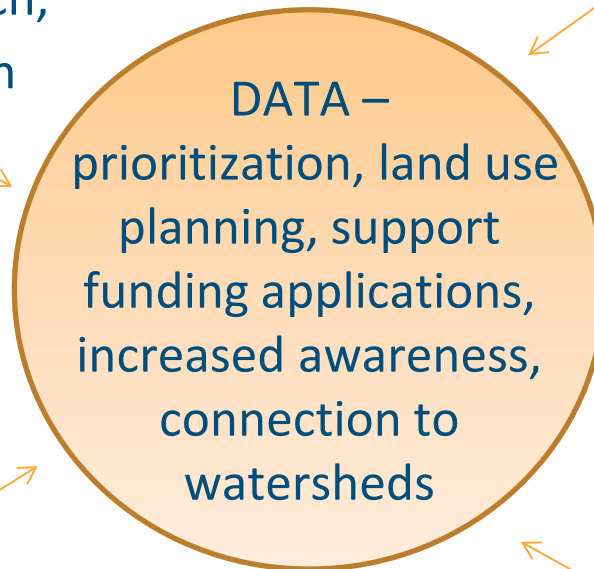


**DRINKING WATER
WATERSHED
PROTECTION**

Partnership

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

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

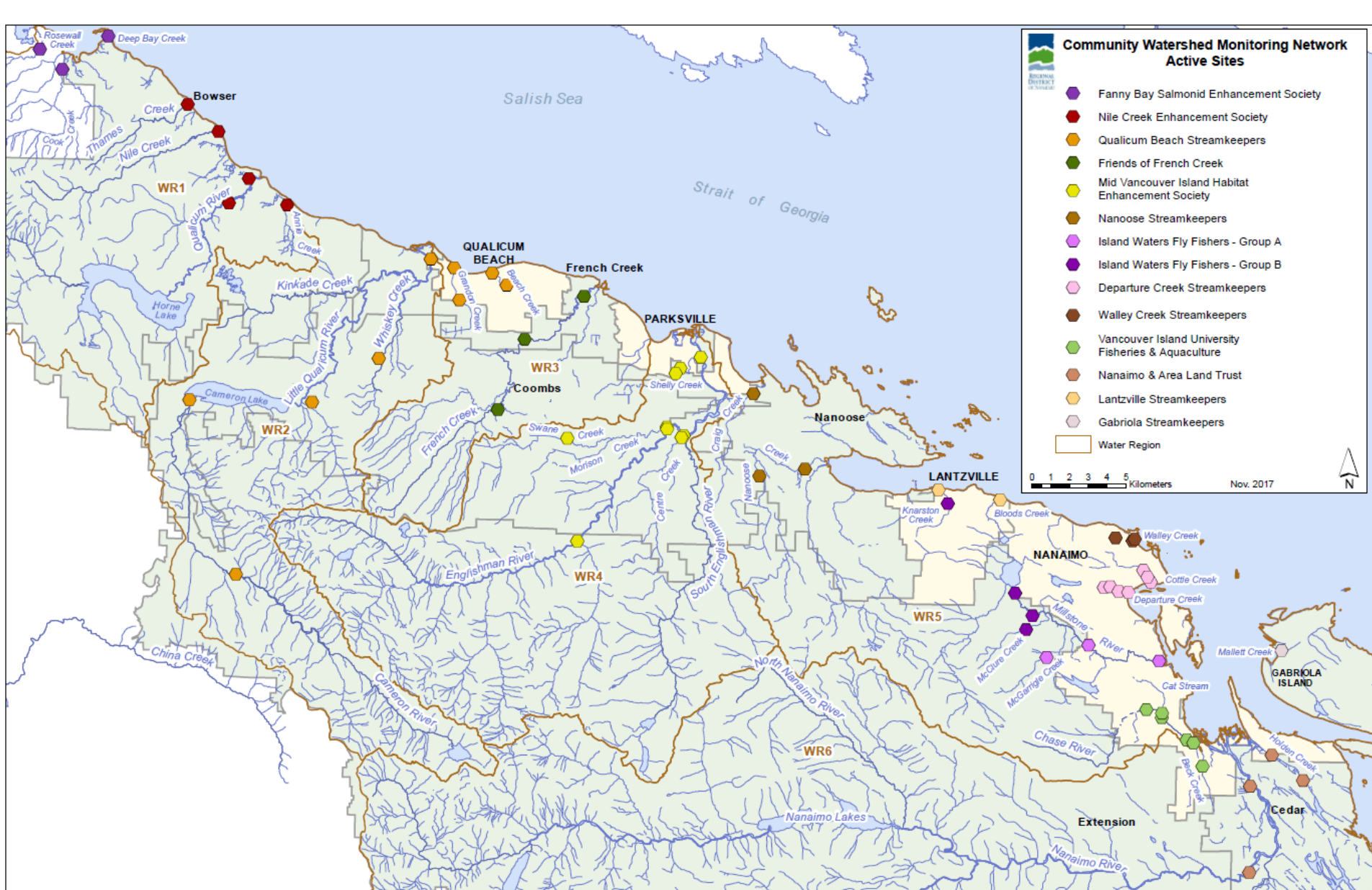


Community Stewardship Groups – annual training, equipment calibrations, sampling, local knowledge

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

Positives

- Expanded to include new groups, streams, and sites
- Consistent data collection
- Excellent cooperation between all partners
- Growing awareness in community
- Great coverage: 62 sites; 36 streams; 25 watersheds



New in 2017....

Sites added

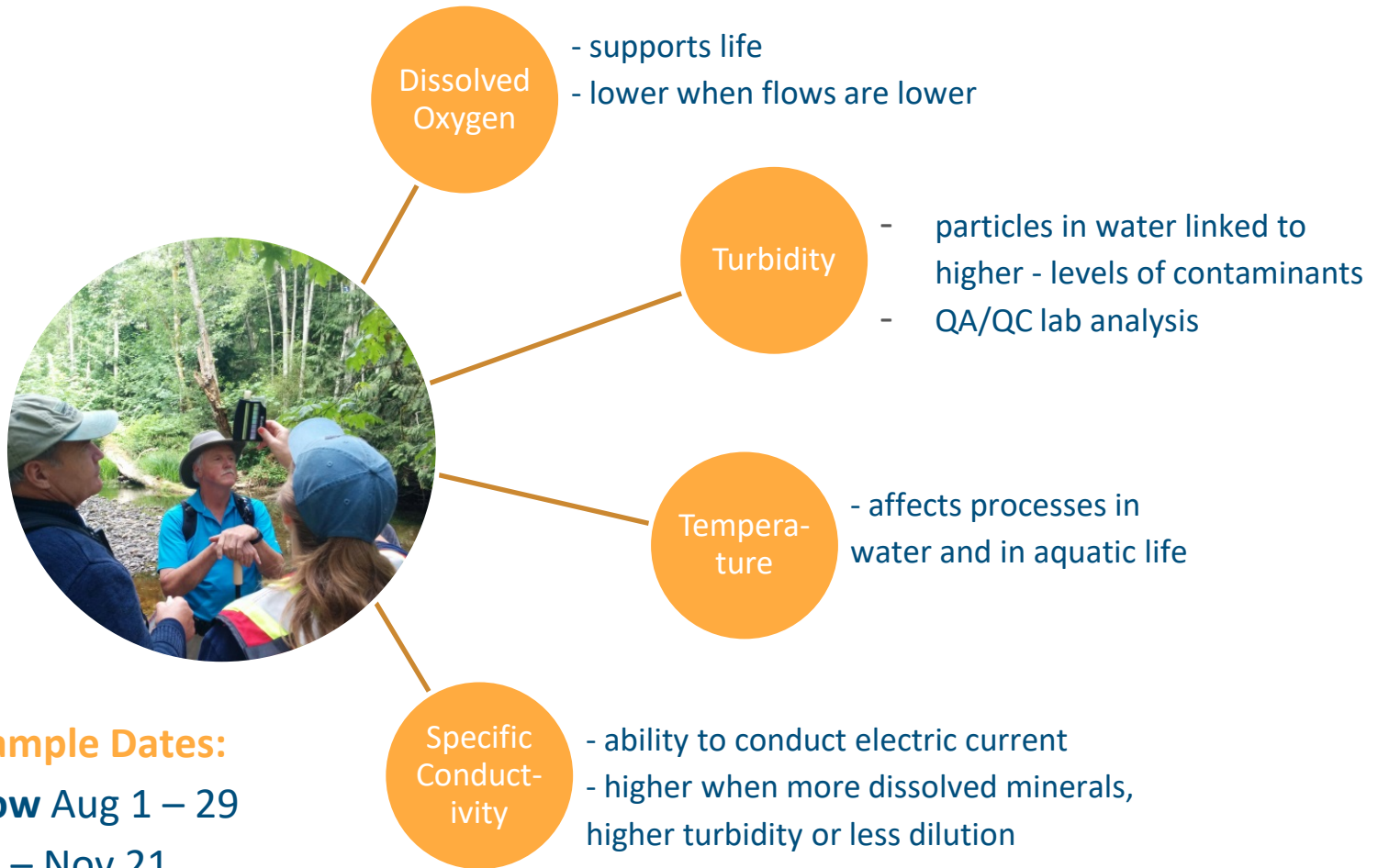
- Cook Ck @ Old Isl Hwy (FBSES)
- Knarston Ck u/s Lantzville Rd (LS)*
- Bloods Ck u/s Dickenson Rd (LS)*
- McClure Ck @ Montessori (IWFF)
- Cottle Ck d/s Hammond Bay Rd (DCS)
- Chase River @ Estuary Park (VIU)
- Holden Ck off Lazo Lane (NALT)*
- Holden Ck u/s Duke Pt Hwy (NALT)

Sites deactivated

- Englishman River u/s Allsbrook Canyon
- Benson Ck @ Biggs Rd
- Upper McGarrigle Ck (private property access)
- N Cottle Ck 100 m d/s from Burma Rd (ephemeral)
- Cottle Ck @ Landalt Rd (ephemeral)
- Haslam Ck u/s Nanaimo River

**Monitored in the fall only*

Water Quality Monitoring Parameters

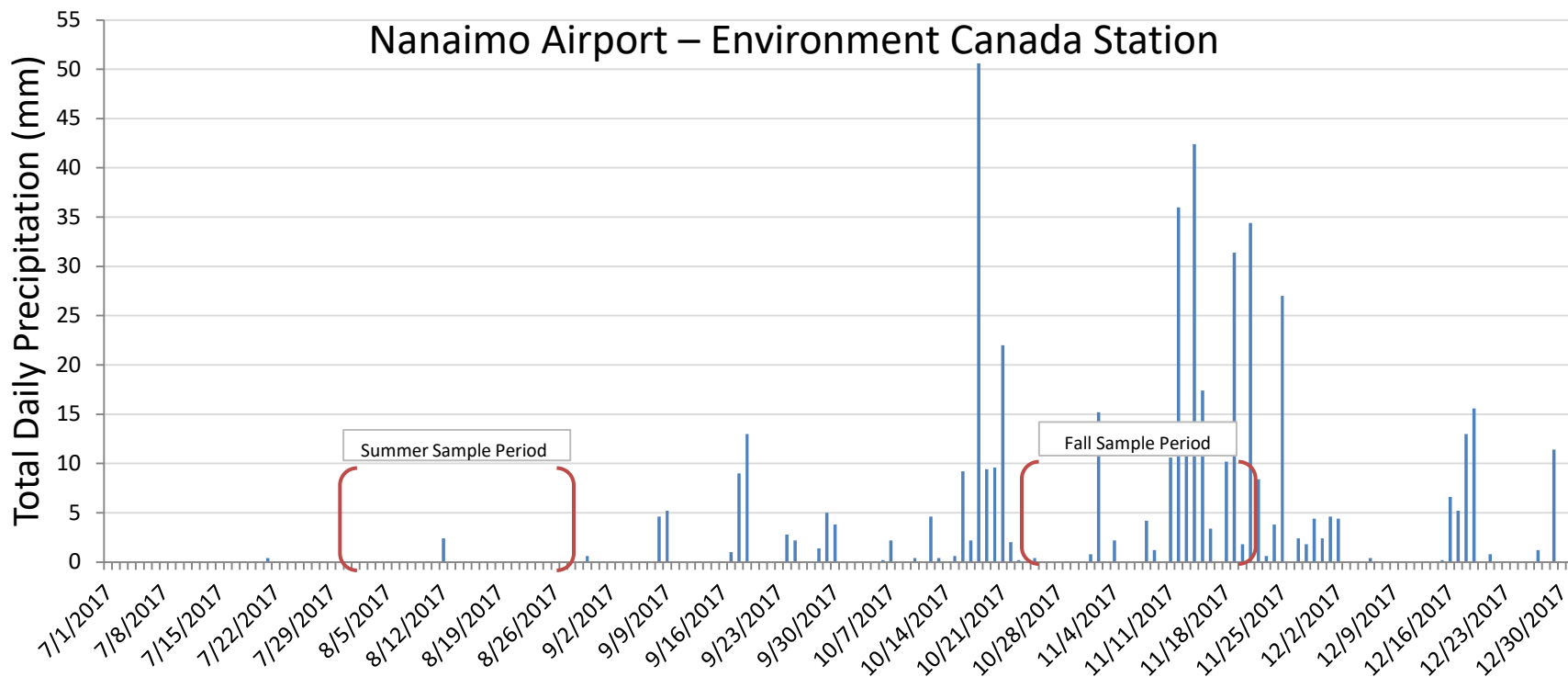


2017 Tuesday Sample Dates:

Summer Low Flow Aug 1 – 29

Fall Flush Oct 24 – Nov 21

Precipitation Data - South



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)

2016 rainfall:

23.4 mm Summer

(Aug 1 – Aug 31)

379.2 mm Fall

(Oct 1 – Nov 8)

2017 rainfall:

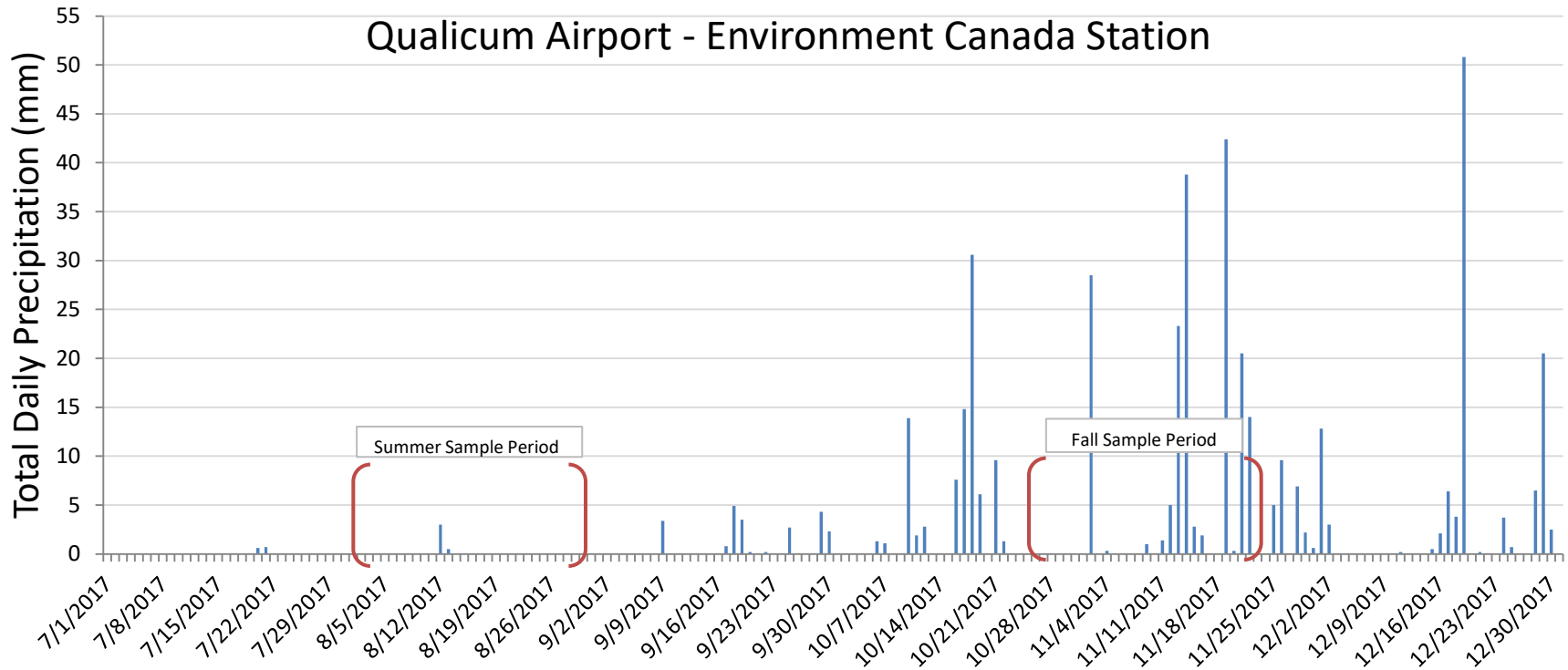
3 mm Summer

(Aug 1 – Aug 31)

336.4 mm Fall

(Oct 1 – Nov 21)

Precipitation Data - North



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)

2016 rainfall:

15.7 mm Summer

(Aug 1 – Aug 31)

252.2 mm Fall

(Oct 1 – Nov 8)

2017 rainfall:

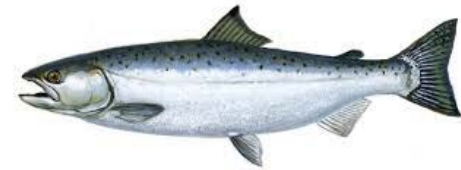
3.5 mm Summer

(Aug 1 – Aug 31)

257.2 mm Fall

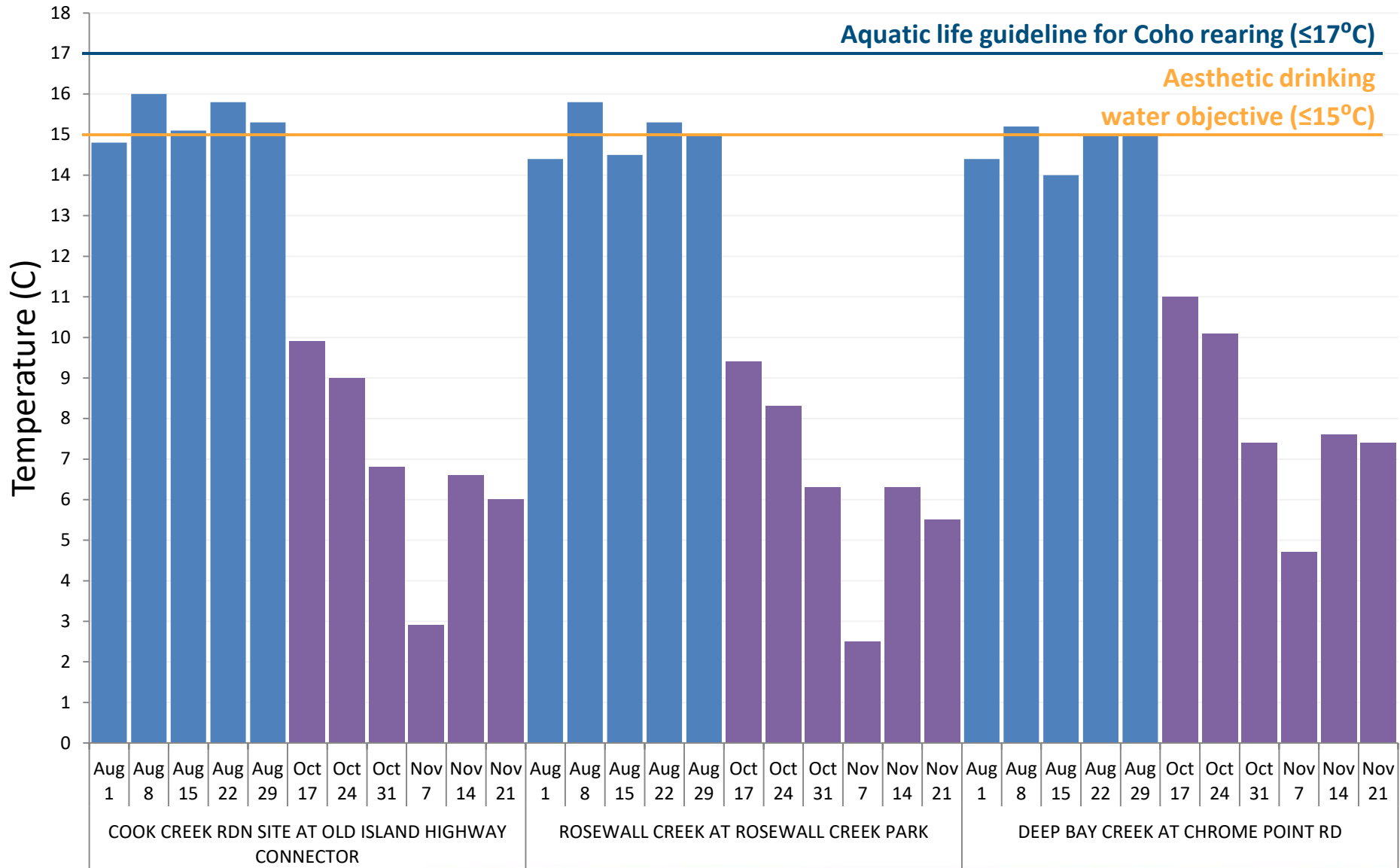
(Oct 1 – Nov 21)

Temperature

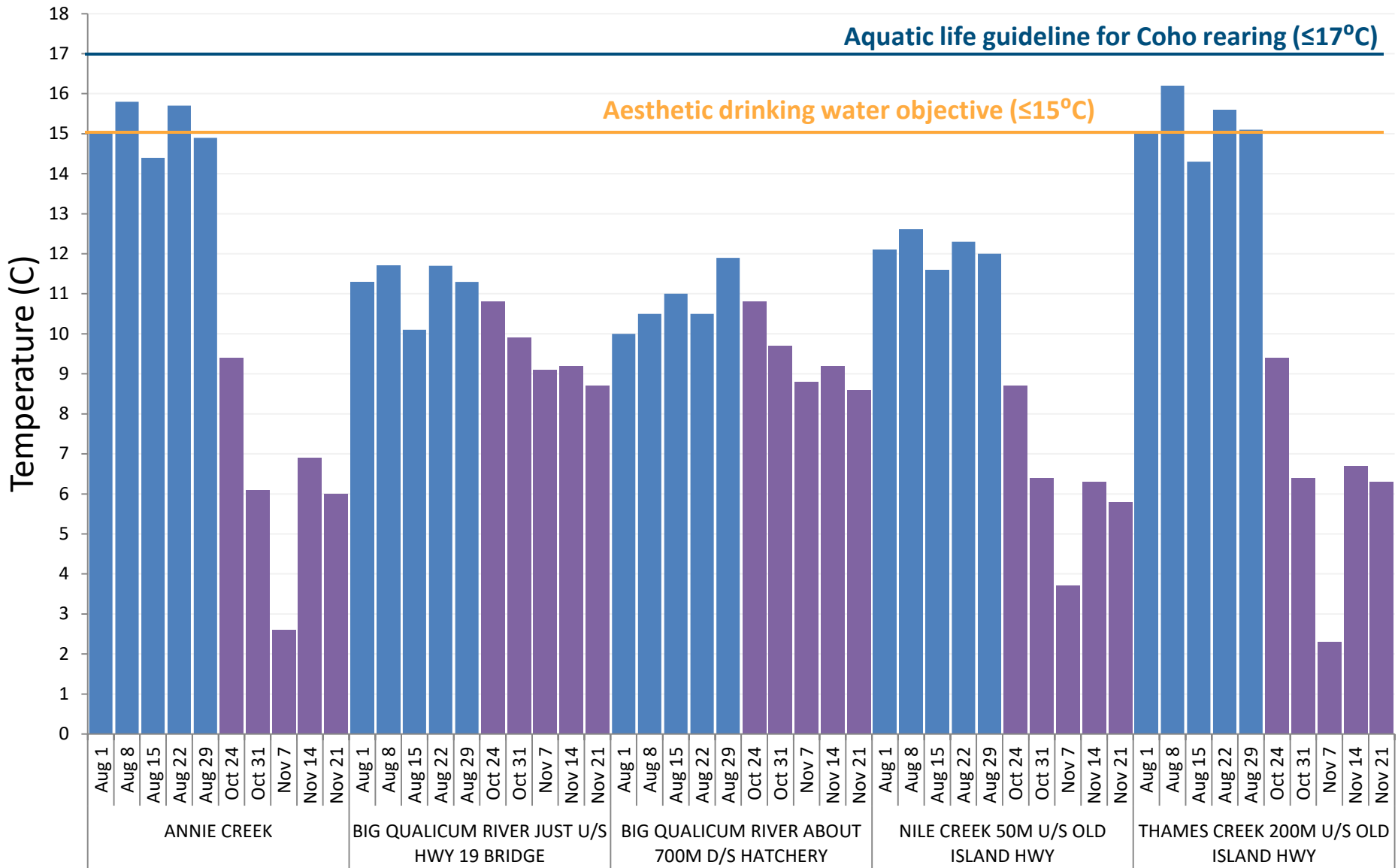


- **Aesthetic drinking water objective (weekly average $\leq 15^{\circ}\text{C}$)**
- **Aquatic life guideline for Coho rearing (weekly average $\leq 17^{\circ}\text{C}$)**

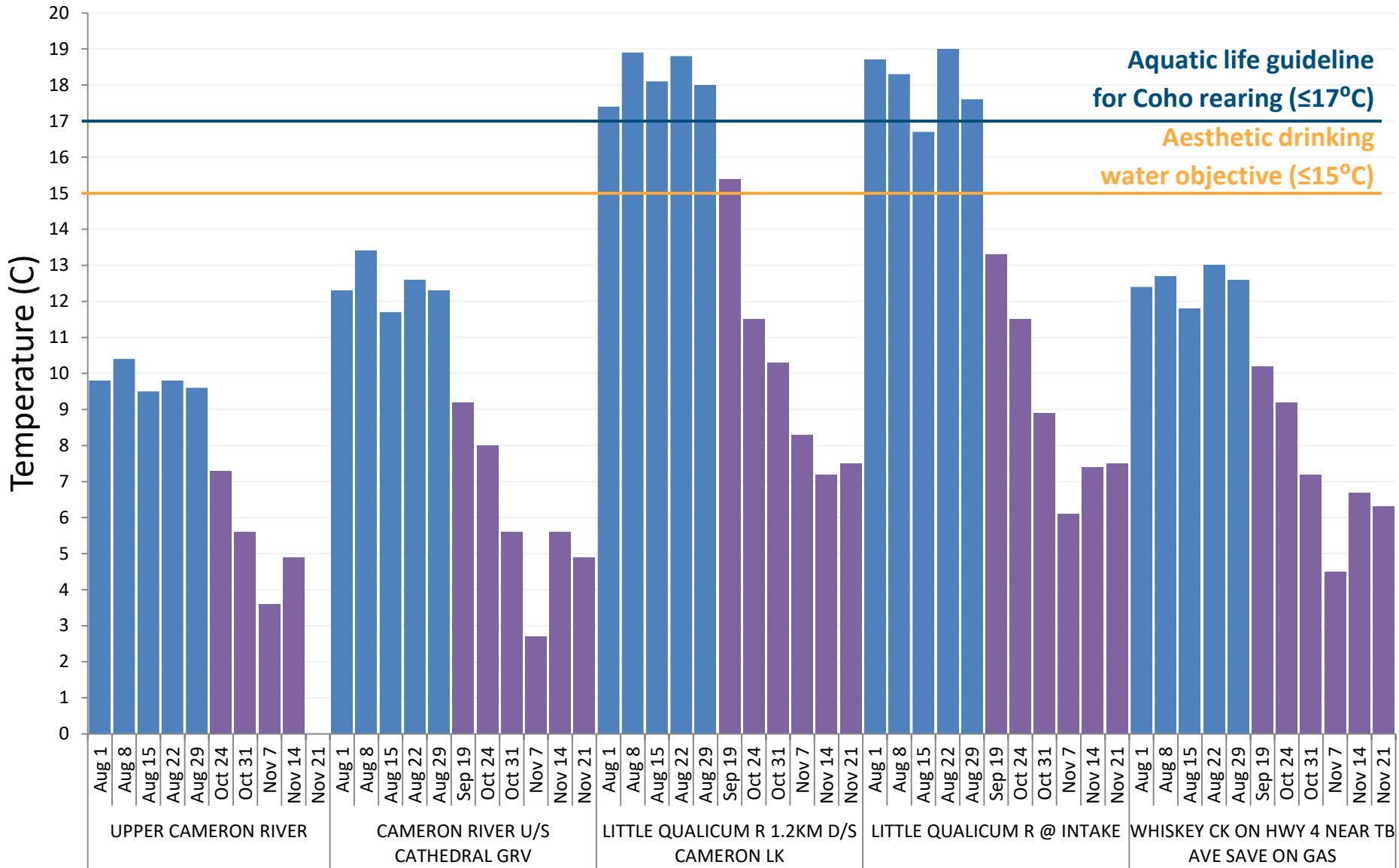
2017 Fanny Bay Salmonid Enhancement Society



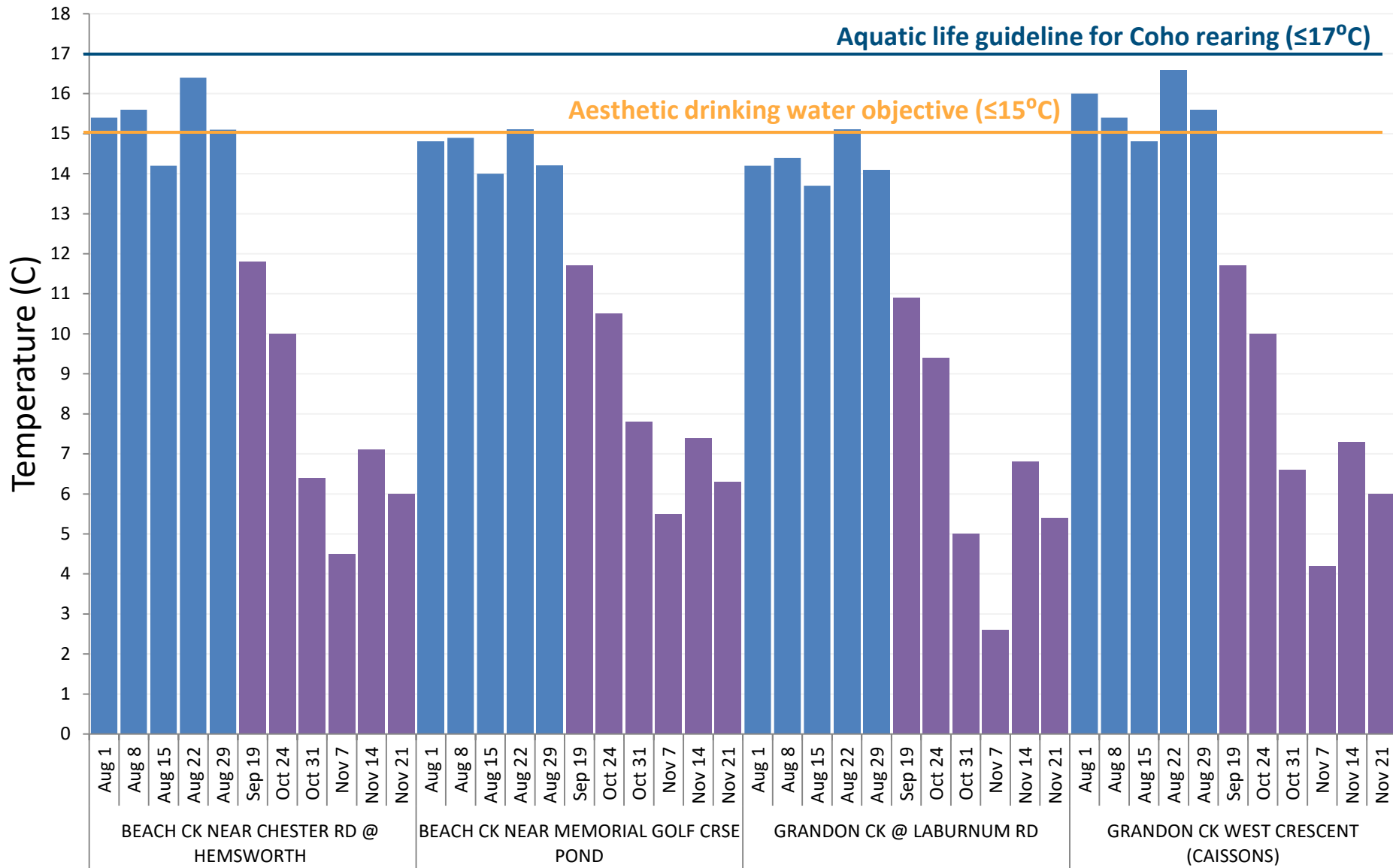
2017 Nile Creek Enhancement Society



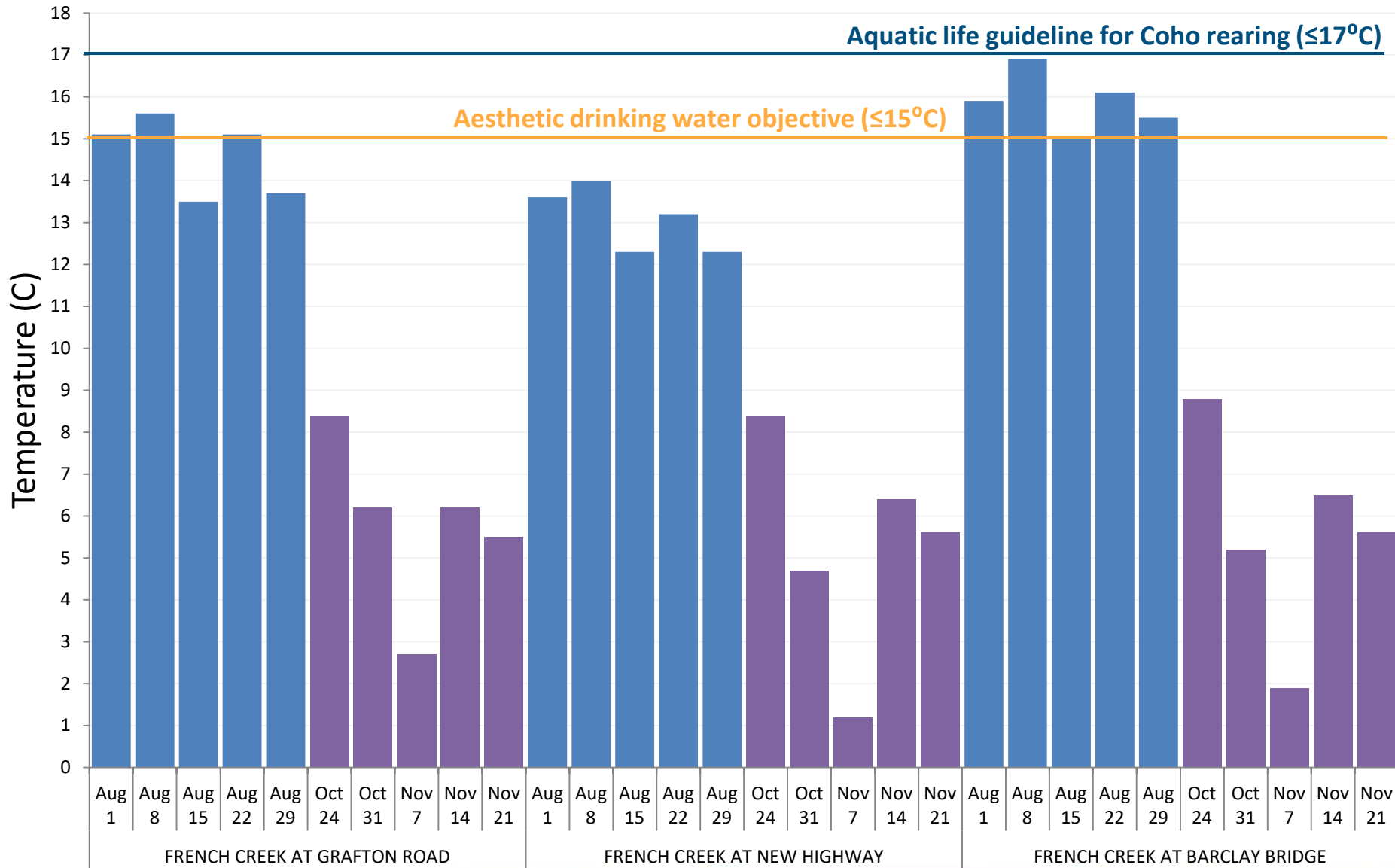
2017 Qualicum Beach Streamkeepers



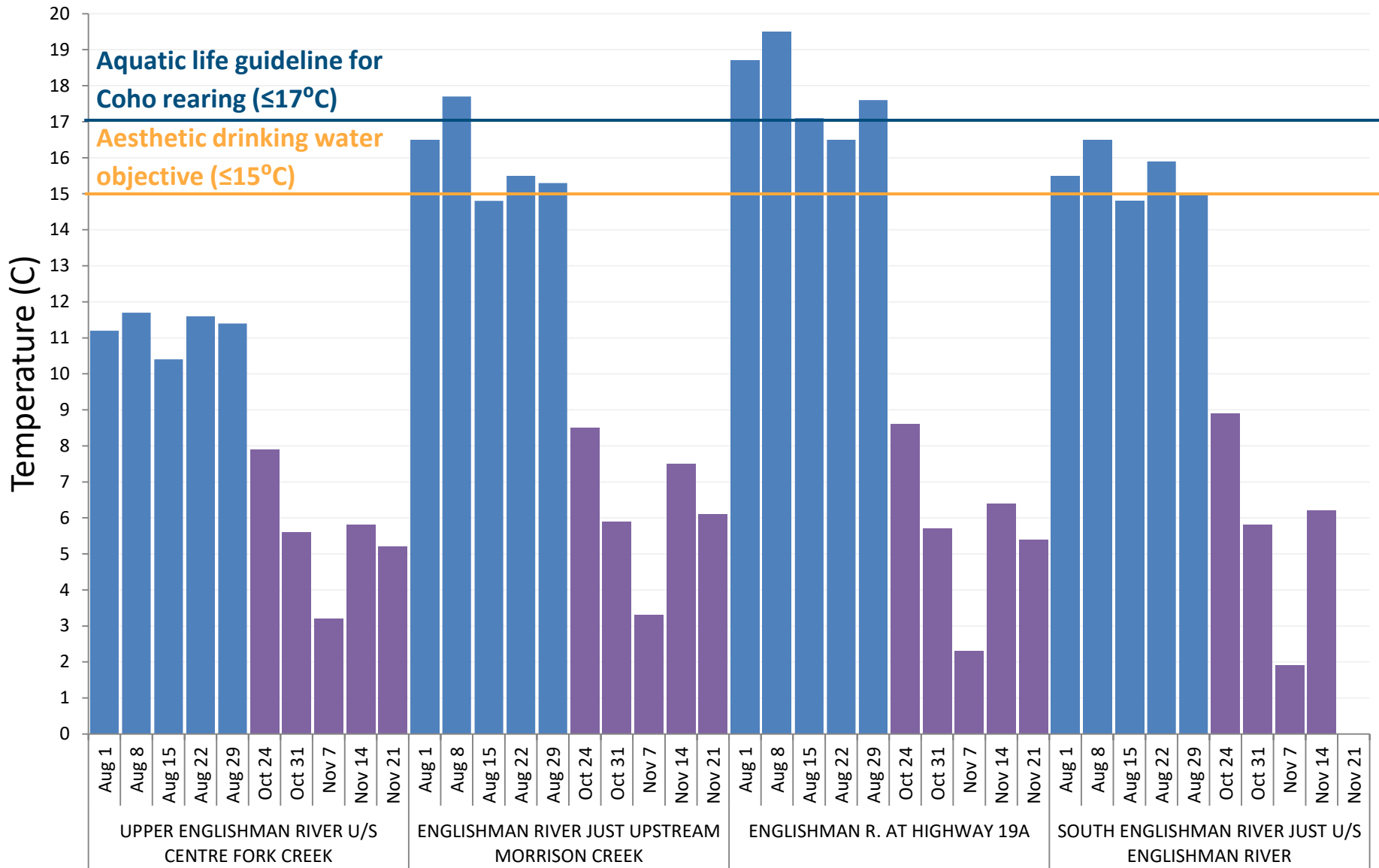
2017 Qualicum Beach Streamkeepers



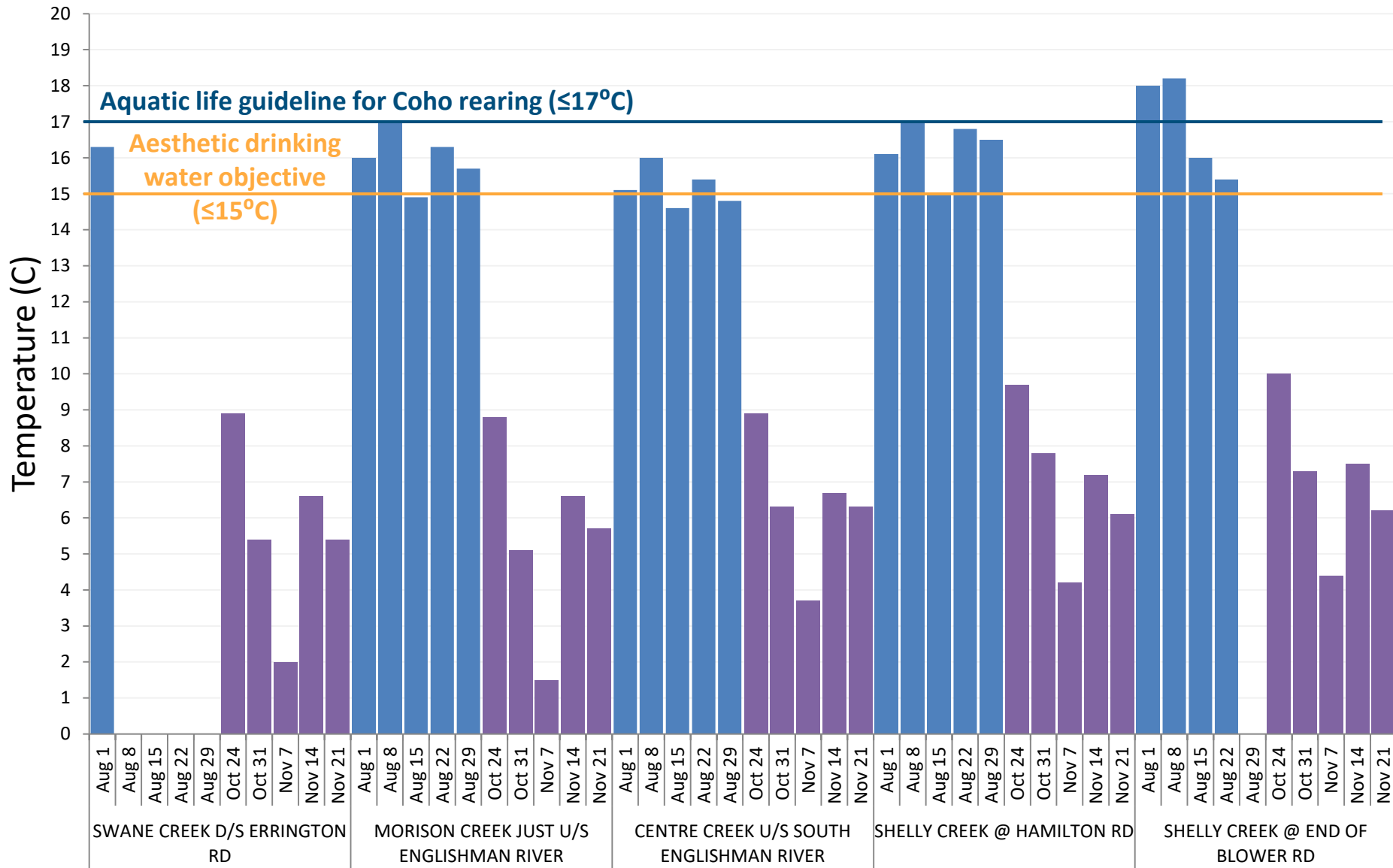
2017 Friends of French Creek Conservation Society



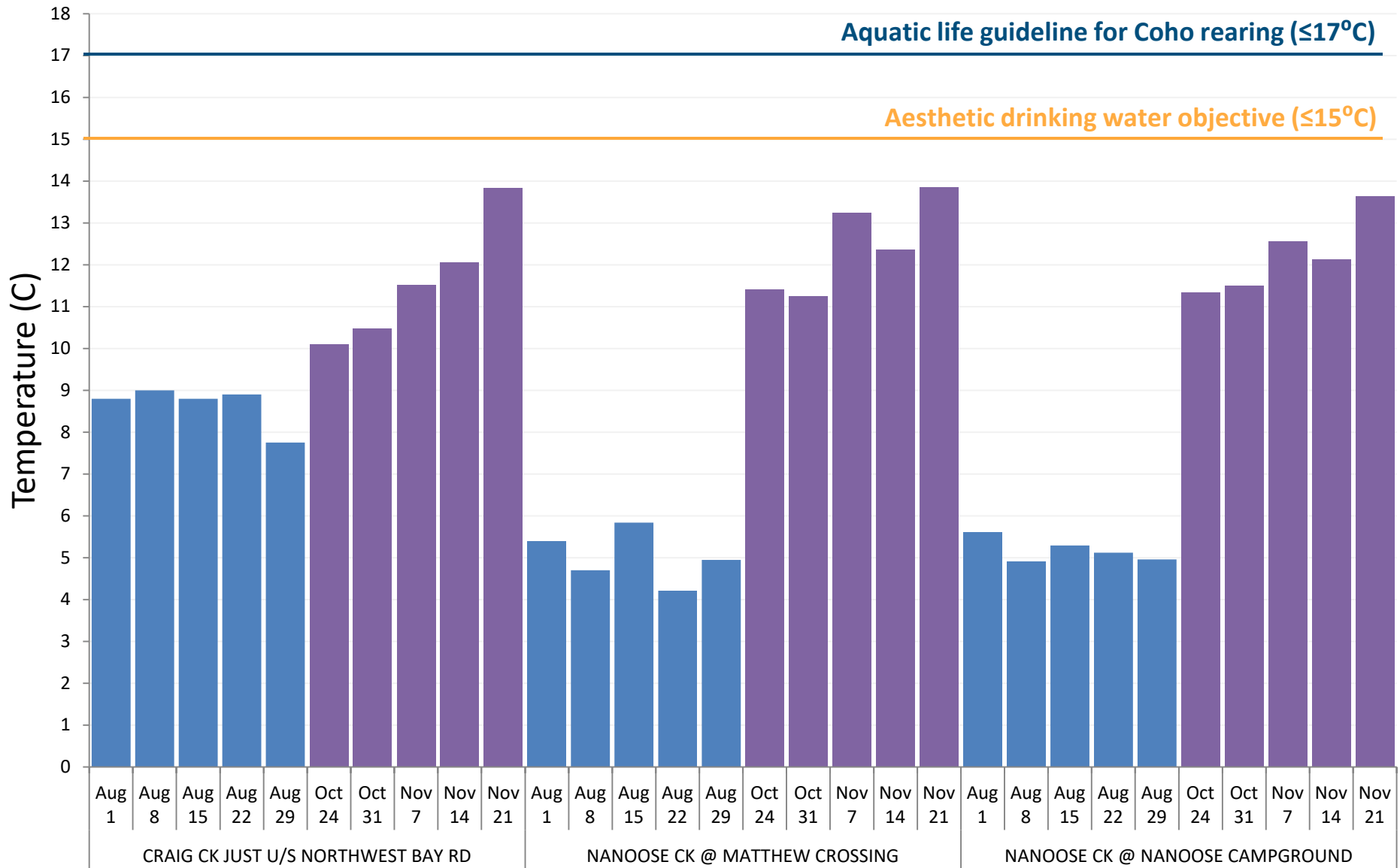
2017 Mid Vancouver Island Habitat Enhancement Society



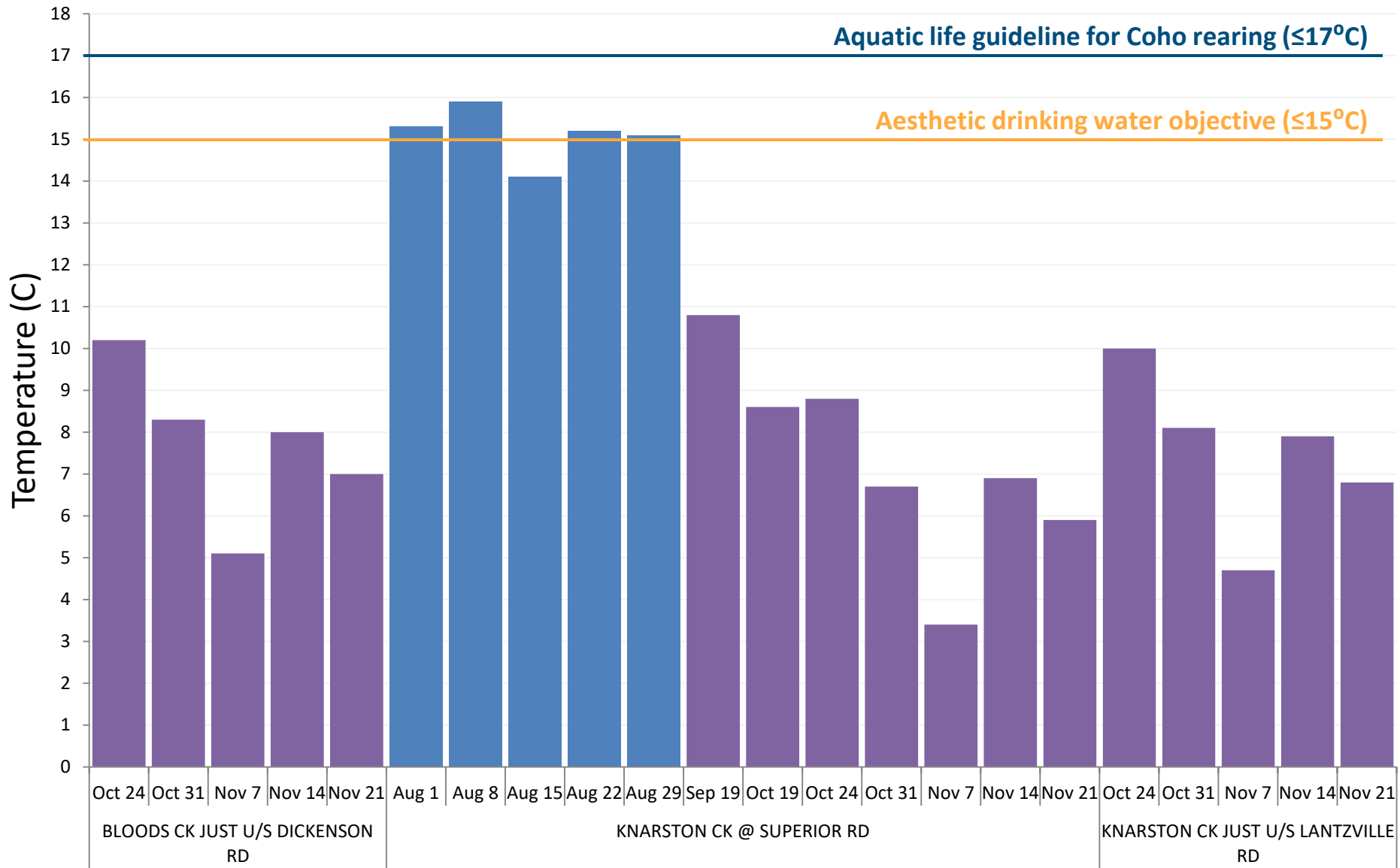
2017 Mid Vancouver Island Habitat Enhancement Society



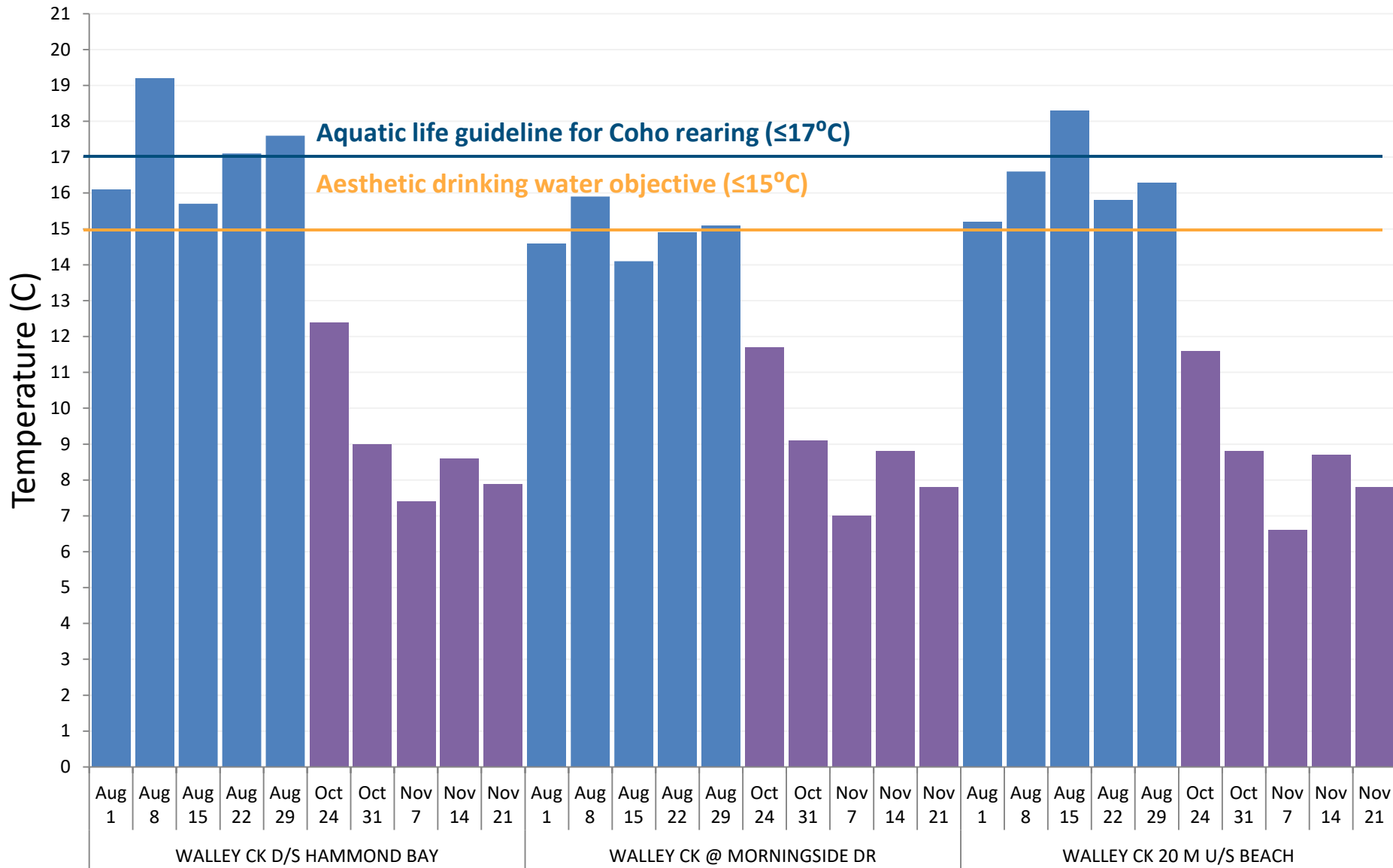
2017 Nanoose Streamkeepers Society



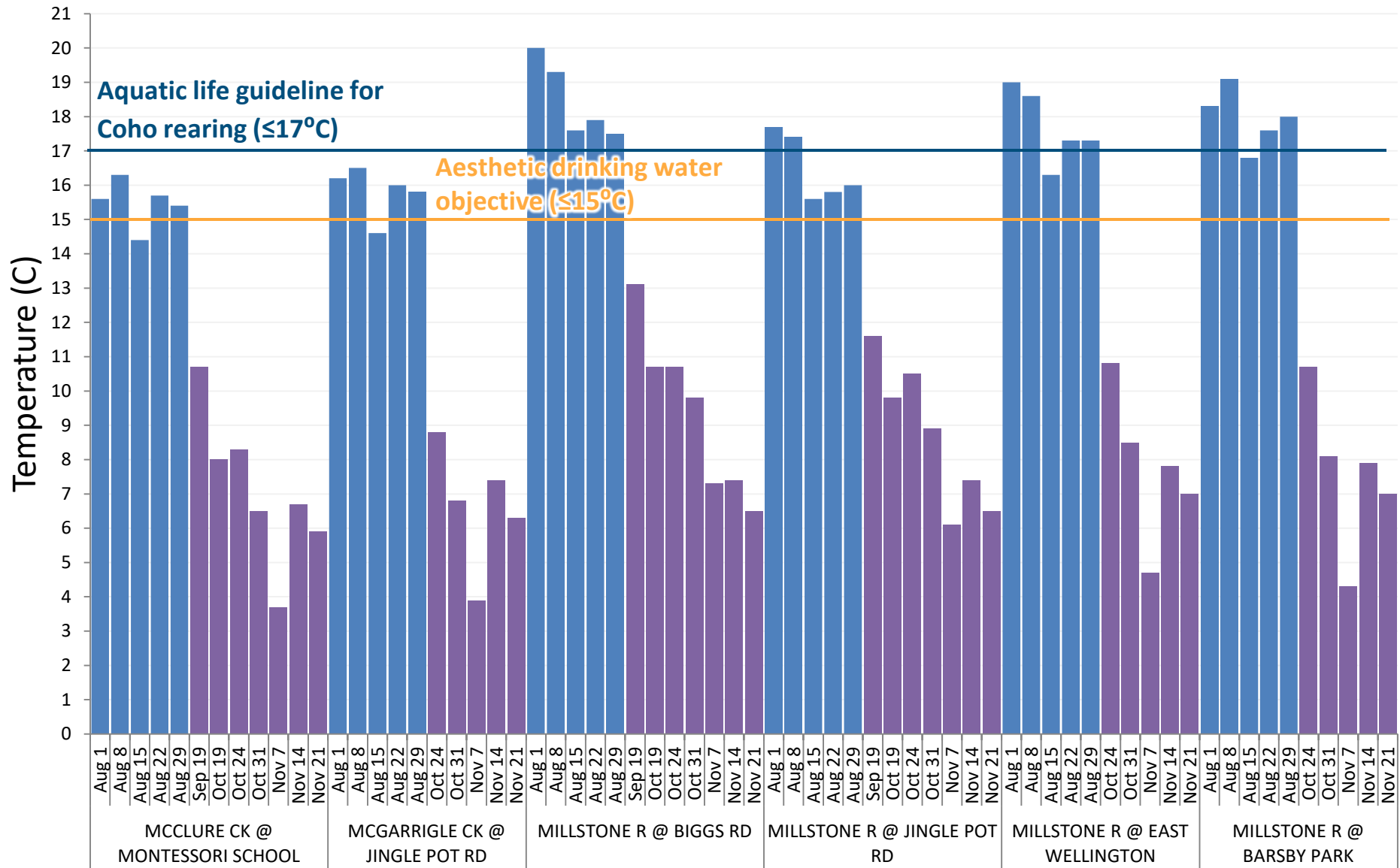
2017 Island Waters Fly Fishers & Lantzville Streamkeepers



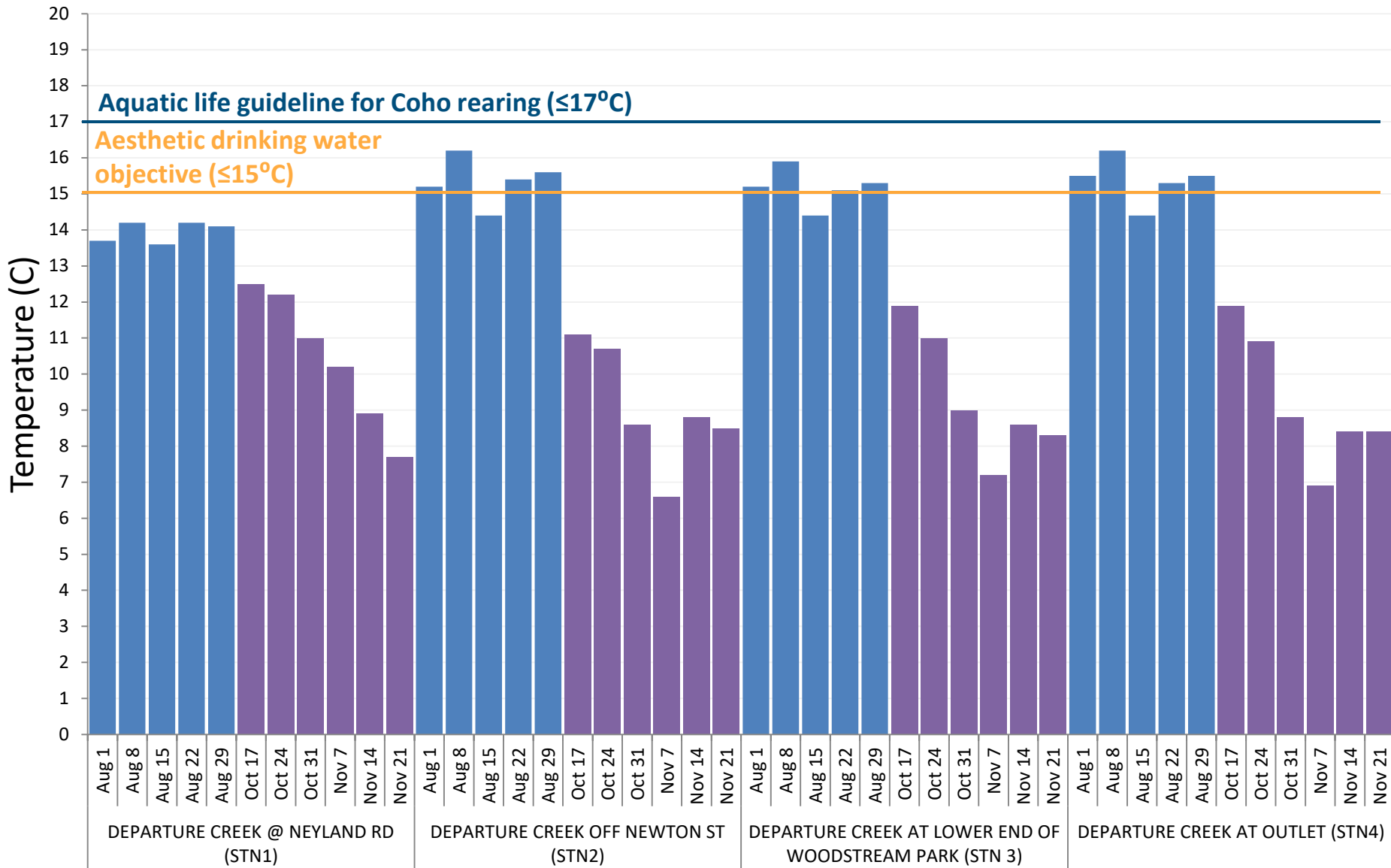
2017 Walley Creek Streamkeepers



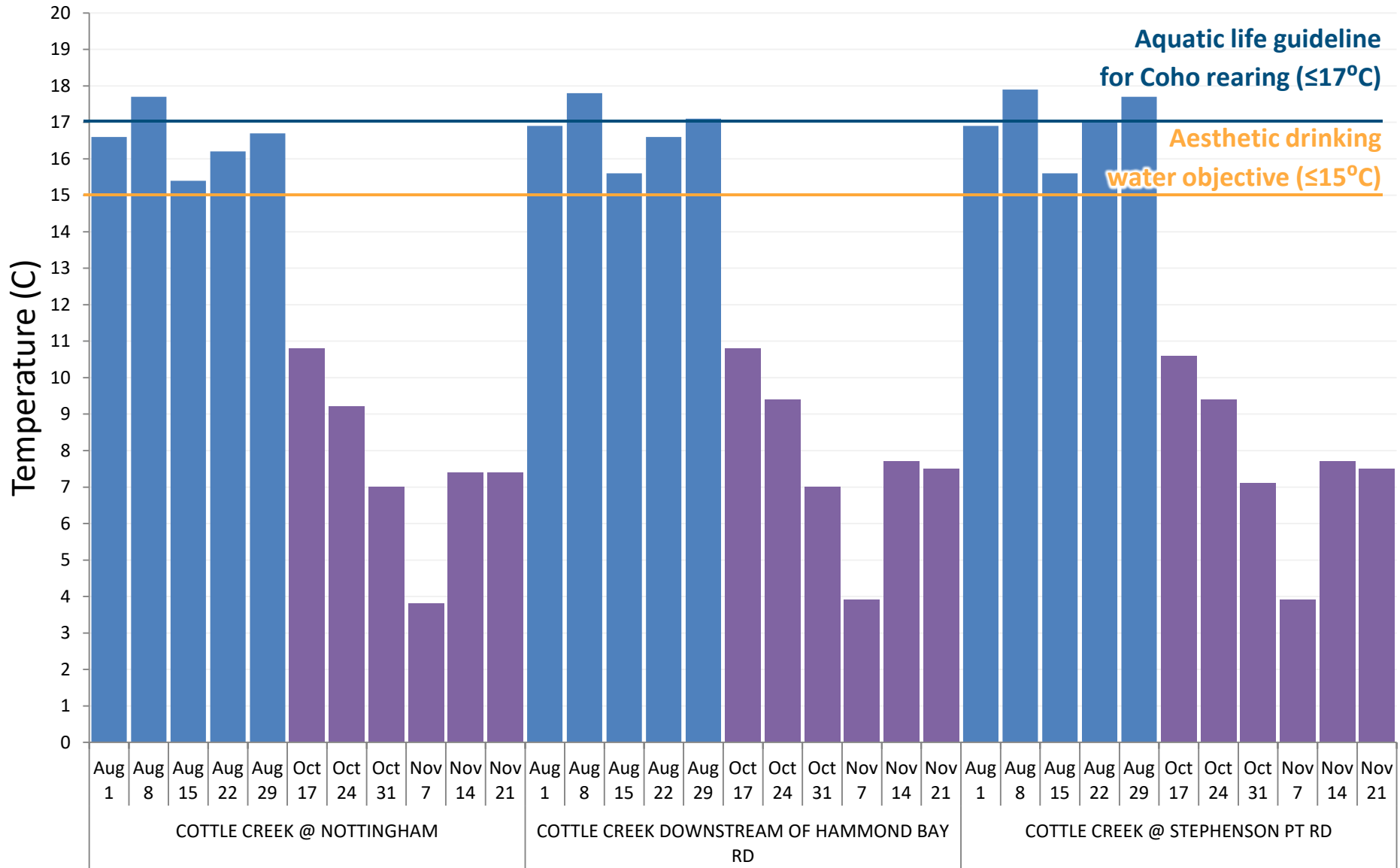
2017 Island Waters Fly Fishers



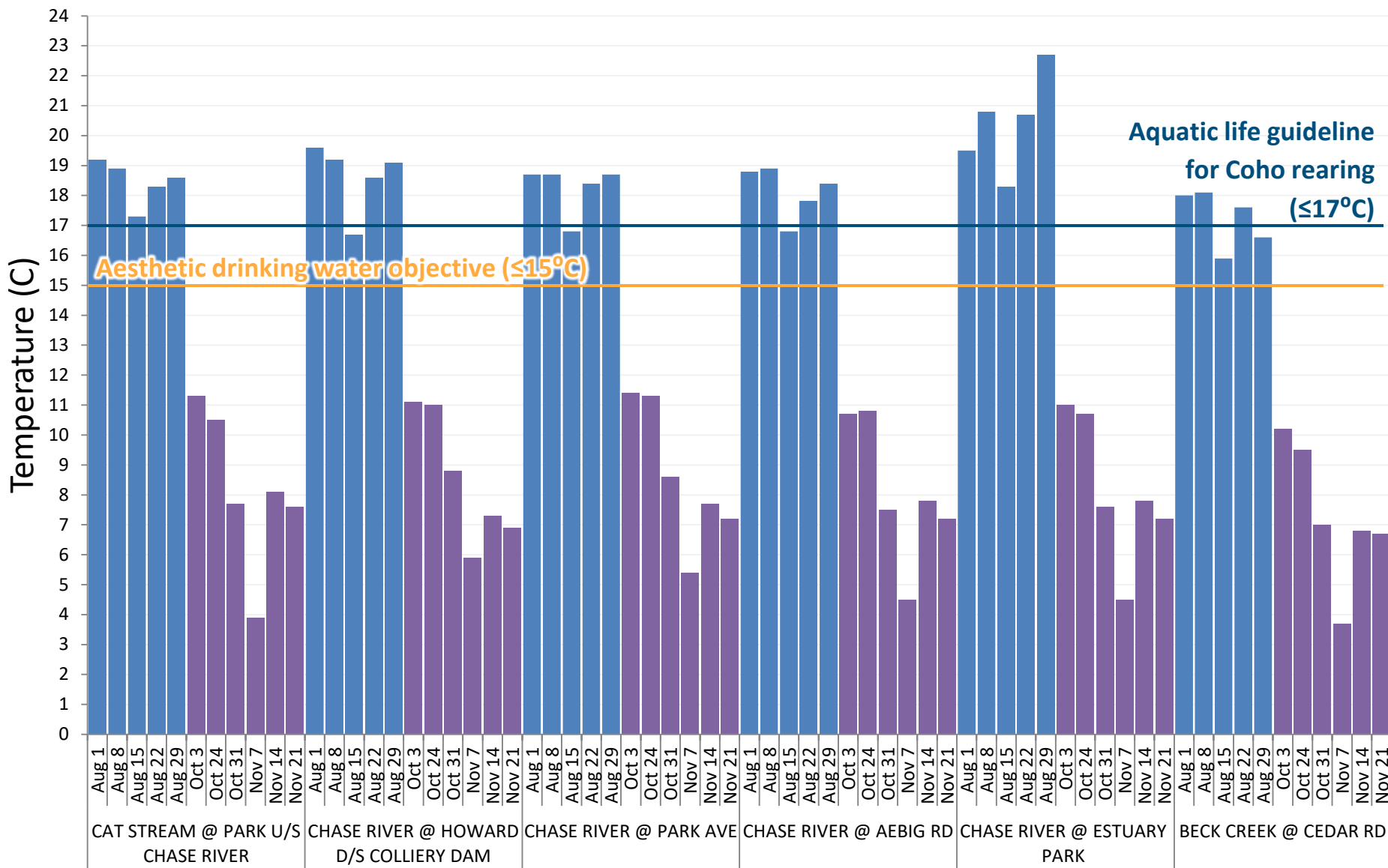
2017 Departure Creek Streamkeepers



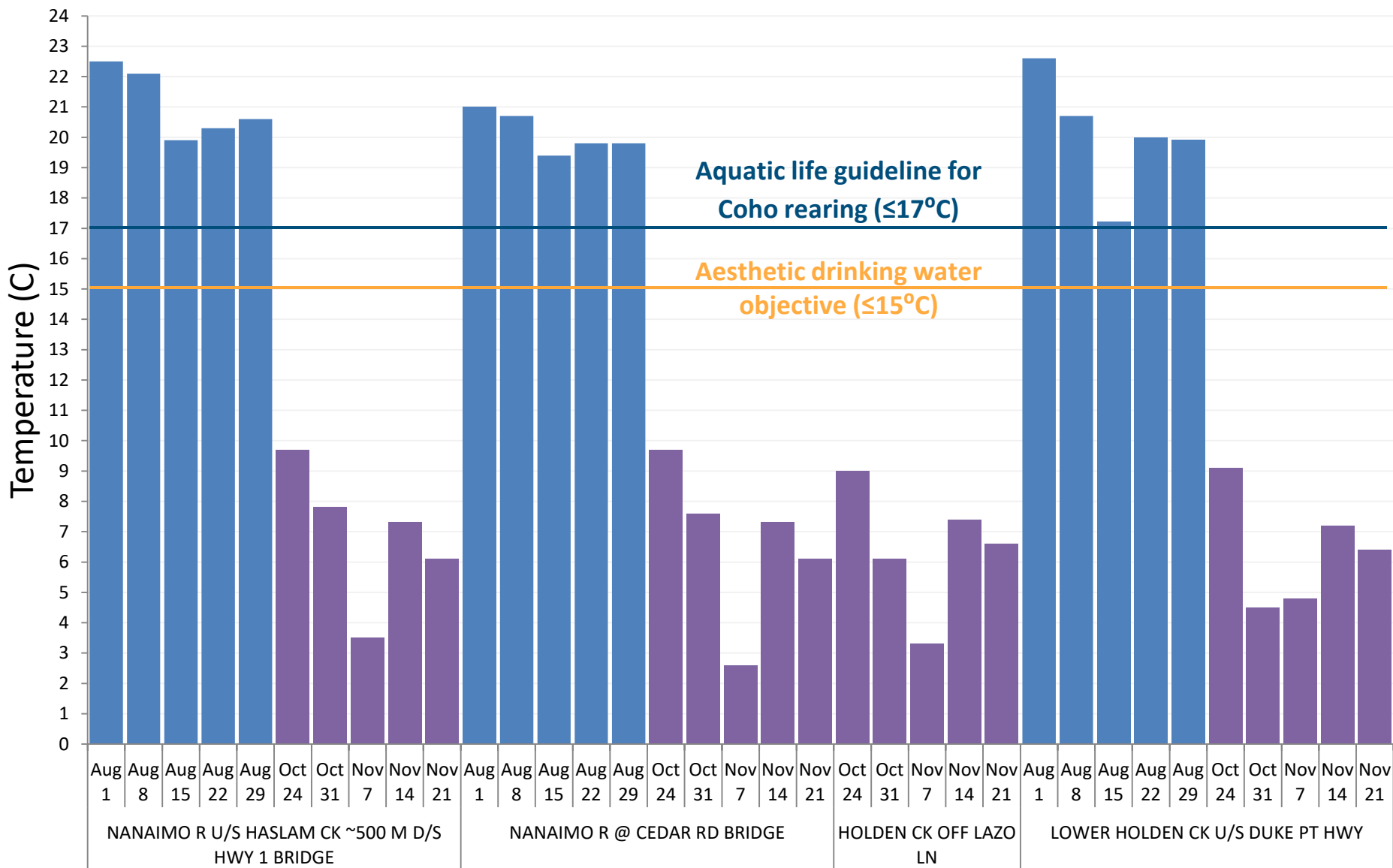
2017 Departure Creek Streamkeepers



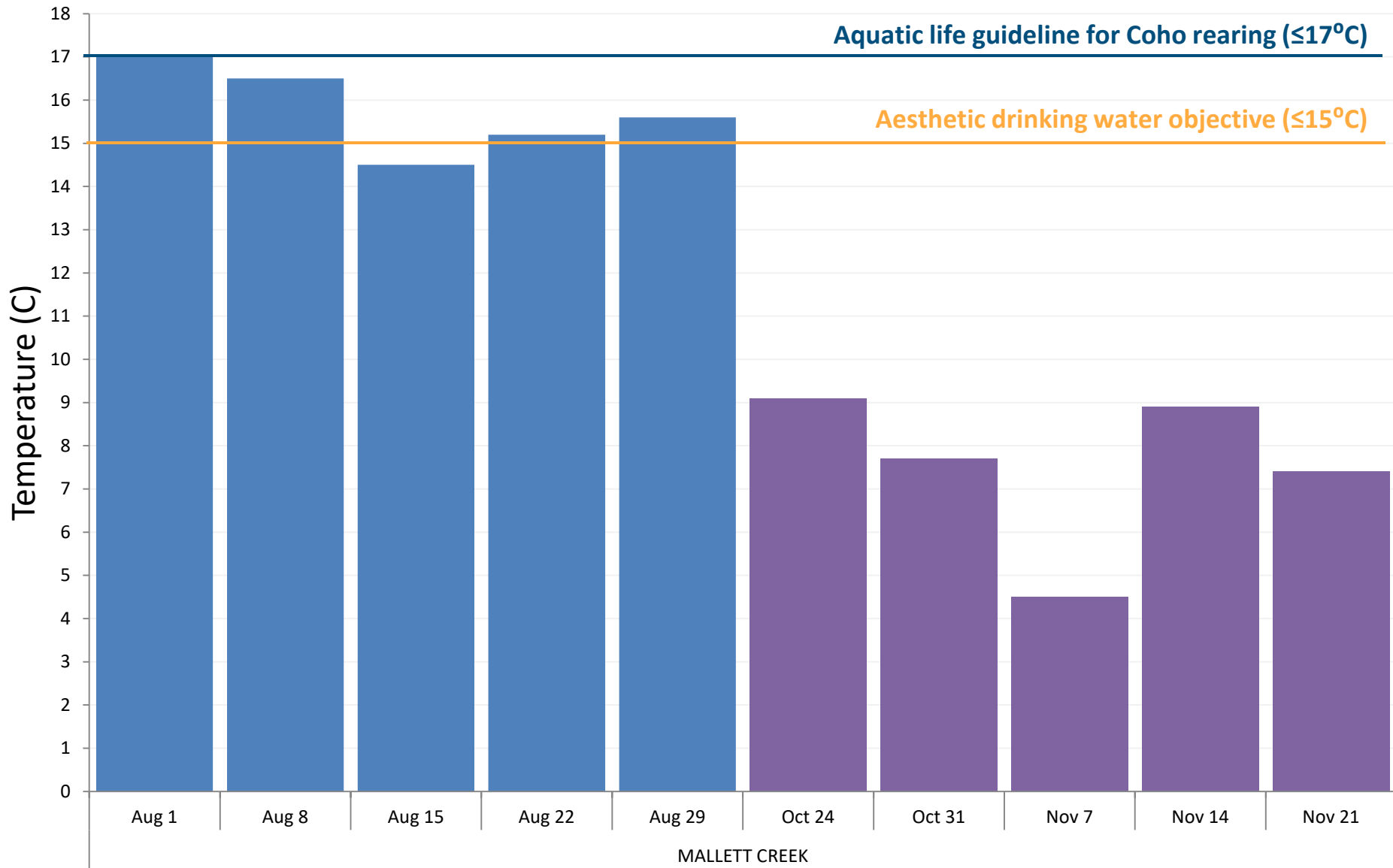
2017 Fisheries & Aquaculture Department - Vancouver Island University



2017 Nanaimo & Area Land Trust



2017 Gabriola Streamkeepers



MALLETT CREEK

Aesthetic drinking water objective (mean weekly maximum temperatures $\leq 15^{\circ}\text{C}$) potential to exceed at:

most low elevation sites in summer

Aquatic life guideline for Coho rearing (mean weekly maximum temperatures $\leq 17^{\circ}\text{C}$) potential to exceed at:

Mallett Creek	Morison Creek	Millstone River
Little Qualicum River	Cottle Creek	Nanaimo River
Englishman River	Holden Creek	Chase River
Shelley Creek	Cat Stream	Beck Creek

Temperature



- Typical of shallow wide portions of lower watersheds
- Okay if juvenile fish have lower temperature refuges (riparian, pools, etc.)

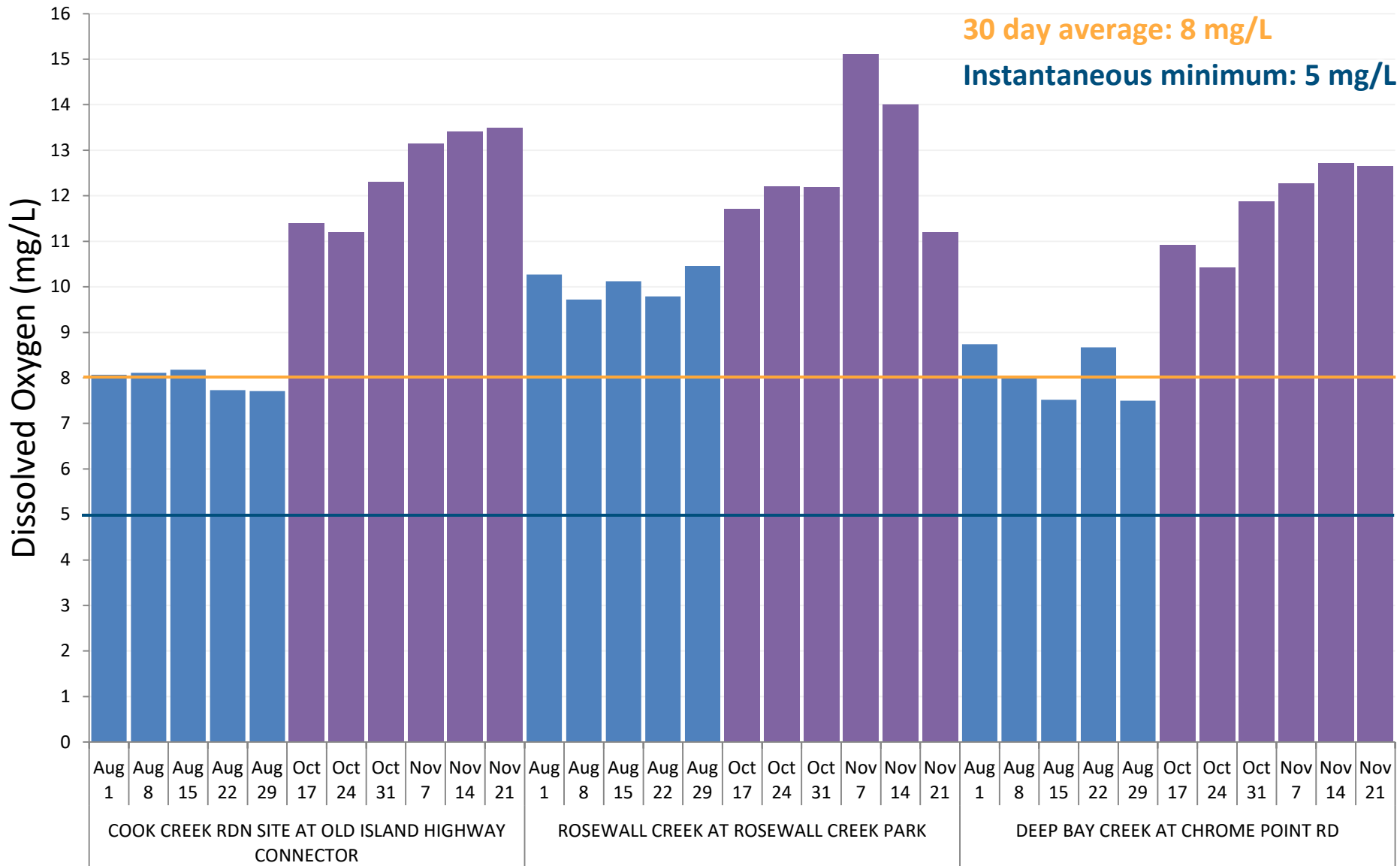
Sample Year	# Summer Samples	# Summer $\geq 15^{\circ}\text{C}$	% Summer $\geq 15^{\circ}\text{C}$	# Summer $\geq 17^{\circ}\text{C}$	% Summer $\geq 17^{\circ}\text{C}$
2014	250	147	58.8%	73	29.2%
2015	225	121	53.8%	51	22.7%
2016	274	168	61.3%	58	21.2%
2017	282	187	66.3%	80	28.4%

Dissolved Oxygen

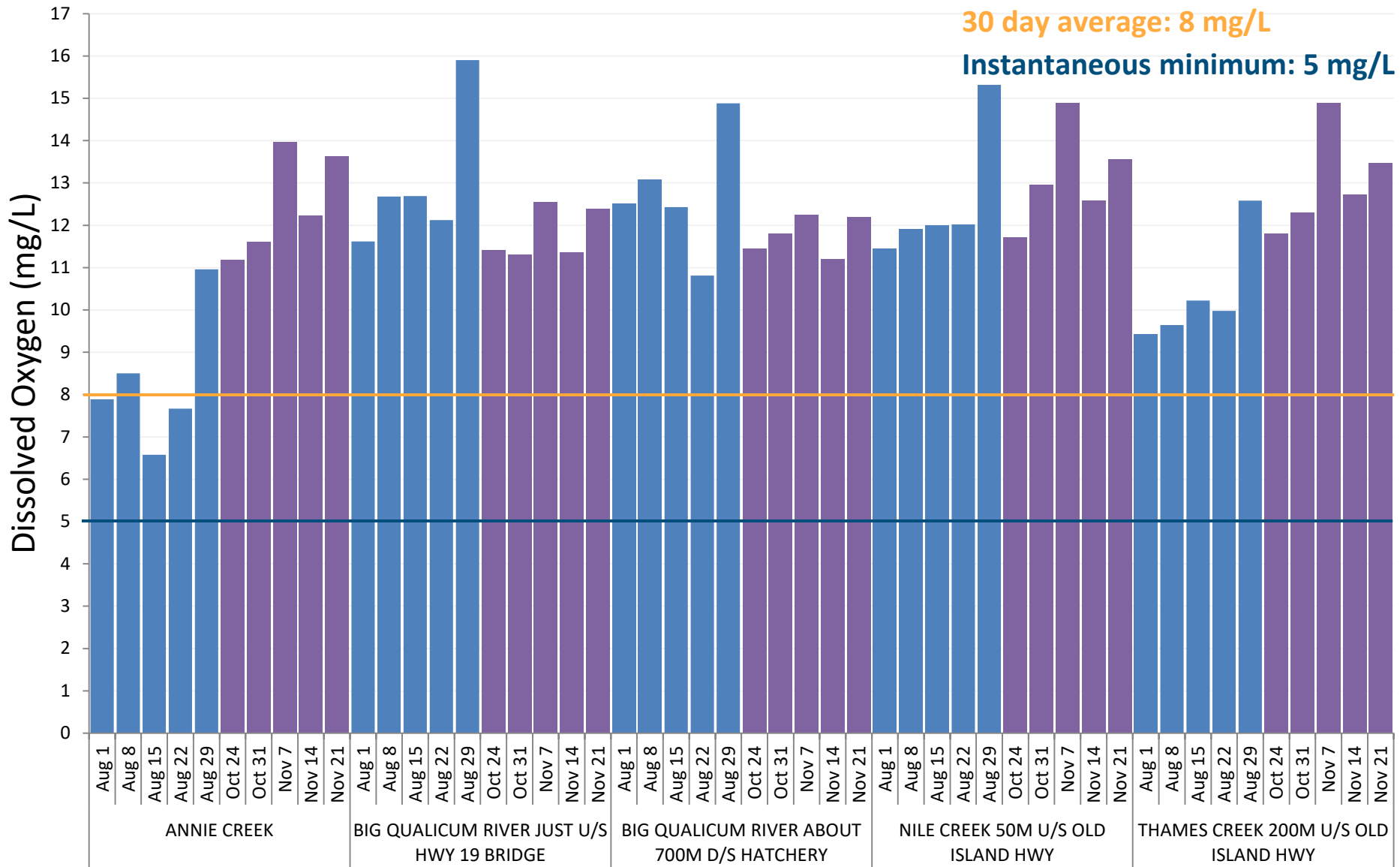


- **30 day average LESS THAN 8 mg/L**
- **Instantaneous minimum LESS THAN 5 mg/L**

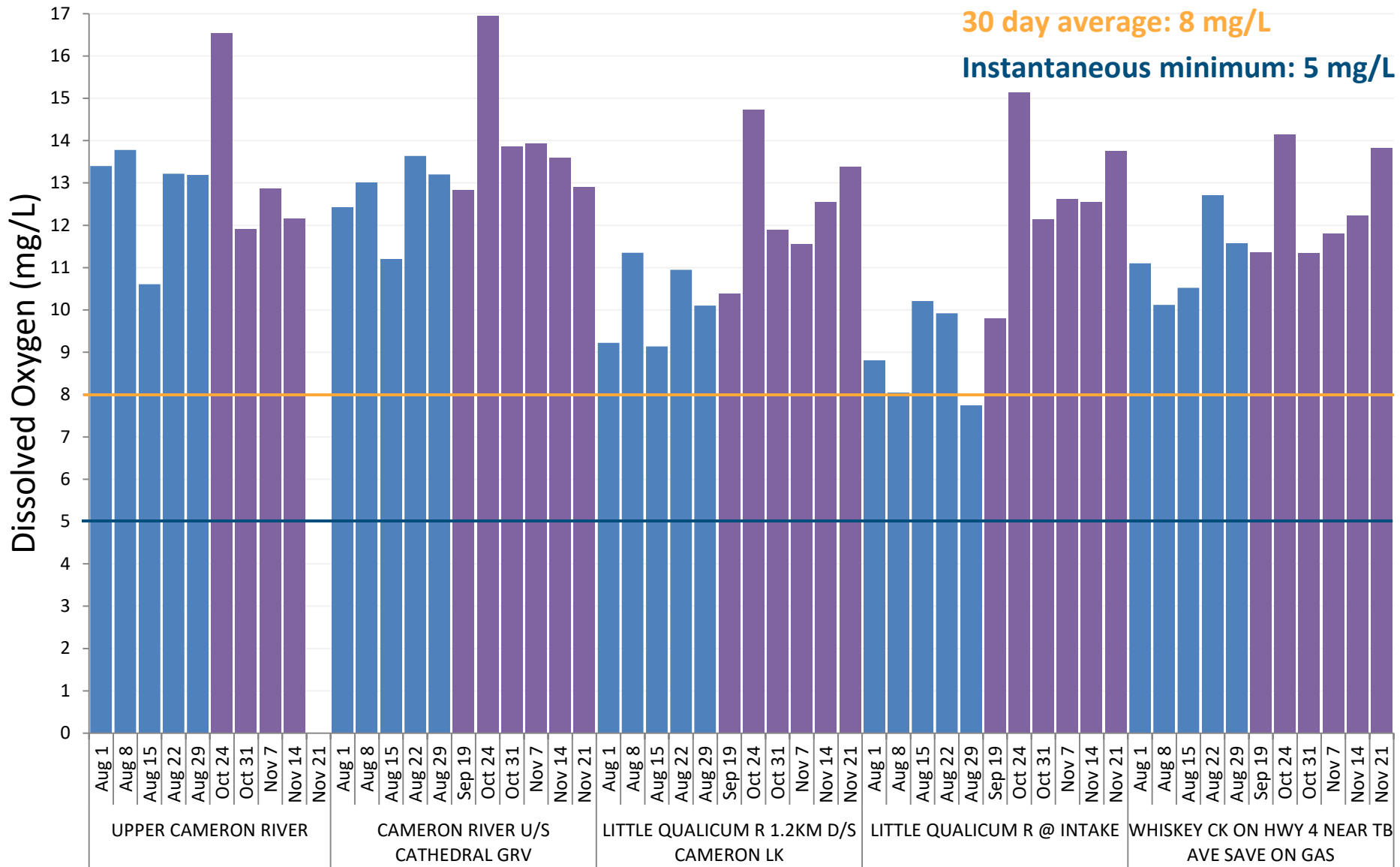
2017 Fanny Bay Salmonid Enhancement Society



2017 Nile Creek Enhancement Society



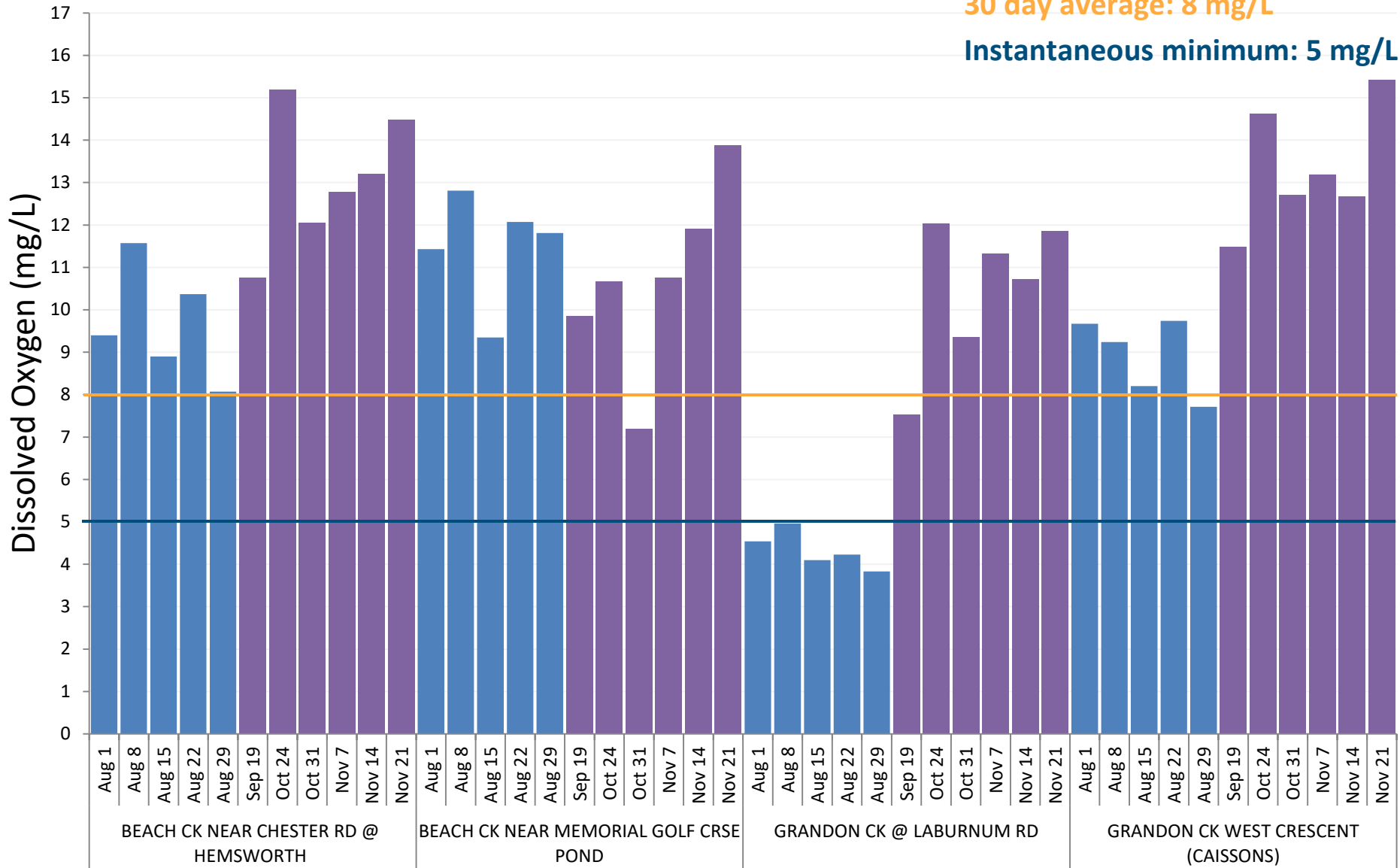
2017 Qualicum Beach Streamkeepers



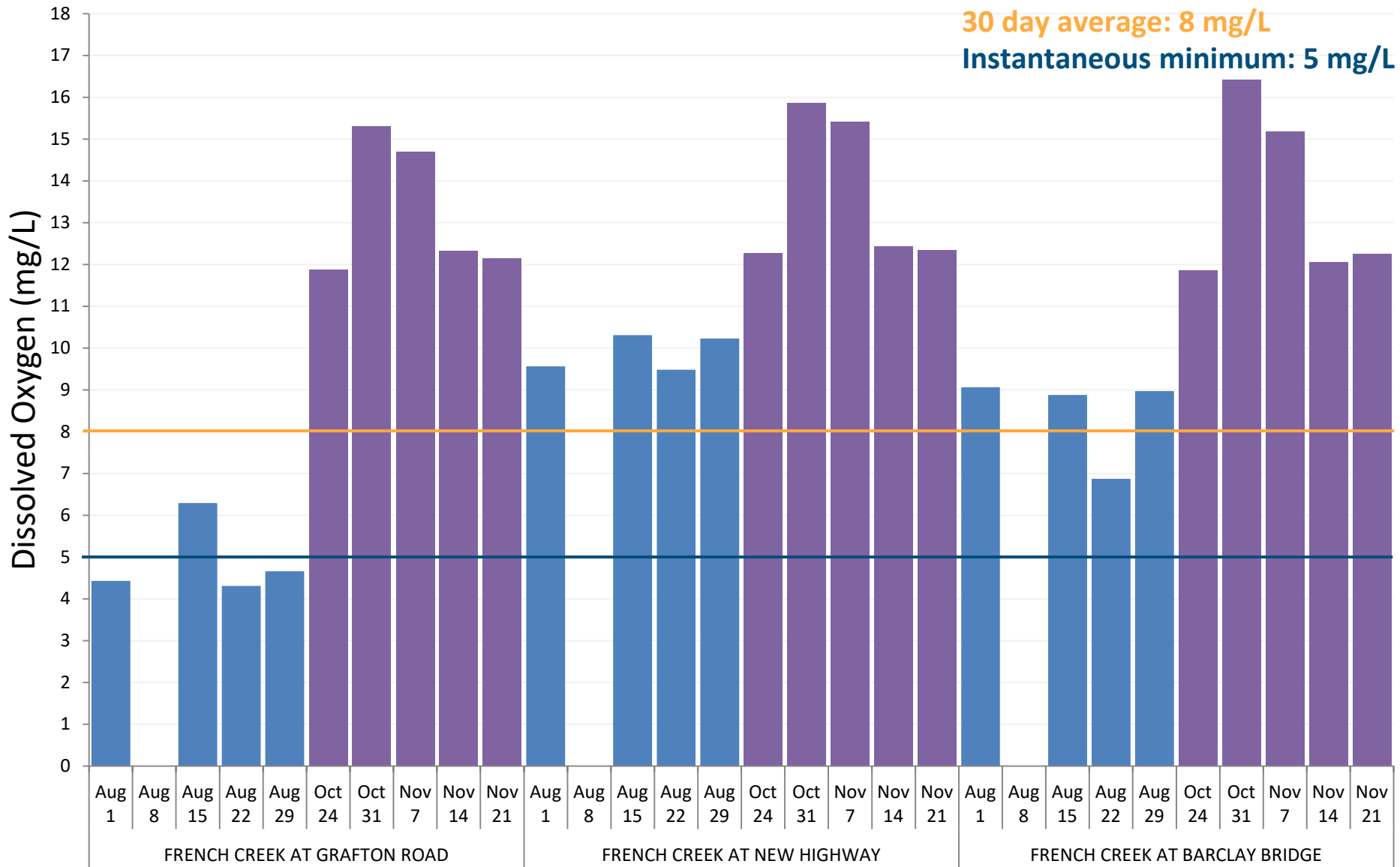
2017 Qualicum Beach Streamkeepers

30 day average: 8 mg/L

Instantaneous minimum: 5 mg/L



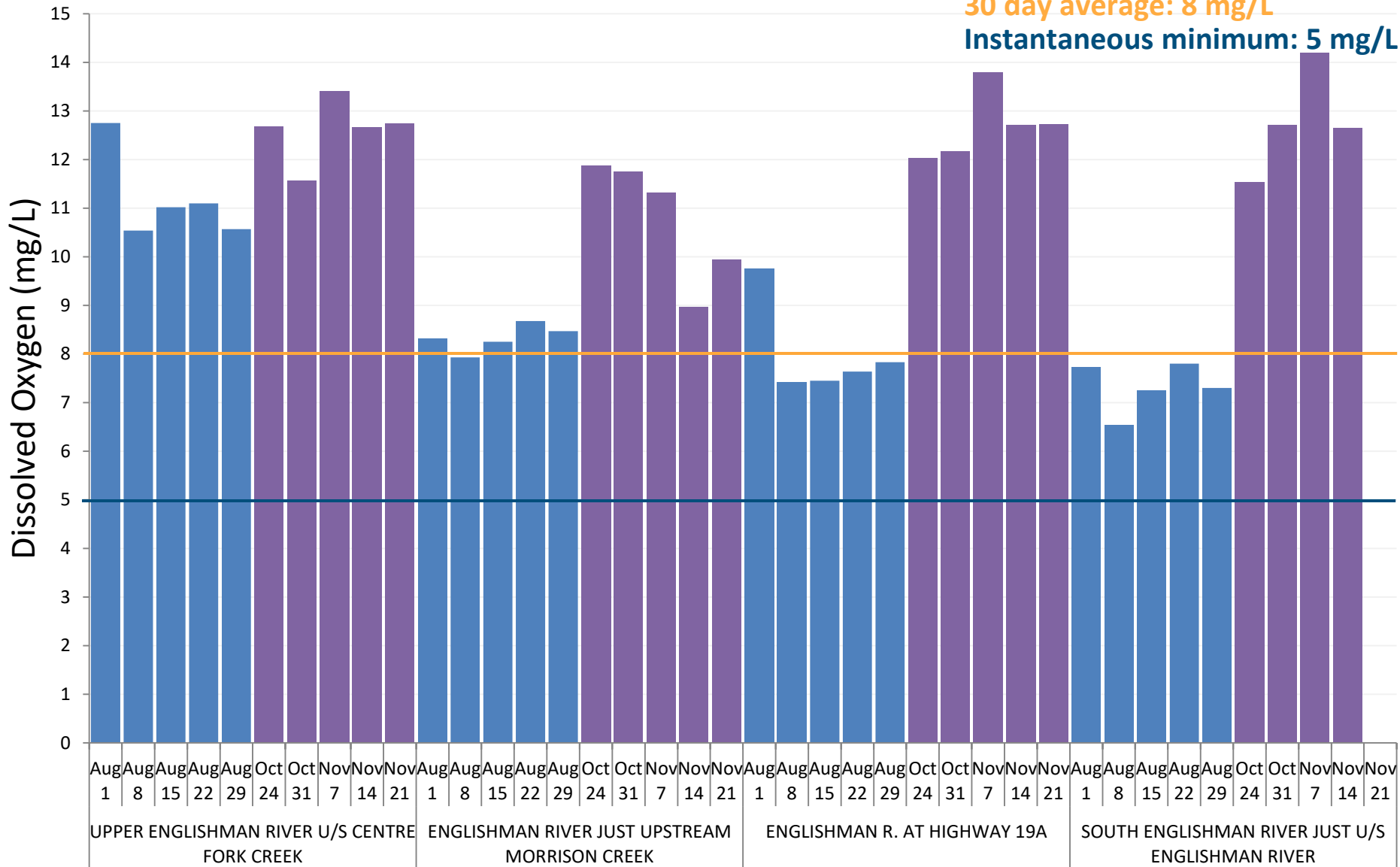
2017 Friends of French Creek Conservation Society



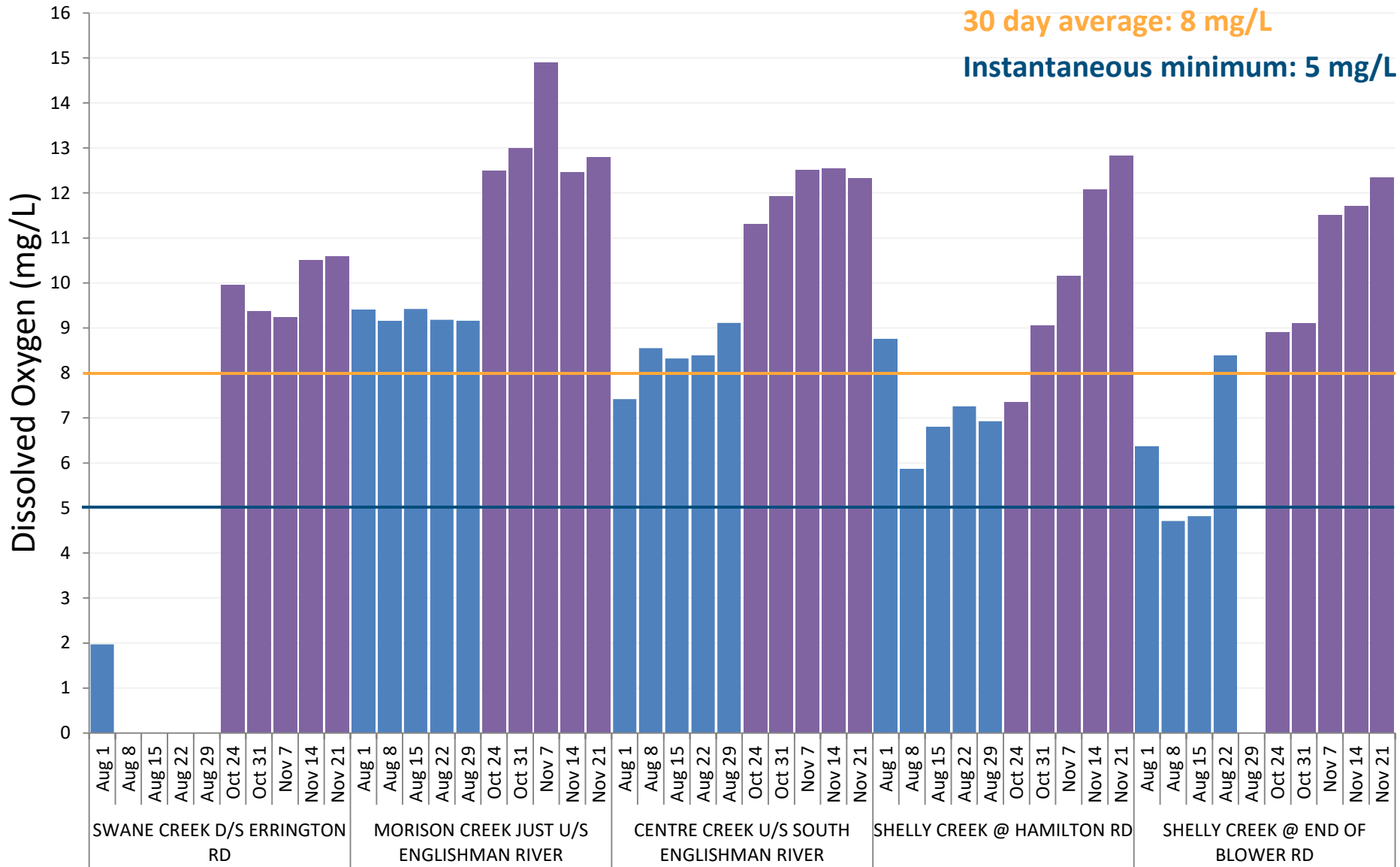
2017 Mid Vancouver Island Habitat Enhancement Society

30 day average: 8 mg/L

Instantaneous minimum: 5 mg/L



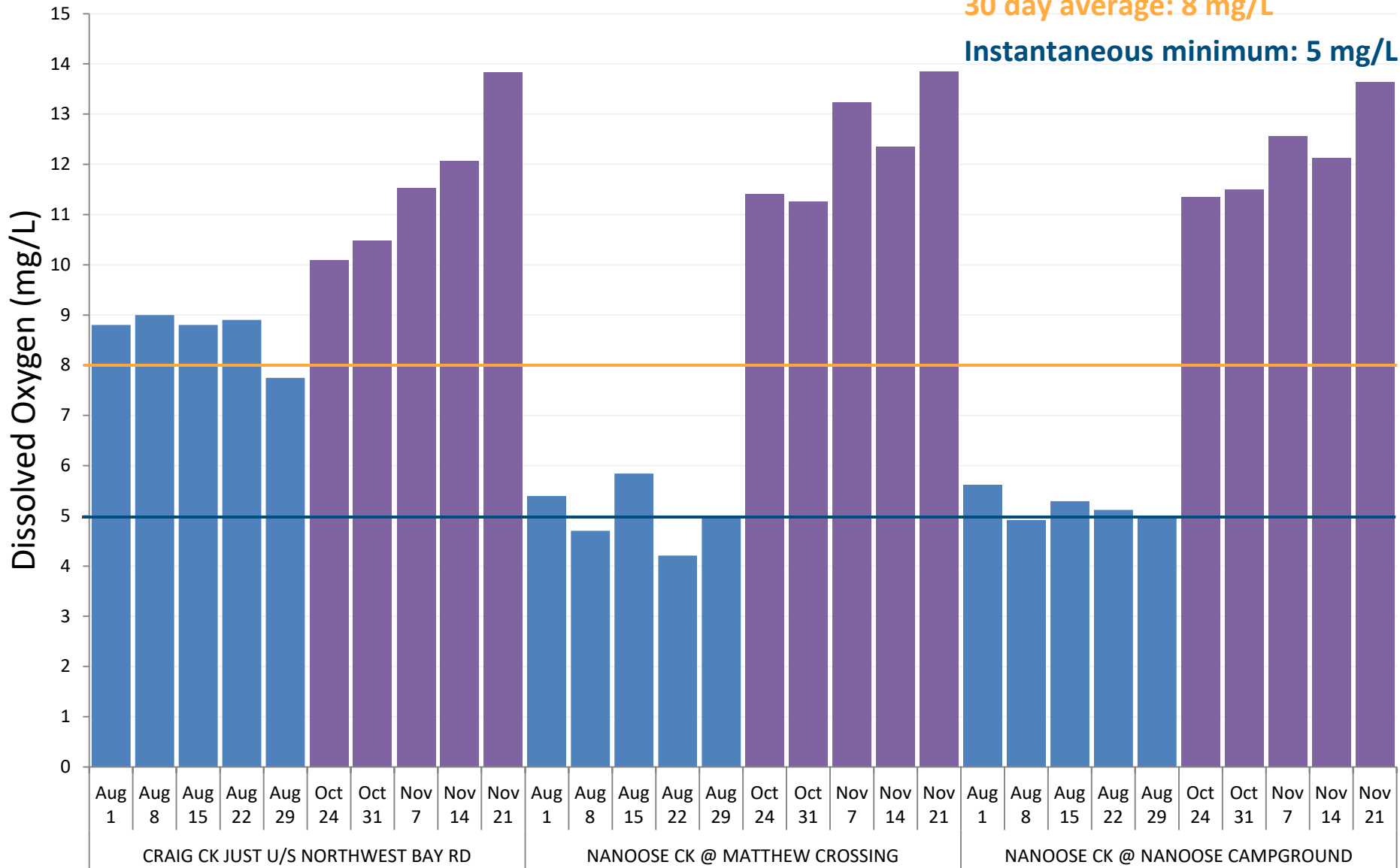
2017 Mid Vancouver Island Habitat Enhancement Society



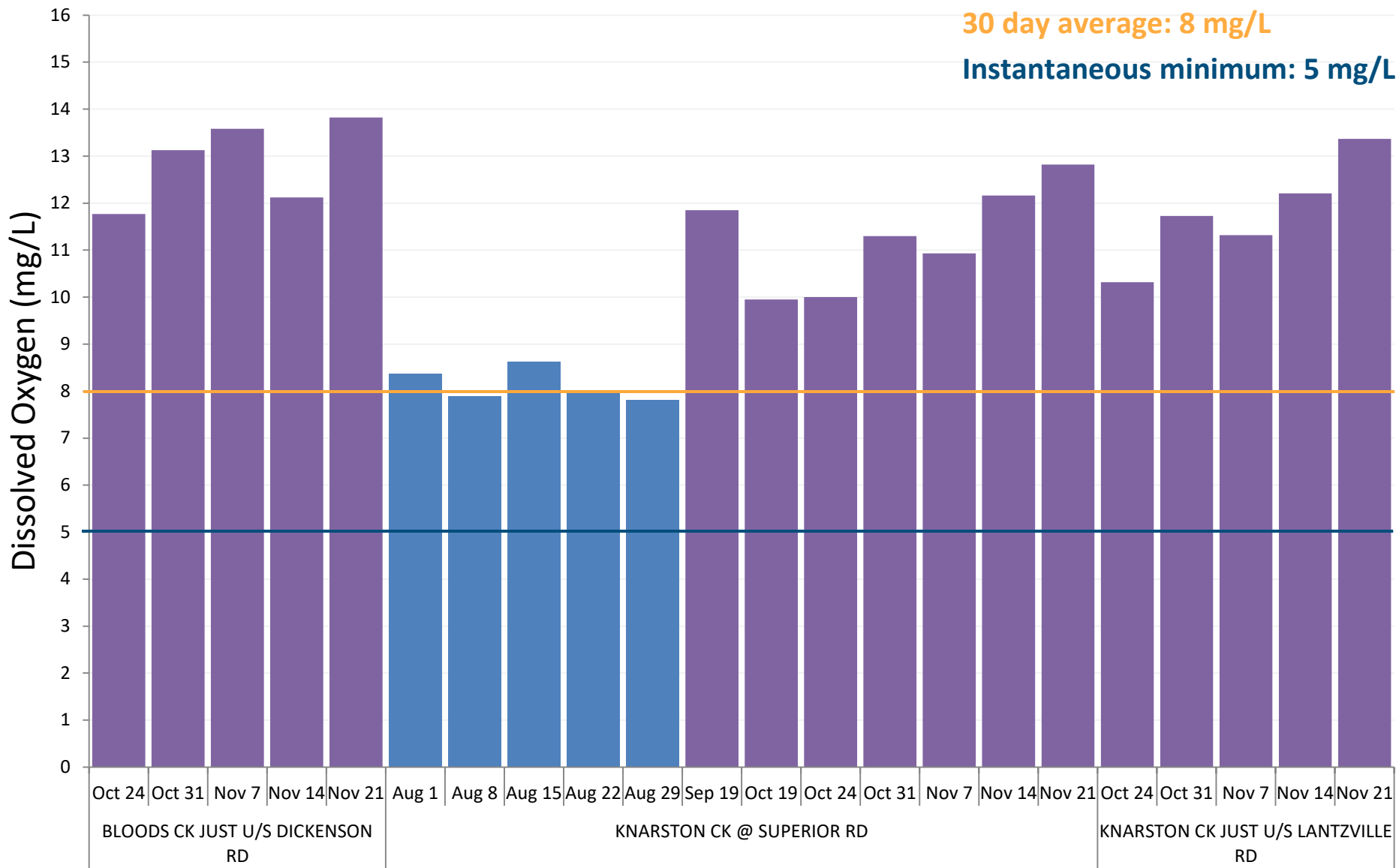
2017 Nanoose Streamkeepers Society

30 day average: 8 mg/L

Instantaneous minimum: 5 mg/L



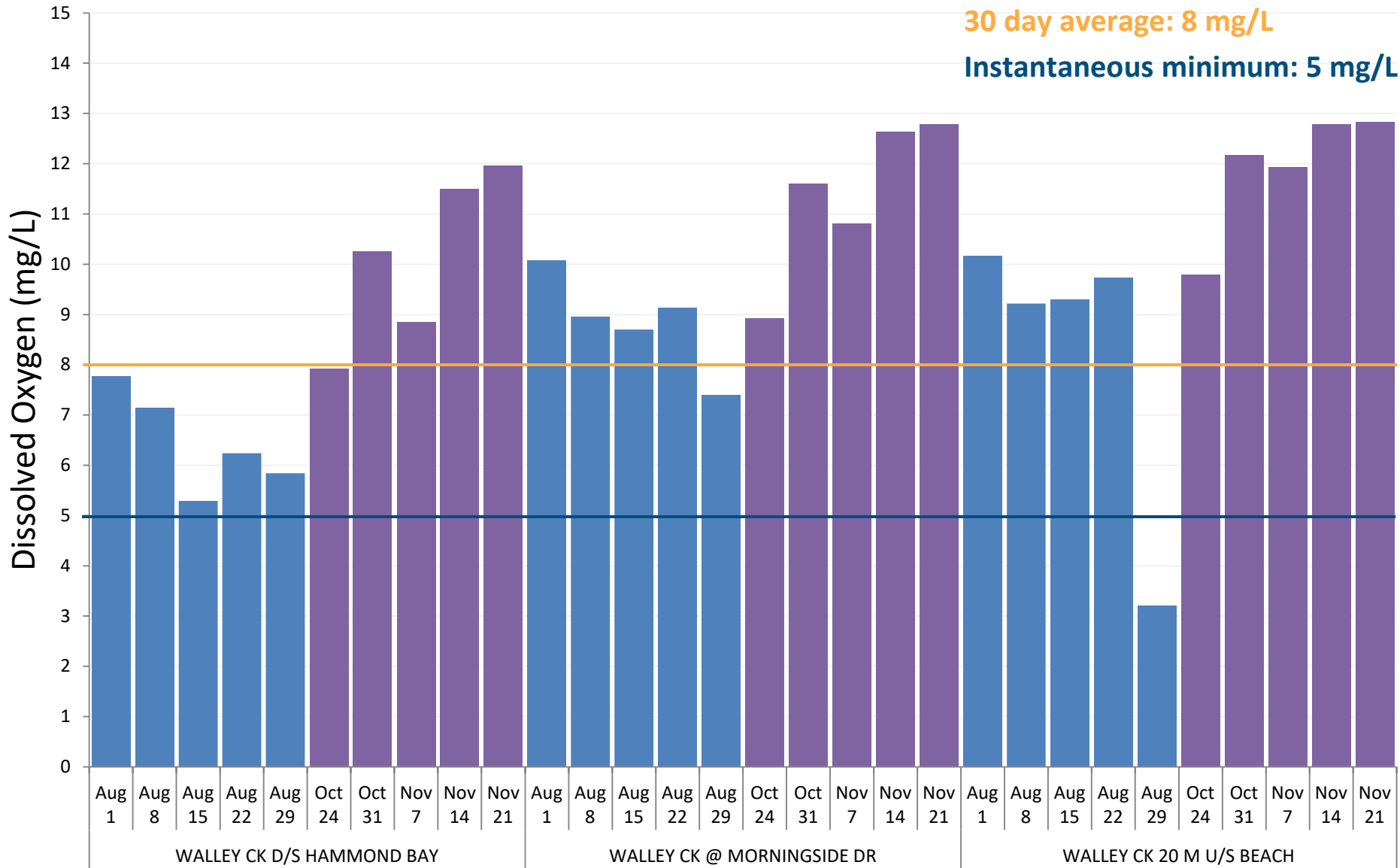
2017 Island Waters Fly Fishers & Lantzville Streamkeepers



2017 Walley Creek Streamkeepers

30 day average: 8 mg/L

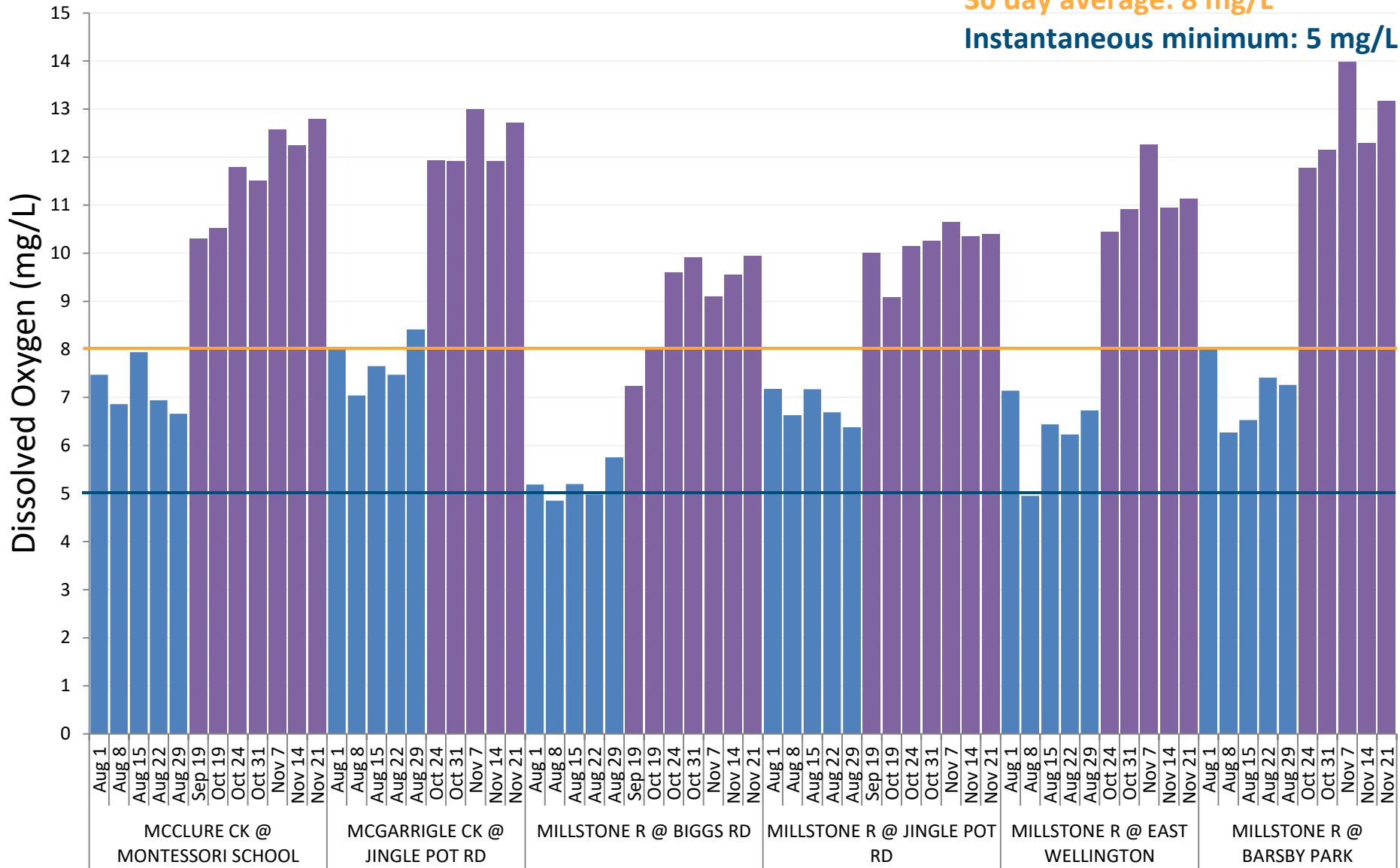
Instantaneous minimum: 5 mg/L



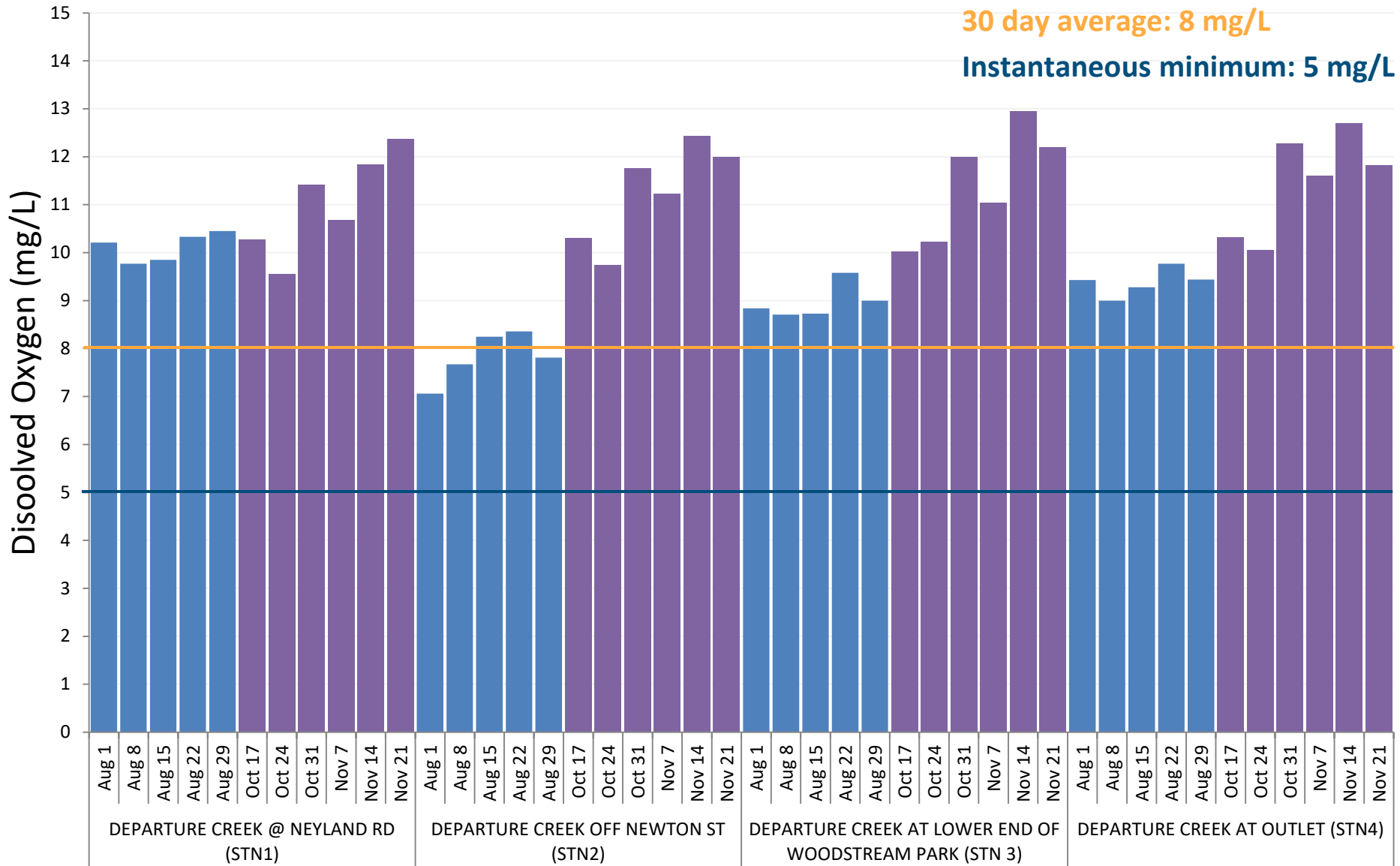
2017 Island Waters Fly Fishers

30 day average: 8 mg/L

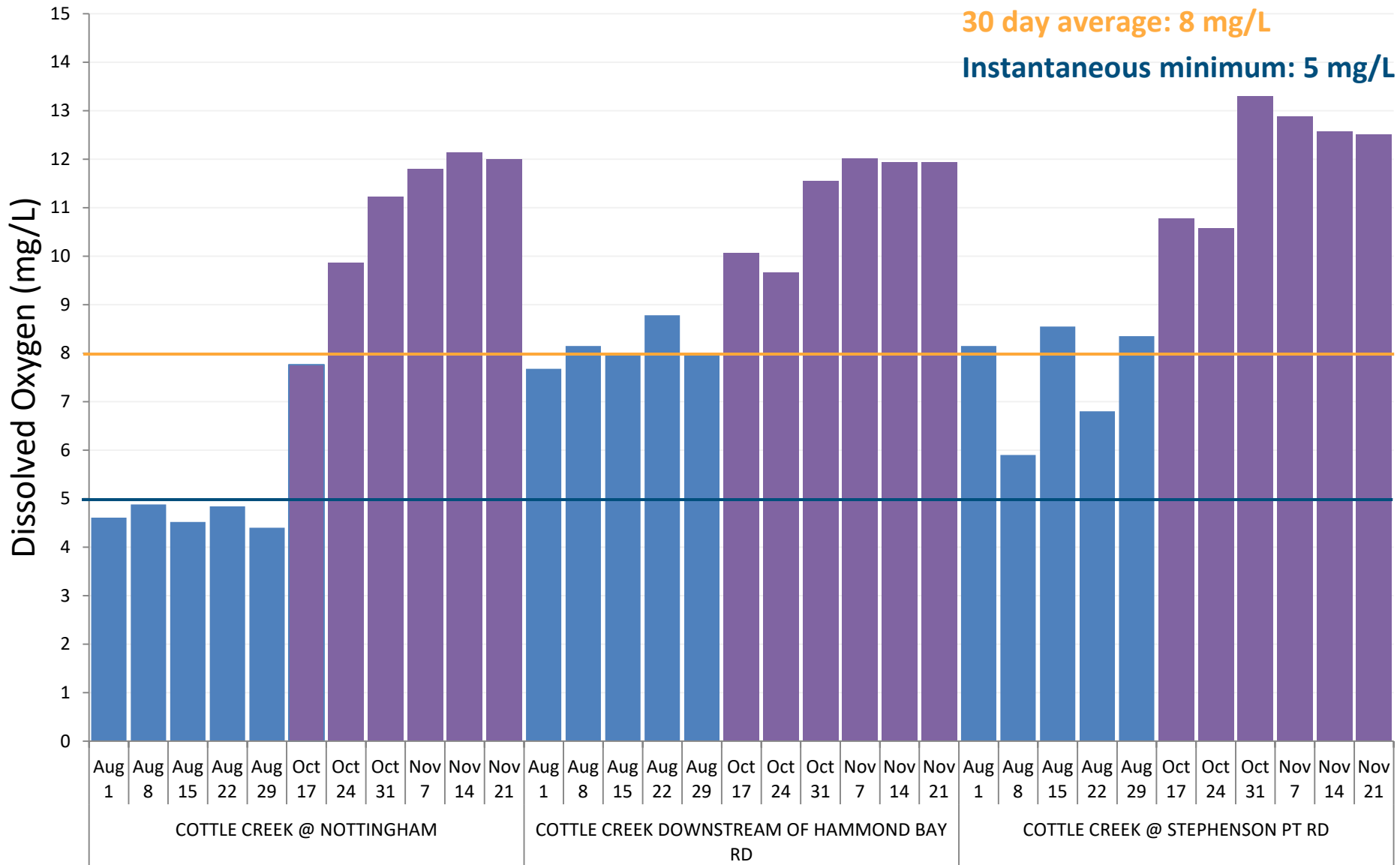
Instantaneous minimum: 5 mg/L



2017 Departure Creek Streamkeepers

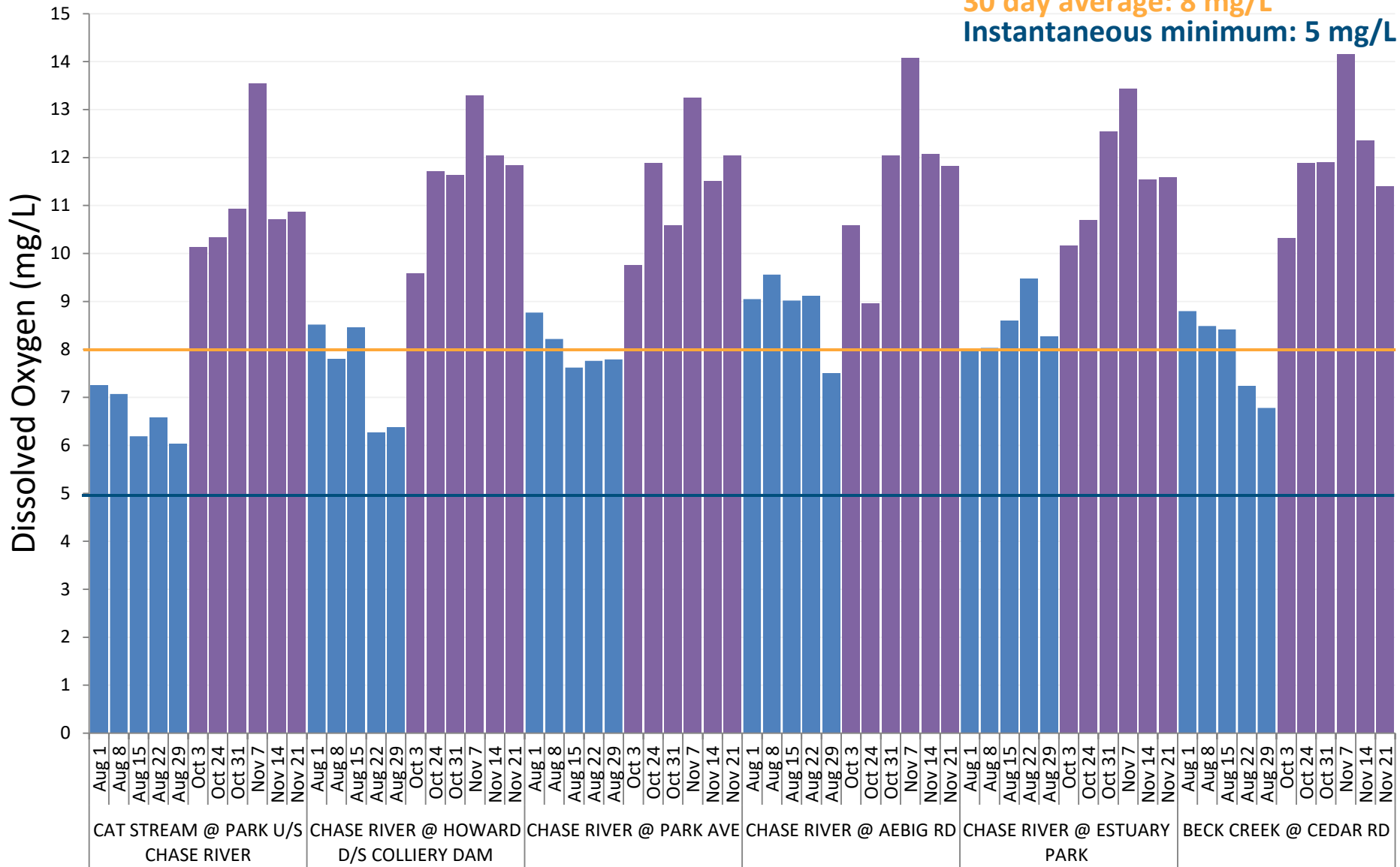


2017 Departure Creek Streamkeepers



2017 Fisheries & Aquaculture Department - Vancouver Island University

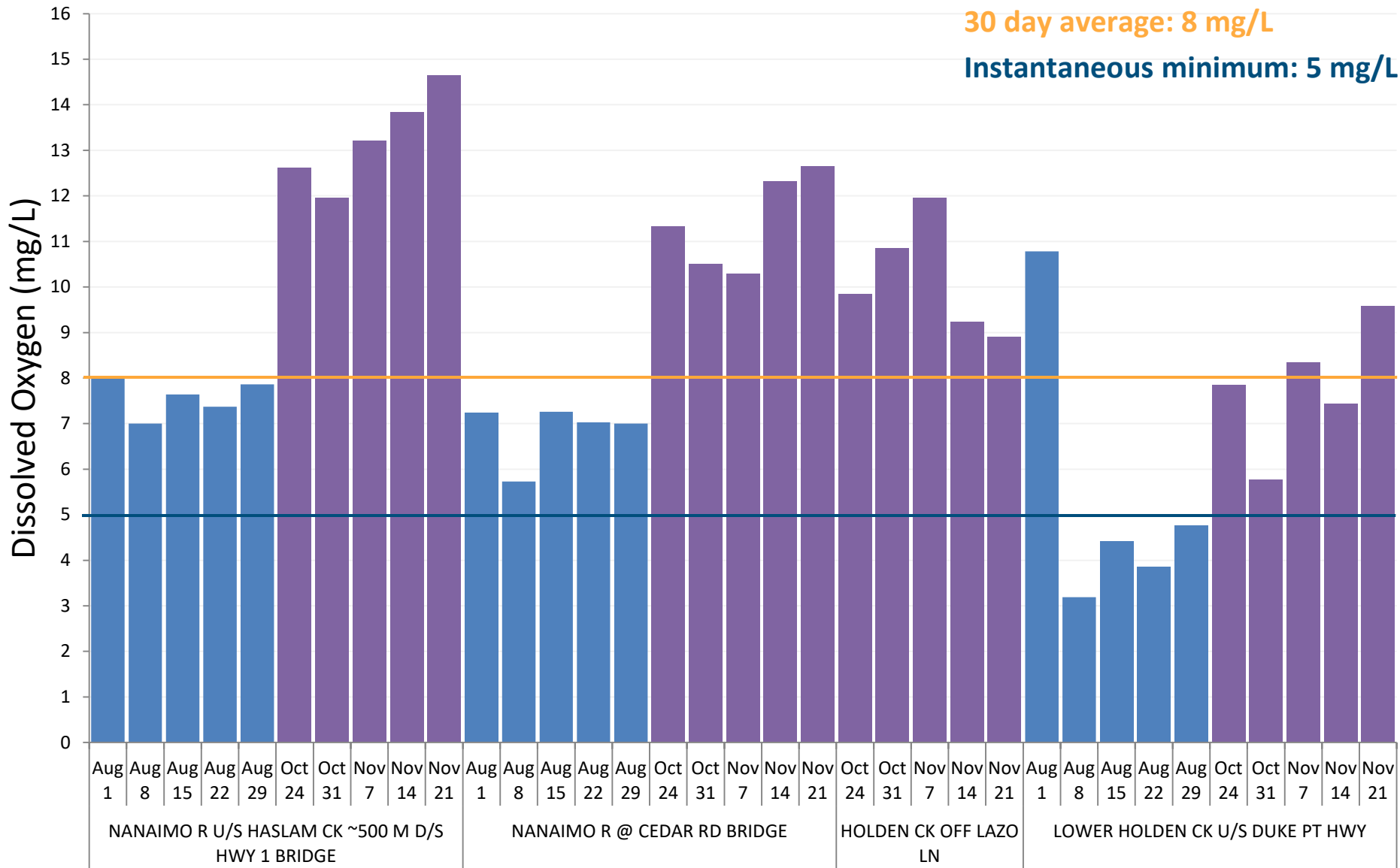
30 day average: 8 mg/L
Instantaneous minimum: 5 mg/L



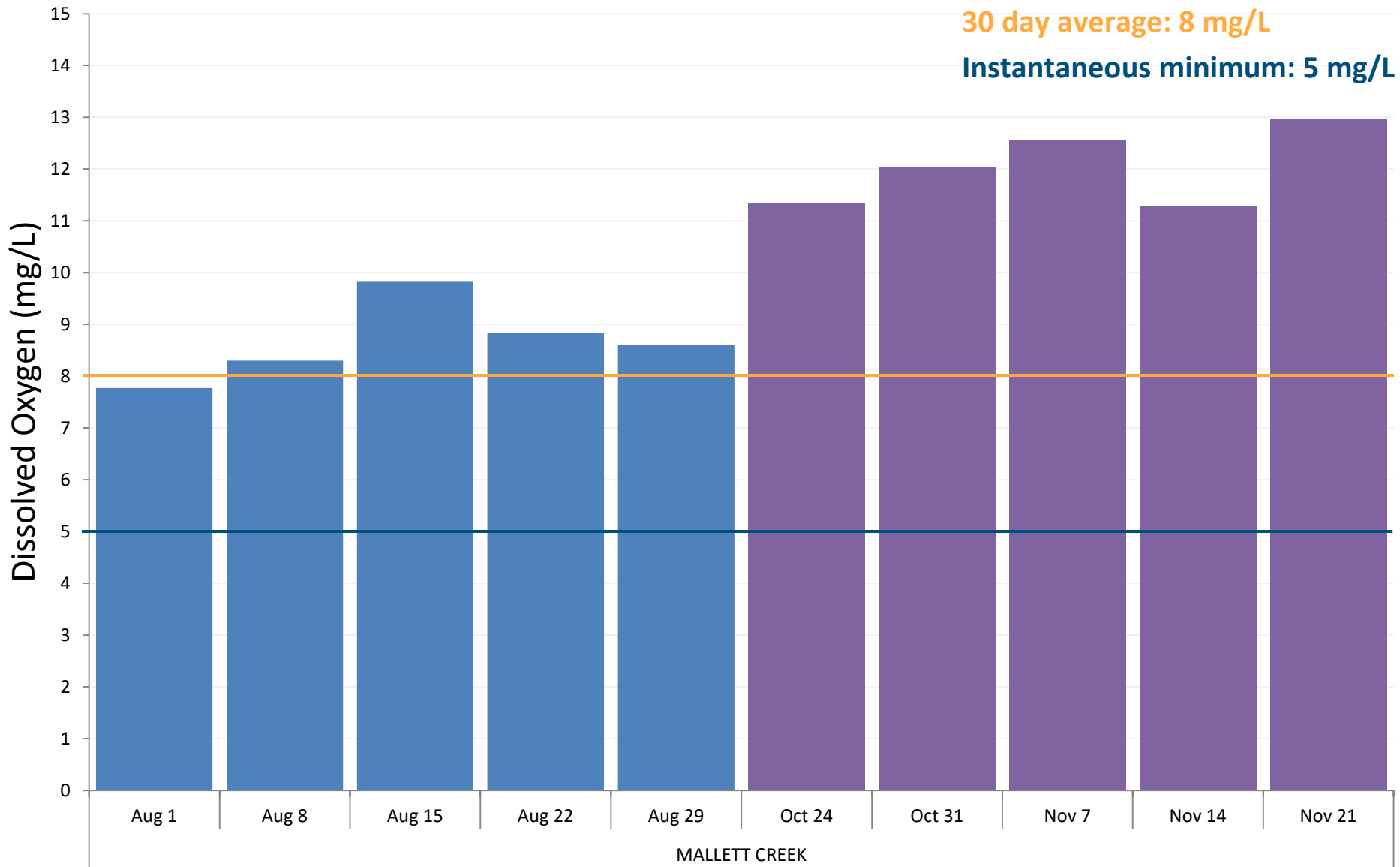
2017 Nanaimo & Area Land Trust

30 day average: 8 mg/L

Instantaneous minimum: 5 mg/L



2017 Gabriola Streamkeepers



MALLETT CREEK

Dissolved Oxygen (DO)

Below instantaneous min. guideline (5 mg/L) at:

Grandon Ck (Laburnum)	Shelley Ck (Blower)
Cottle Ck (Nottingham)	Nanoose Ck (both sites)
Swane Ck (Errington)	Lower Holden Ck
French Ck (Grafton)	Millstone (Biggs & E. Well.)

- Occurred consistently at very low flow sites
- Sites in **blue** had levels below both DO guidelines
- In 2017 two sites went subsurface at sample location:
 - Swane Creek downstream Errington Road between Aug 1st & 8th
 - Shelley Creek at end of Blower Road went dry between Aug 22nd & 29th

Below 30 day average (8 mg/L) at:

Departure Ck (Newton)

Cottle Ck (Nottingham & Stephenson Pt)

Millstone (all 4 sites)

McGarrigle Ck (Jingle Pot)

Nanoose Ck (both sites)

South Englishman R

Nanaimo R (both sites)

Lower Holden Ck

Grandon Ck (Laburnum)

Chase R (Howard)

Cat Stream (Park)

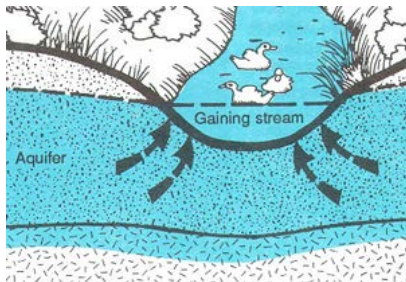
Beck Ck (Cedar)

Shelley Ck (Hamilton & Blower*)

French Ck (Grafton)*

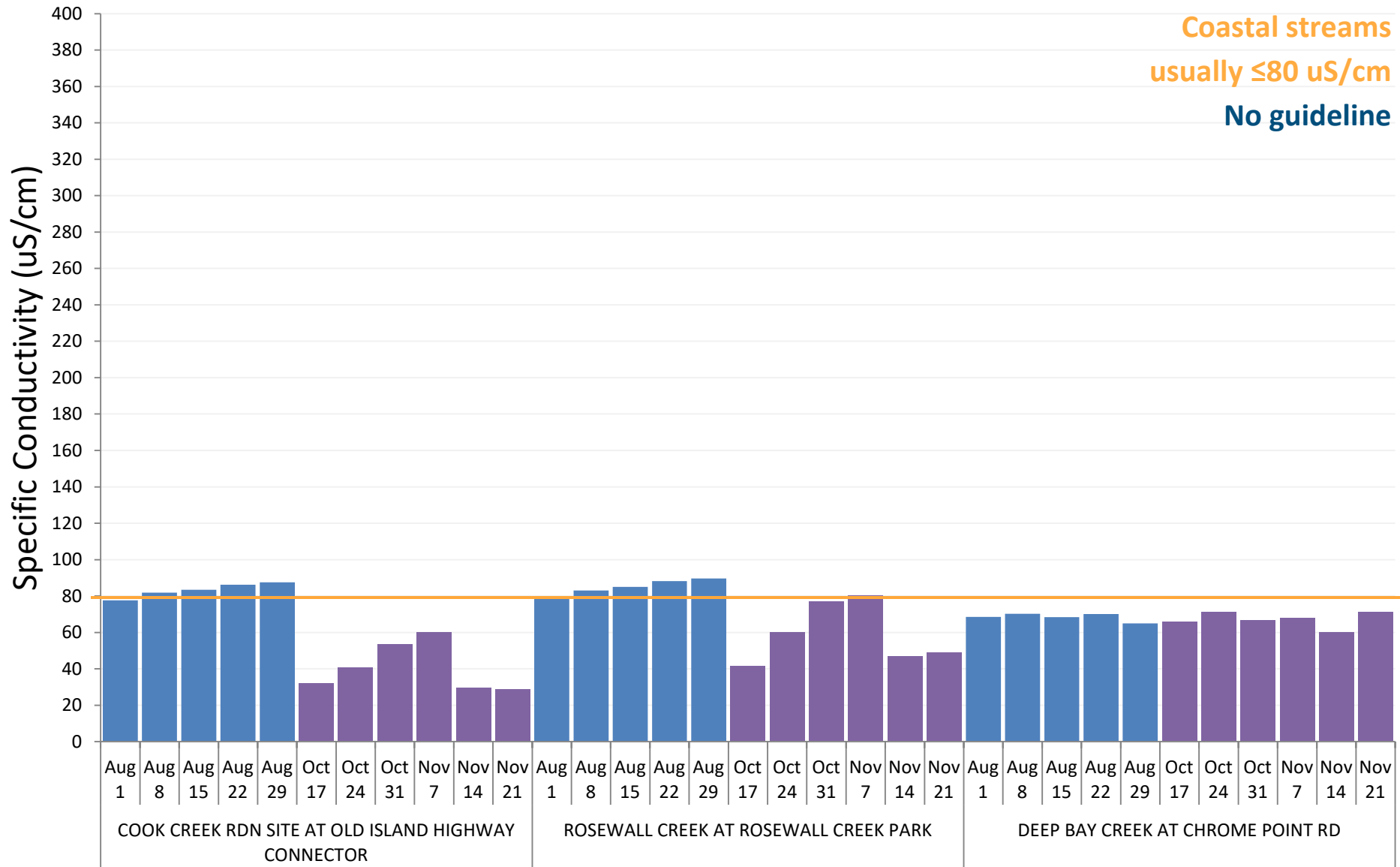
*4 in 30 rather than 5 in 30

Specific Conductivity



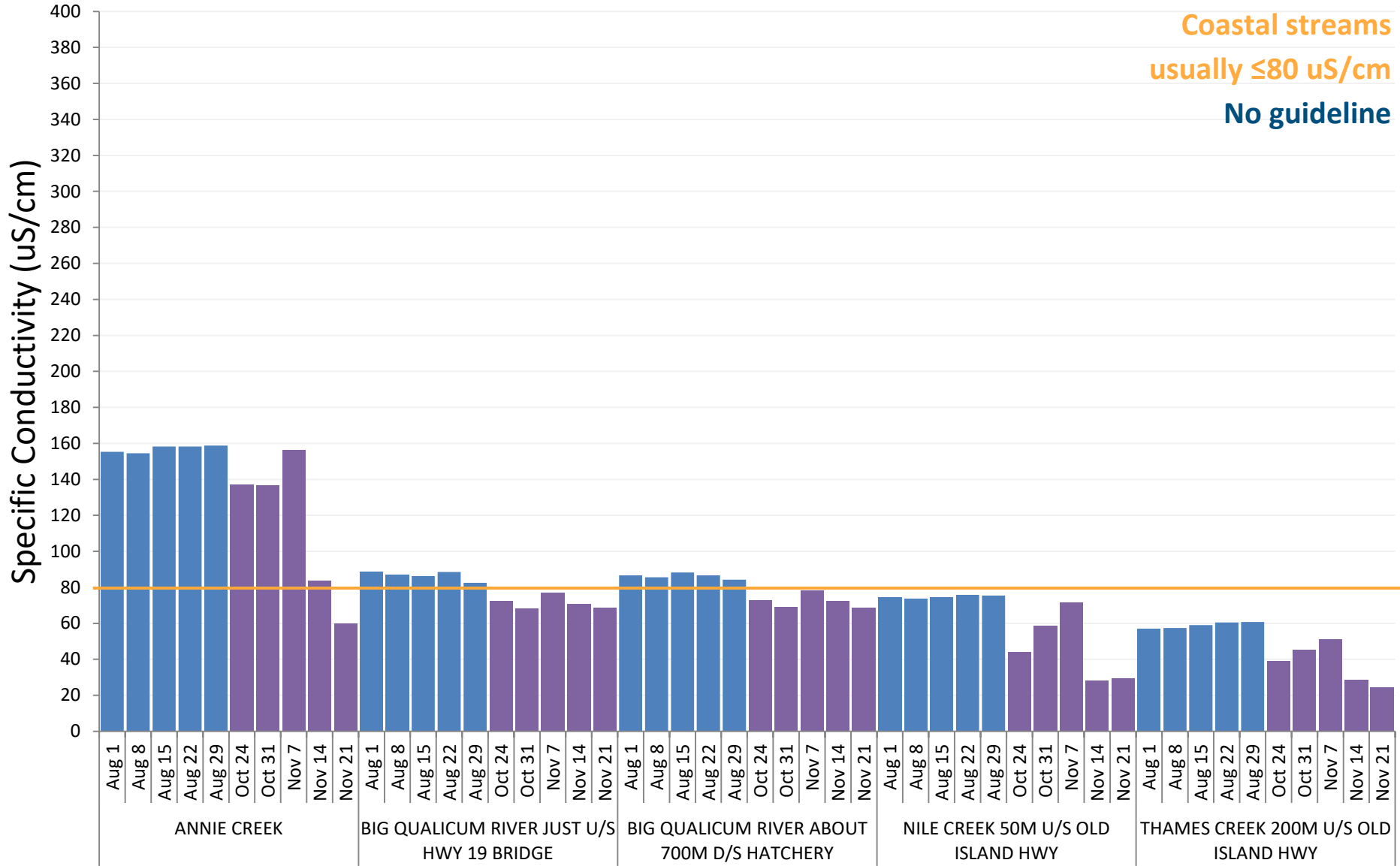
- **Most coastal streams measure less than 80 uS/cm but can be more if groundwater influences are present**
- **No provincial guideline for this parameter**

2017 Fanny Bay Salmonid Enhancement Society



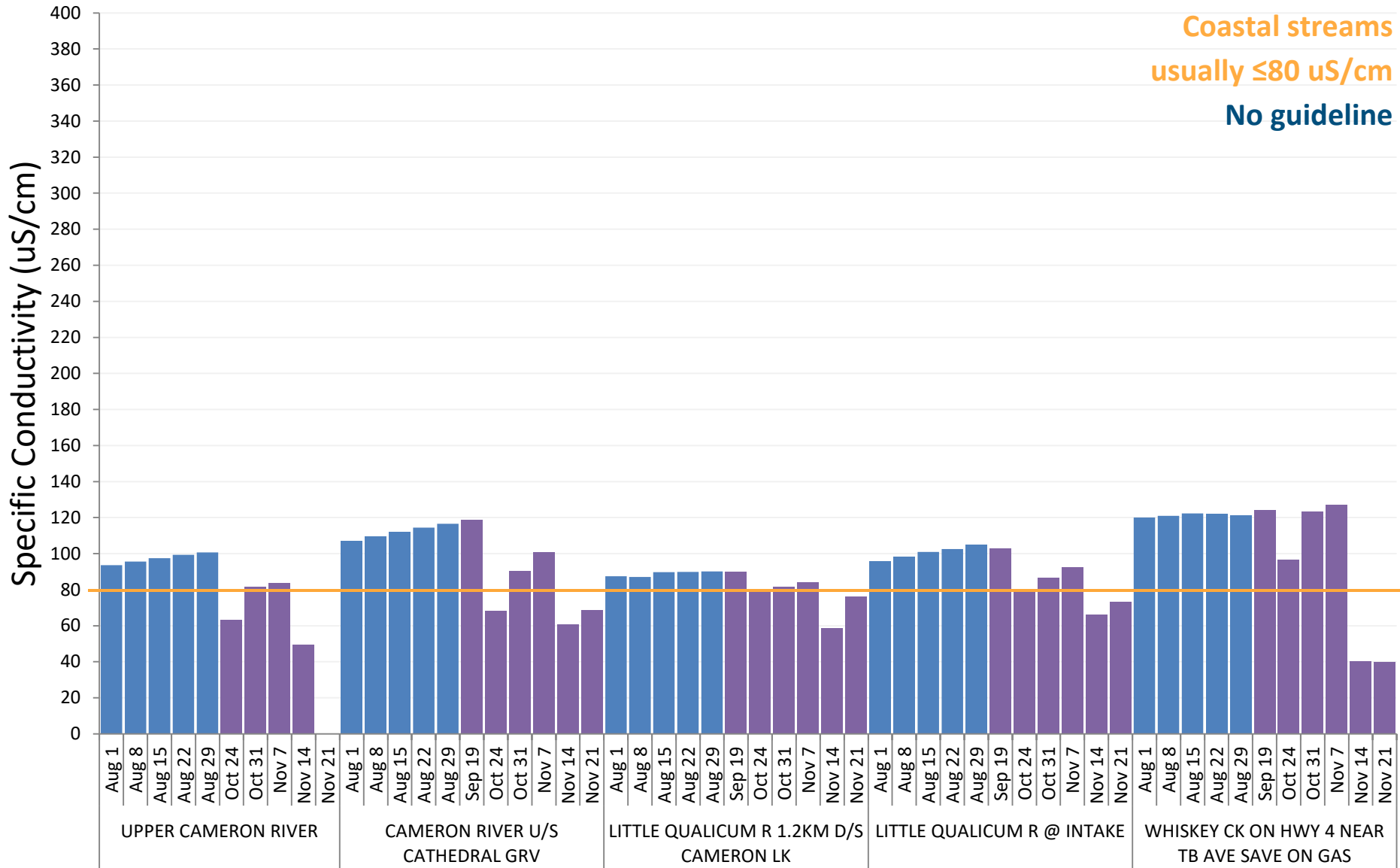
2017 Nile Creek Enhancement Society

Coastal streams
usually ≤ 80 $\mu\text{S}/\text{cm}$
No guideline

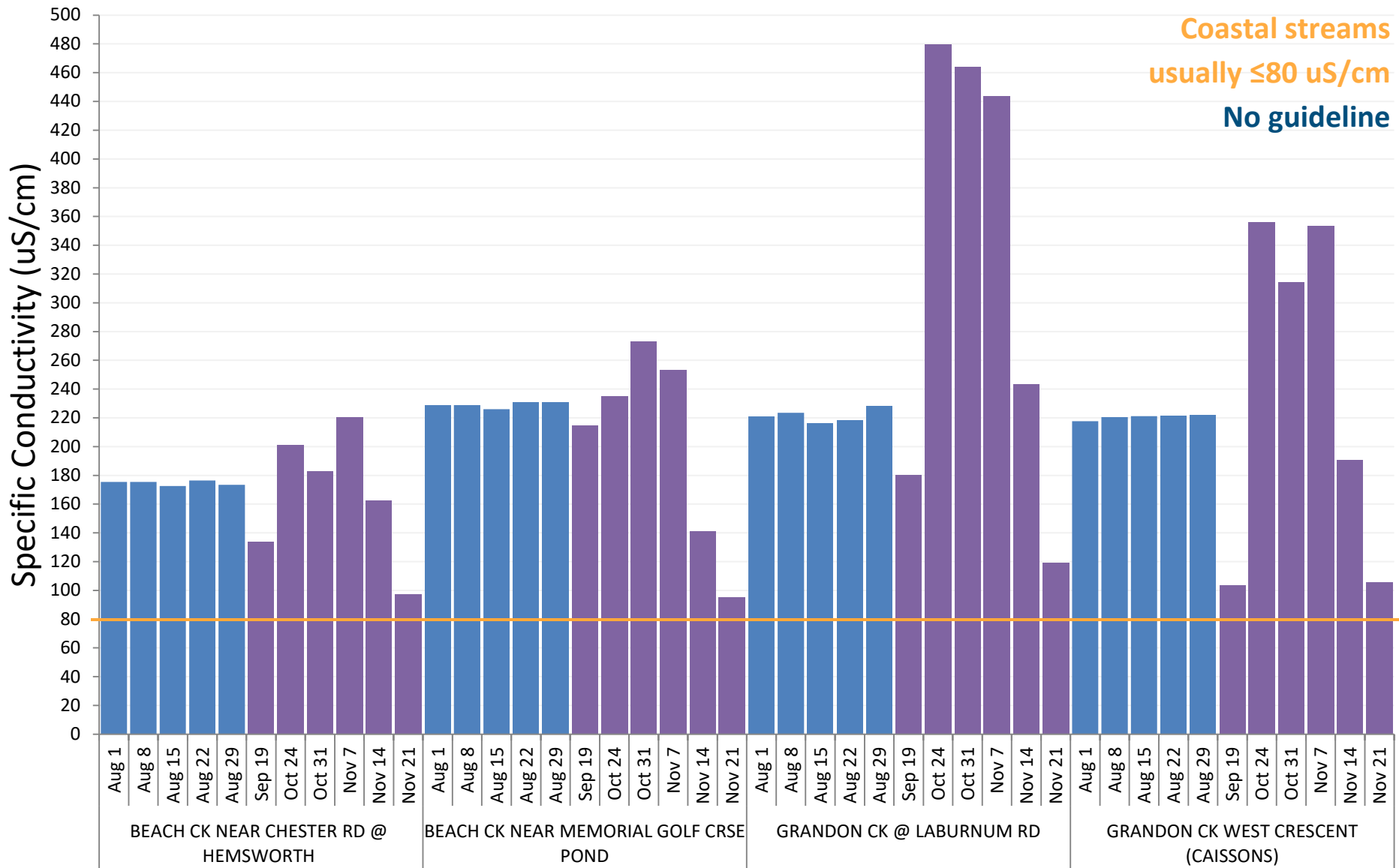


2017 Qualicum Beach Streamkeepers

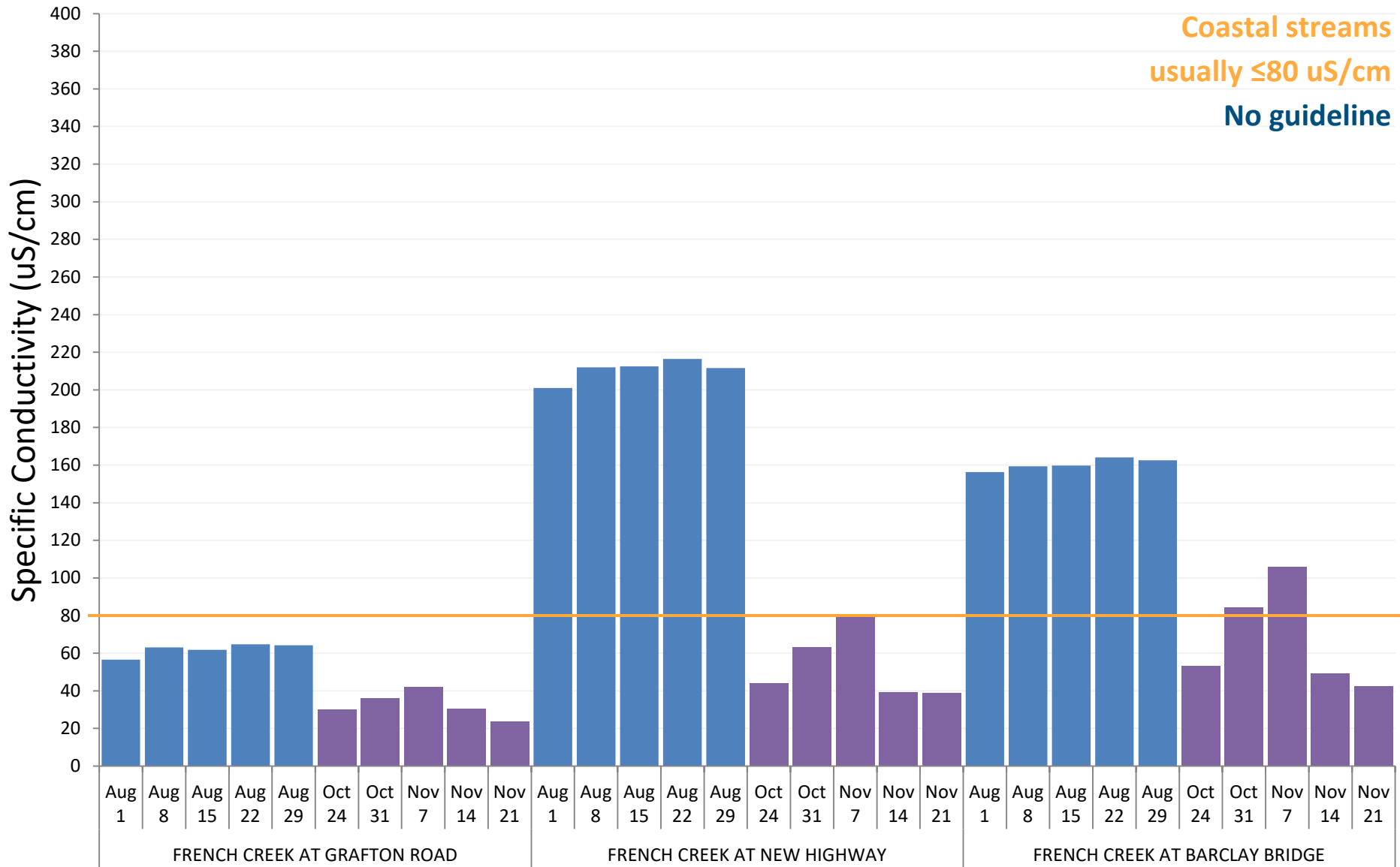
Coastal streams
usually ≤ 80 $\mu\text{S}/\text{cm}$
No guideline



2017 Qualicum Beach Streamkeepers

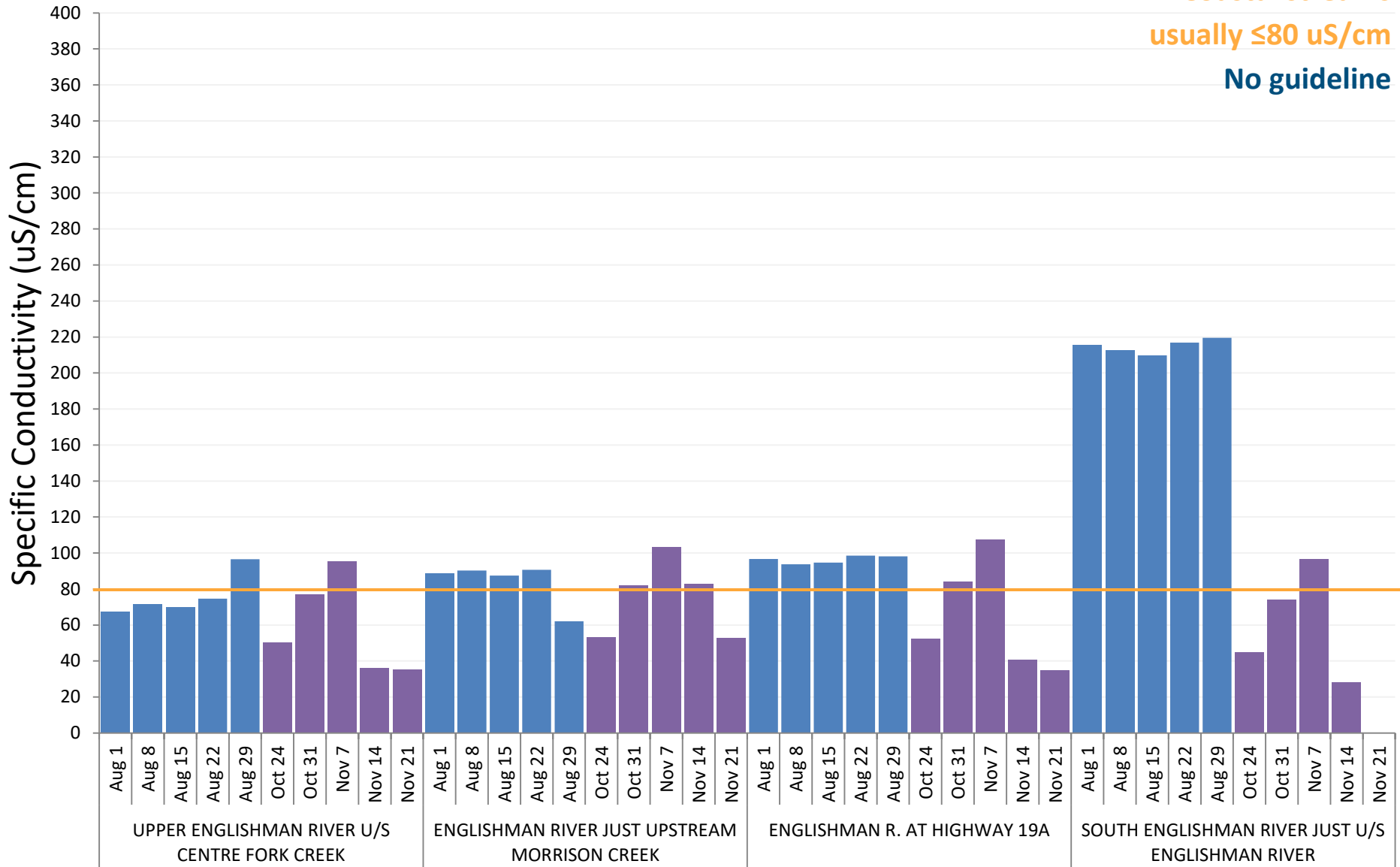


2017 Friends of French Creek Conservation Society

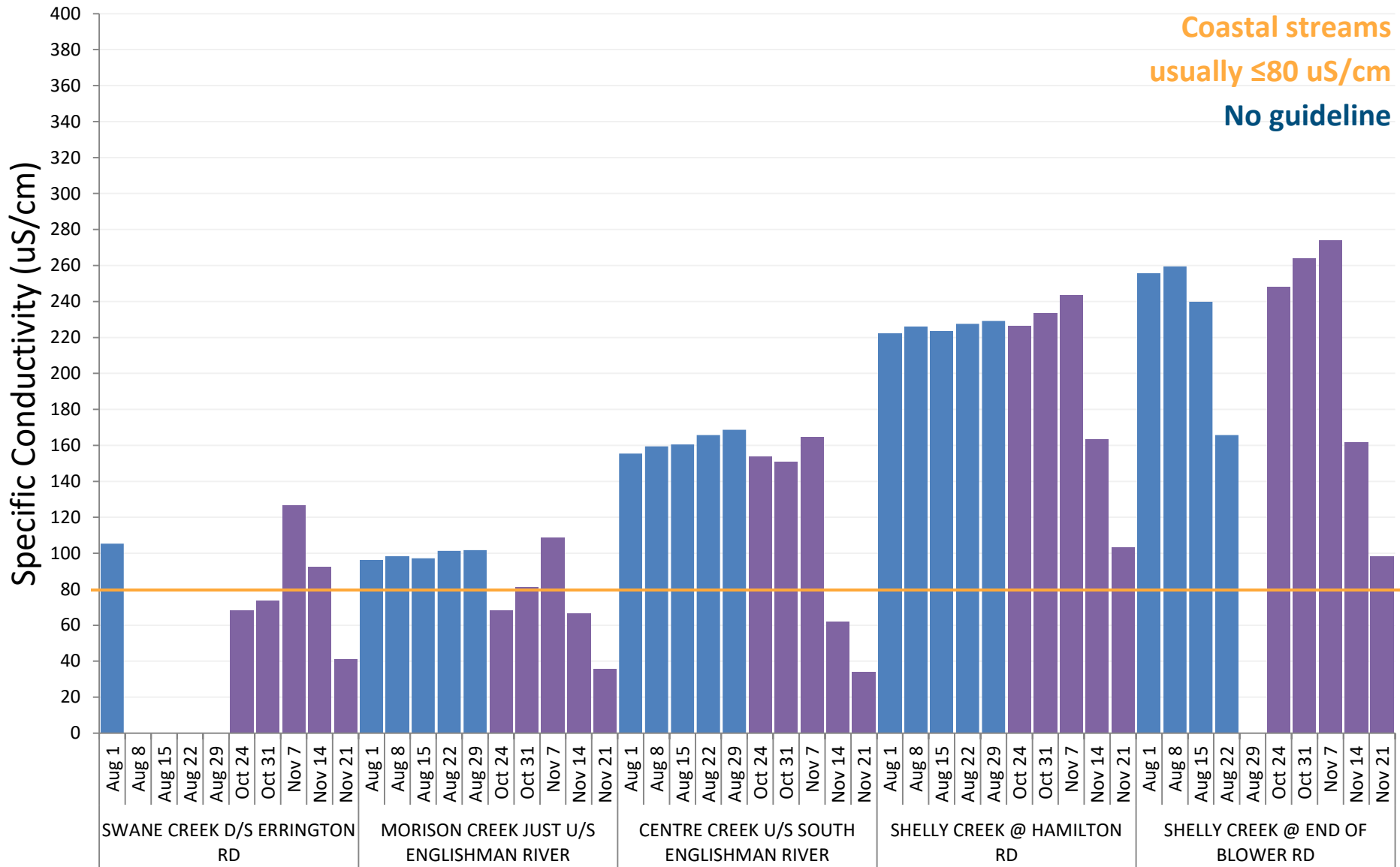


2017 Mid Vancouver Island Habitat Enhancement Society

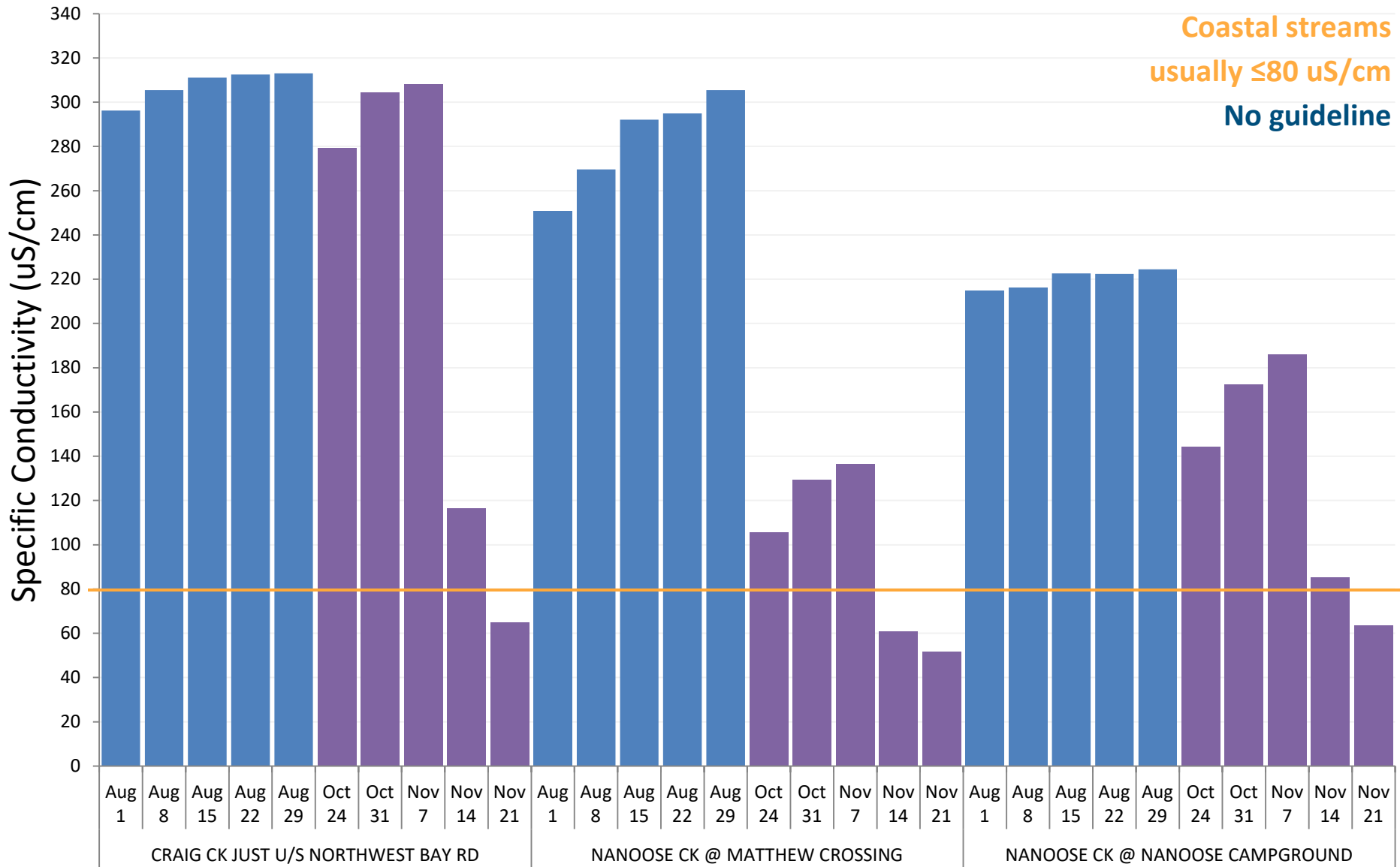
Coastal streams
usually ≤ 80 uS/cm
No guideline



2017 Mid Vancouver Island Habitat Enhancement Society

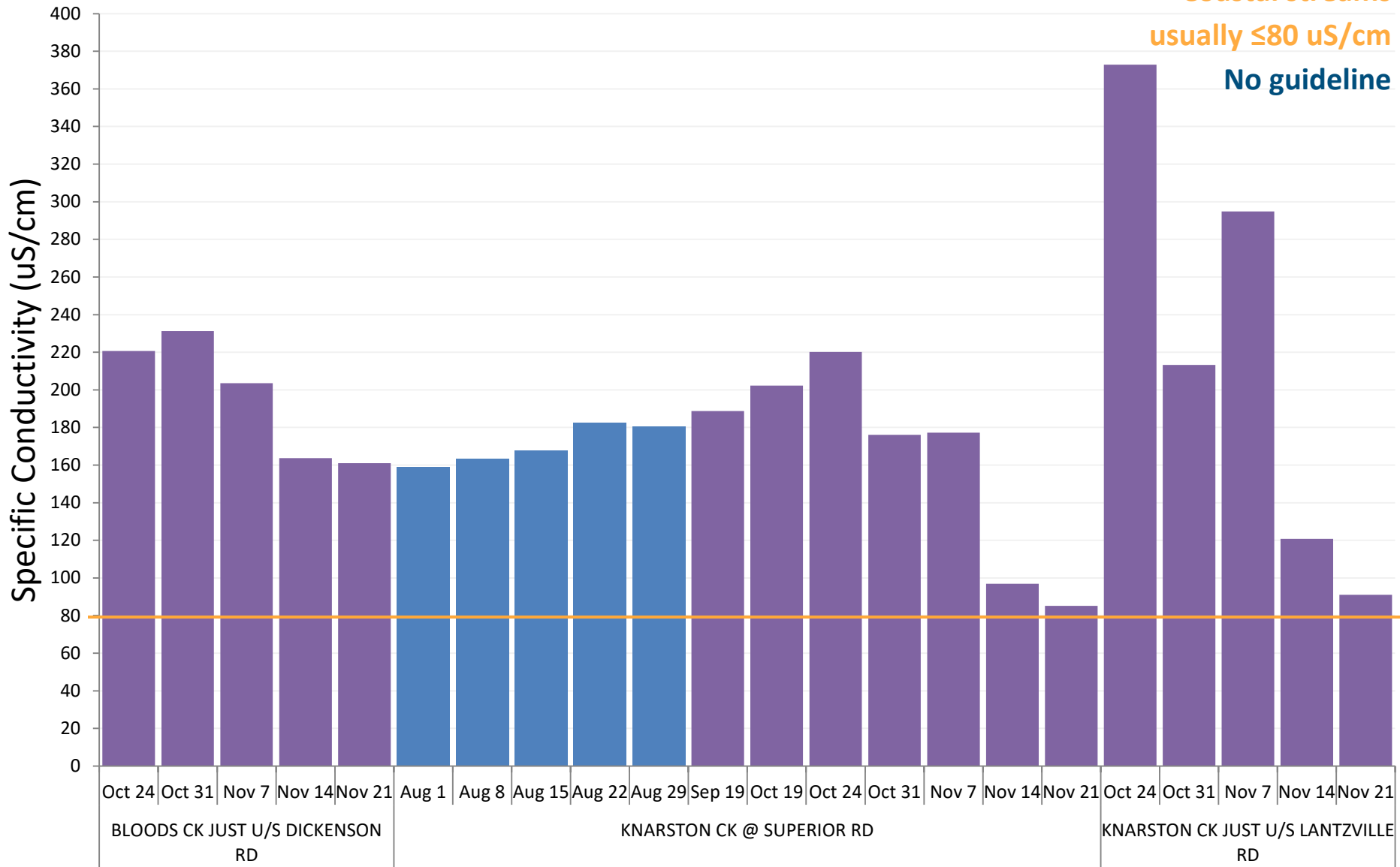


2017 Nanoose Streamkeepers Society

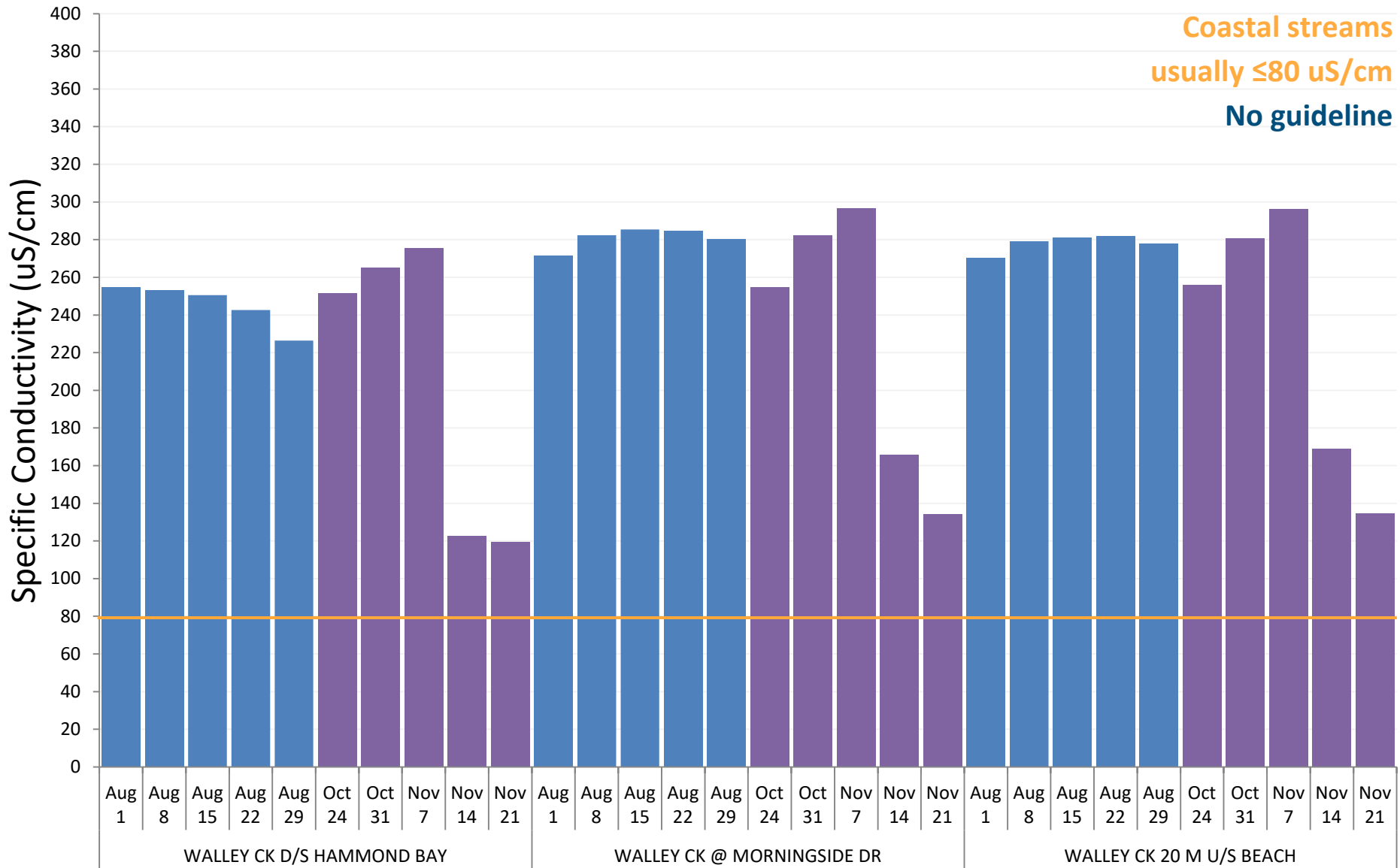


2017 Island Waters Fly Fishers & Lantzville Streamkeepers

Coastal streams
usually ≤ 80 uS/cm
No guideline

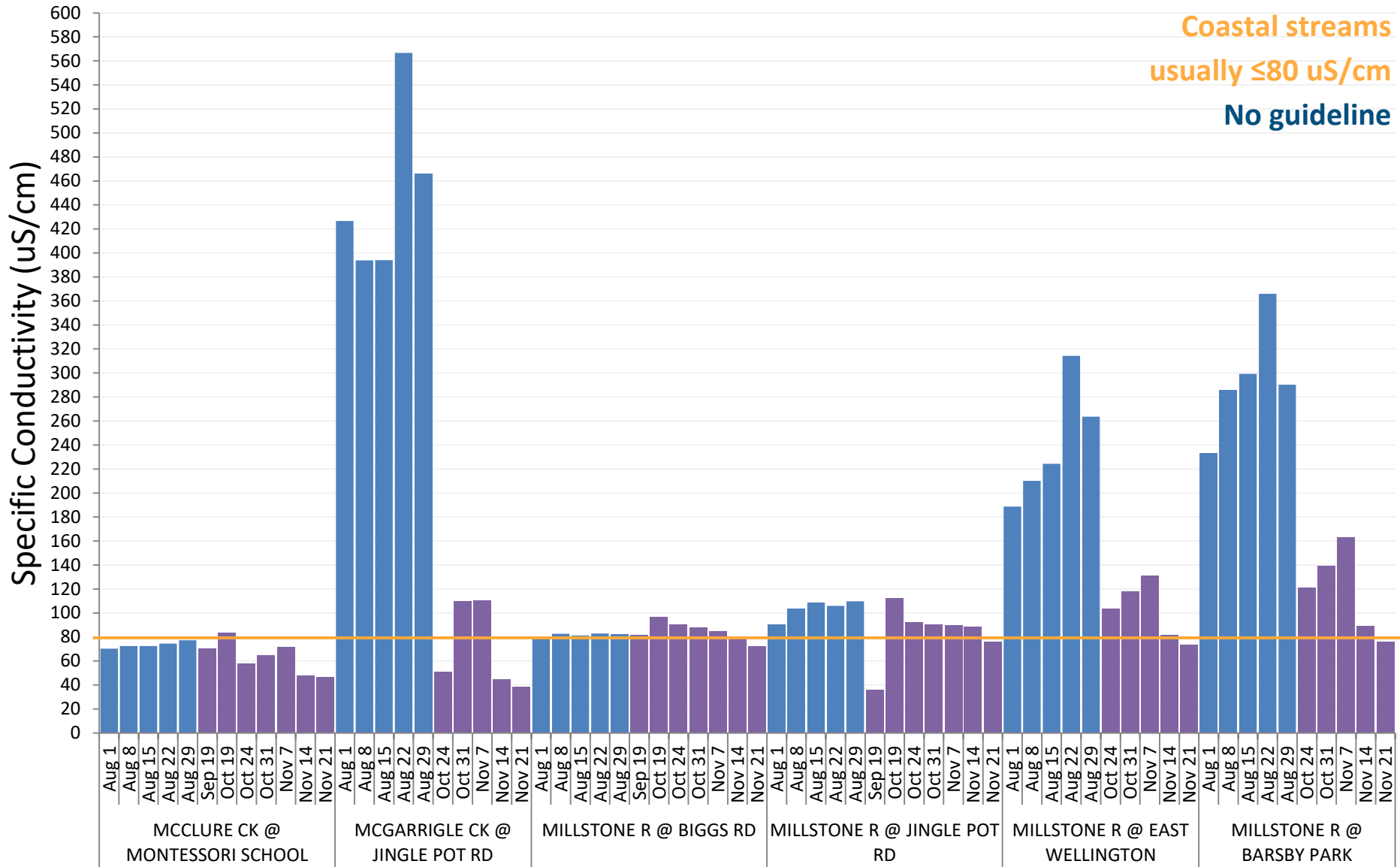


2017 Walley Creek Streamkeepers

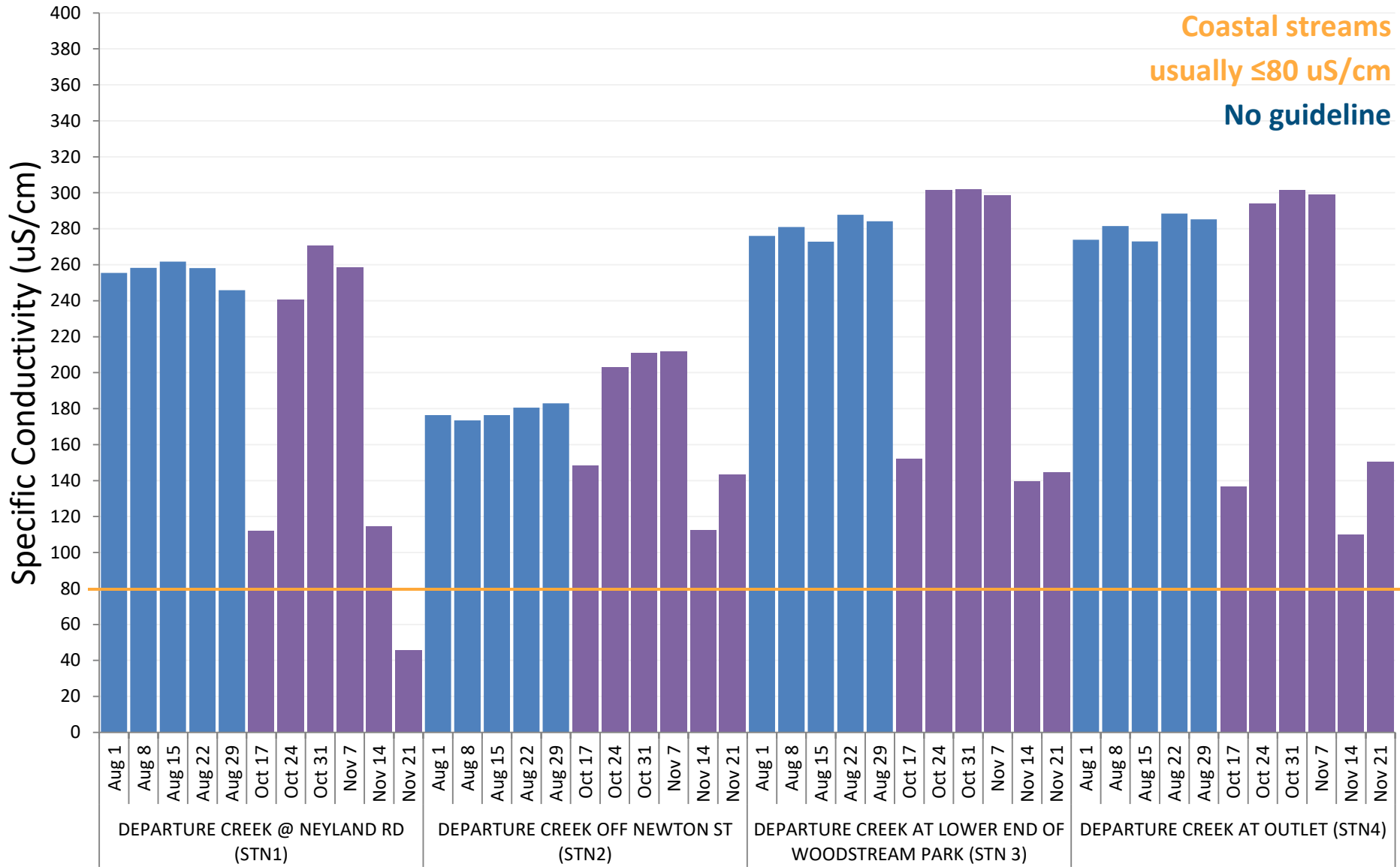


2017 Island Waters Fly Fishers

Coastal streams
usually ≤ 80 uS/cm
No guideline

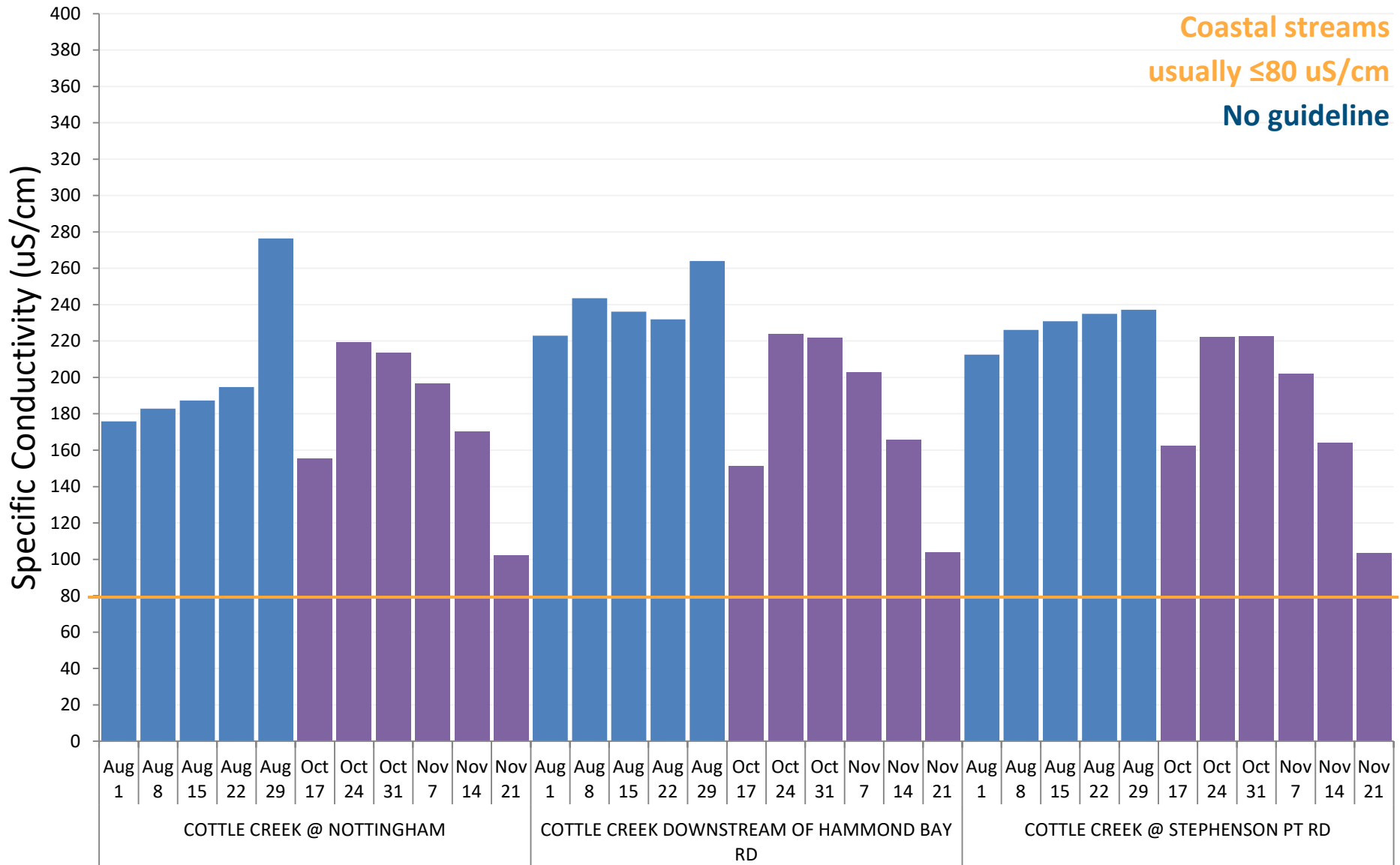


2017 Departure Creek Streamkeepers



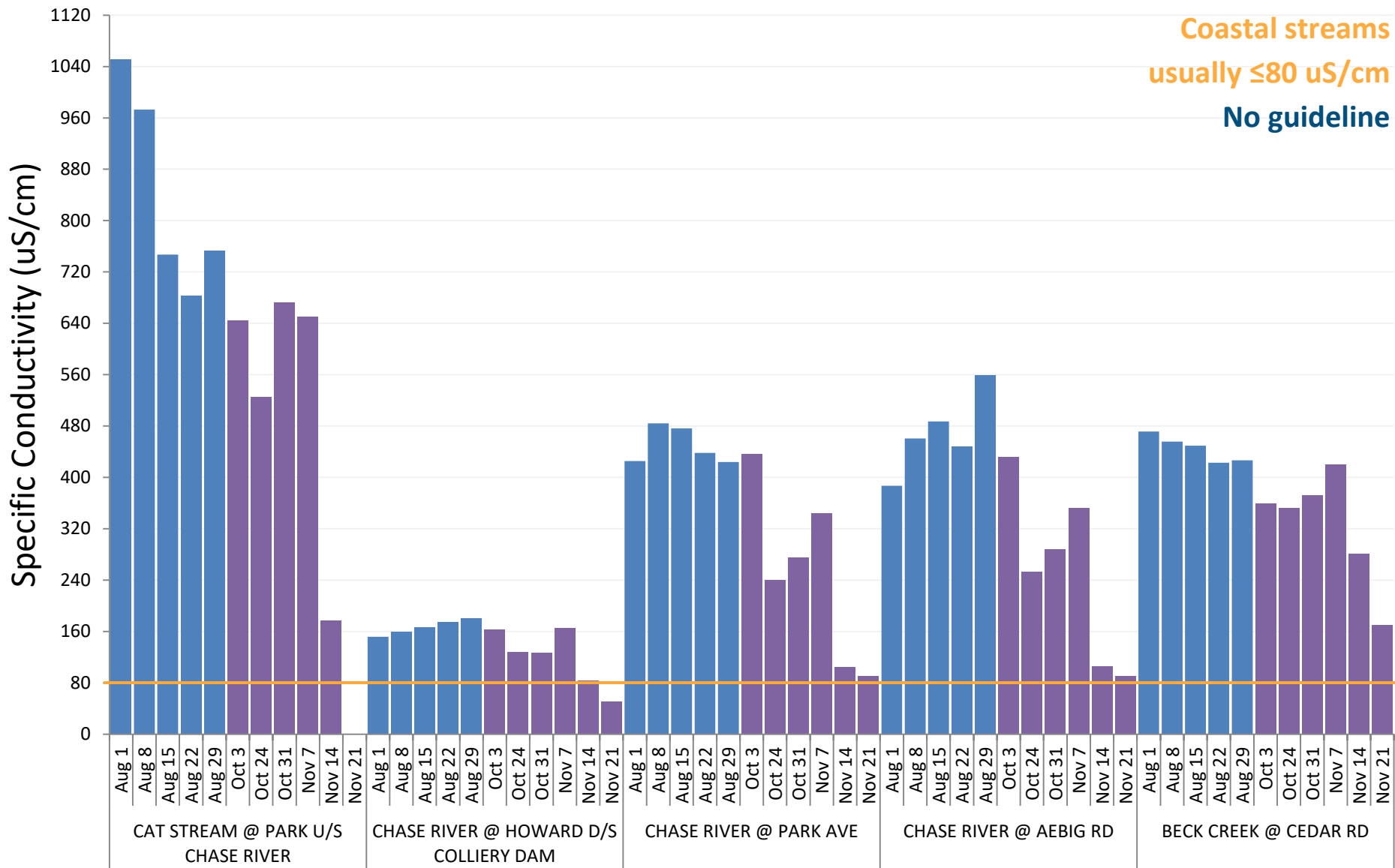
2017 Departure Creek Streamkeepers

Coastal streams
usually ≤ 80 uS/cm
No guideline

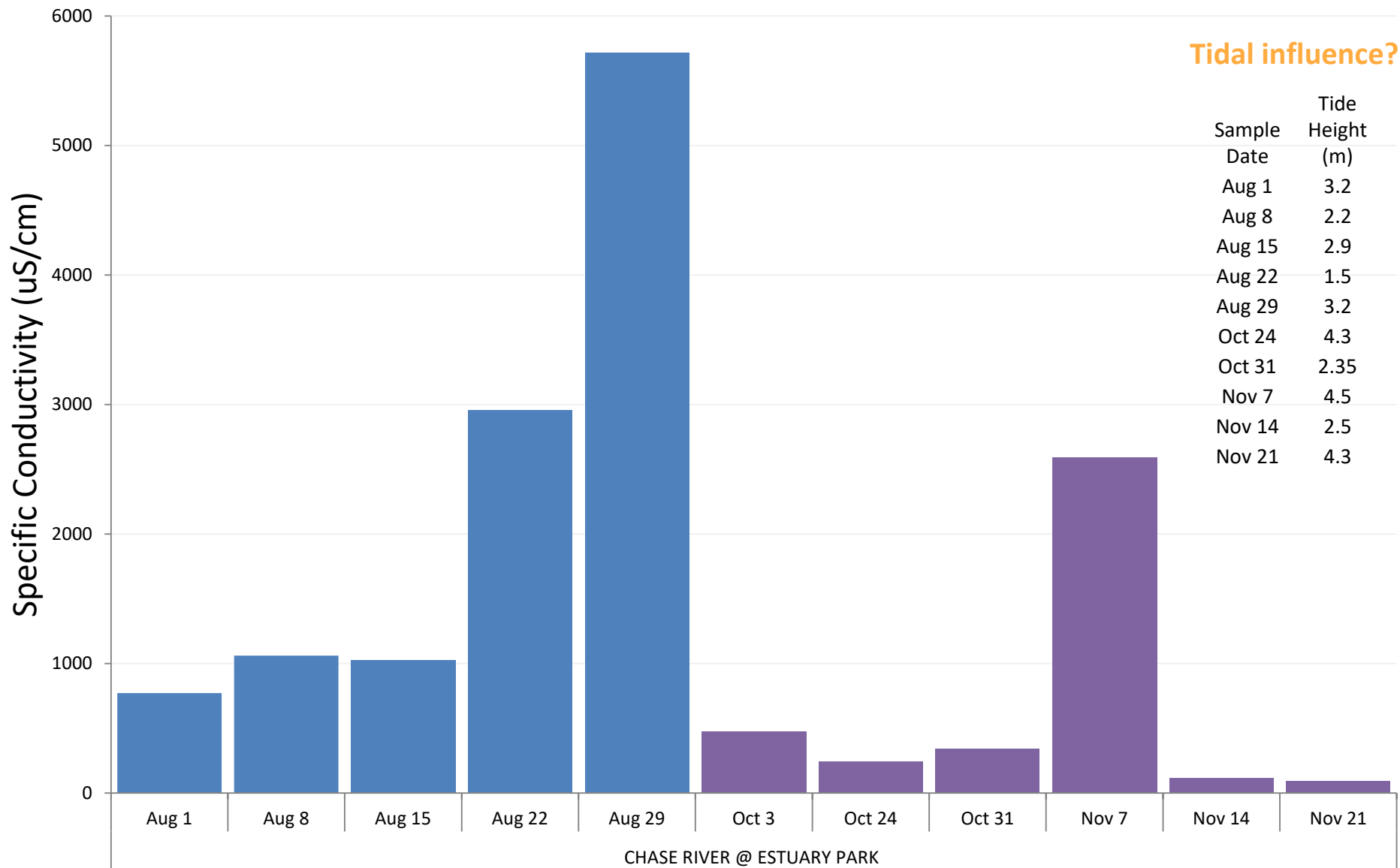


2017 Fisheries & Aquaculture Department - Vancouver Island University

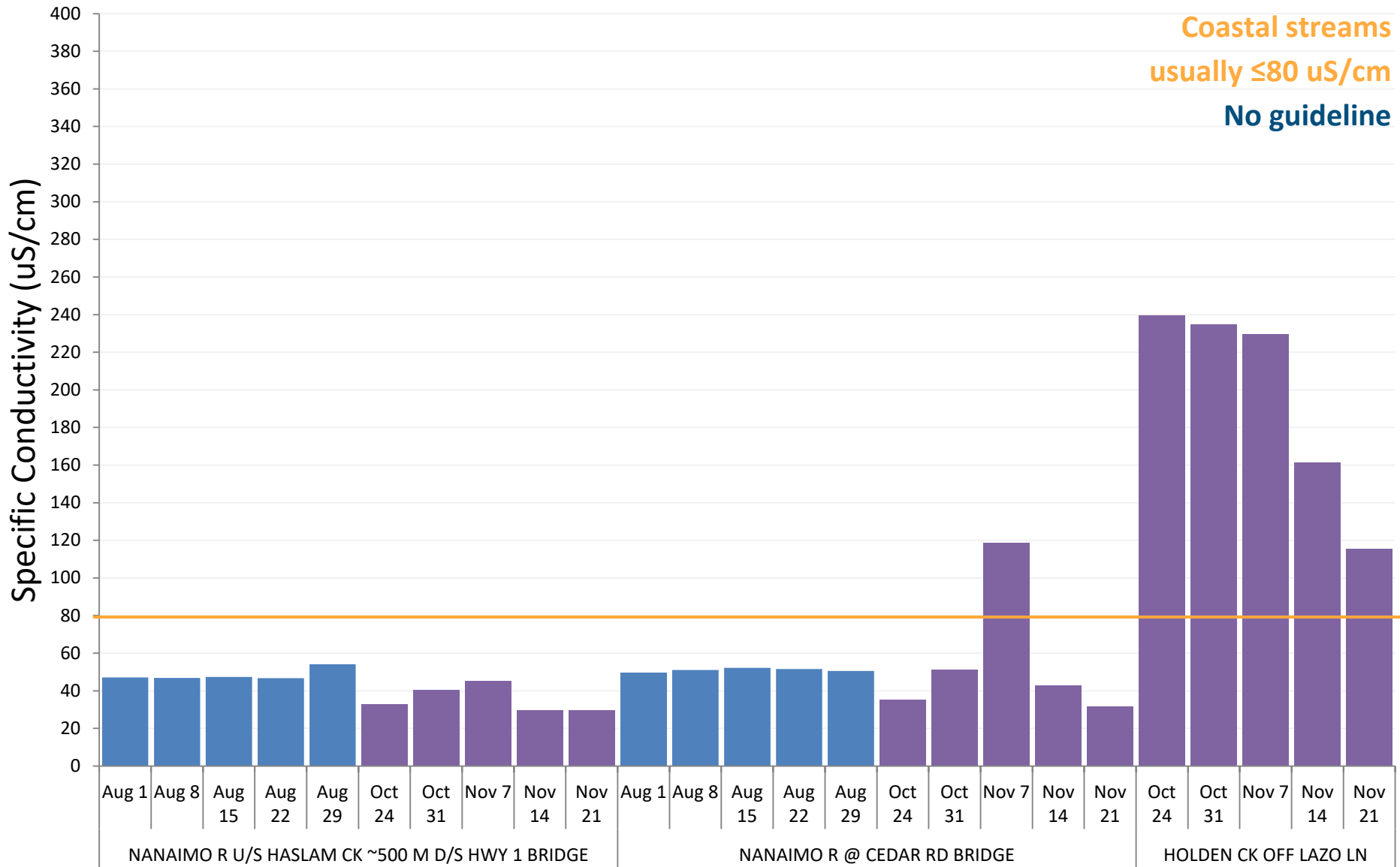
Coastal streams
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2017 Fisheries & Aquaculture Department - Vancouver Island University

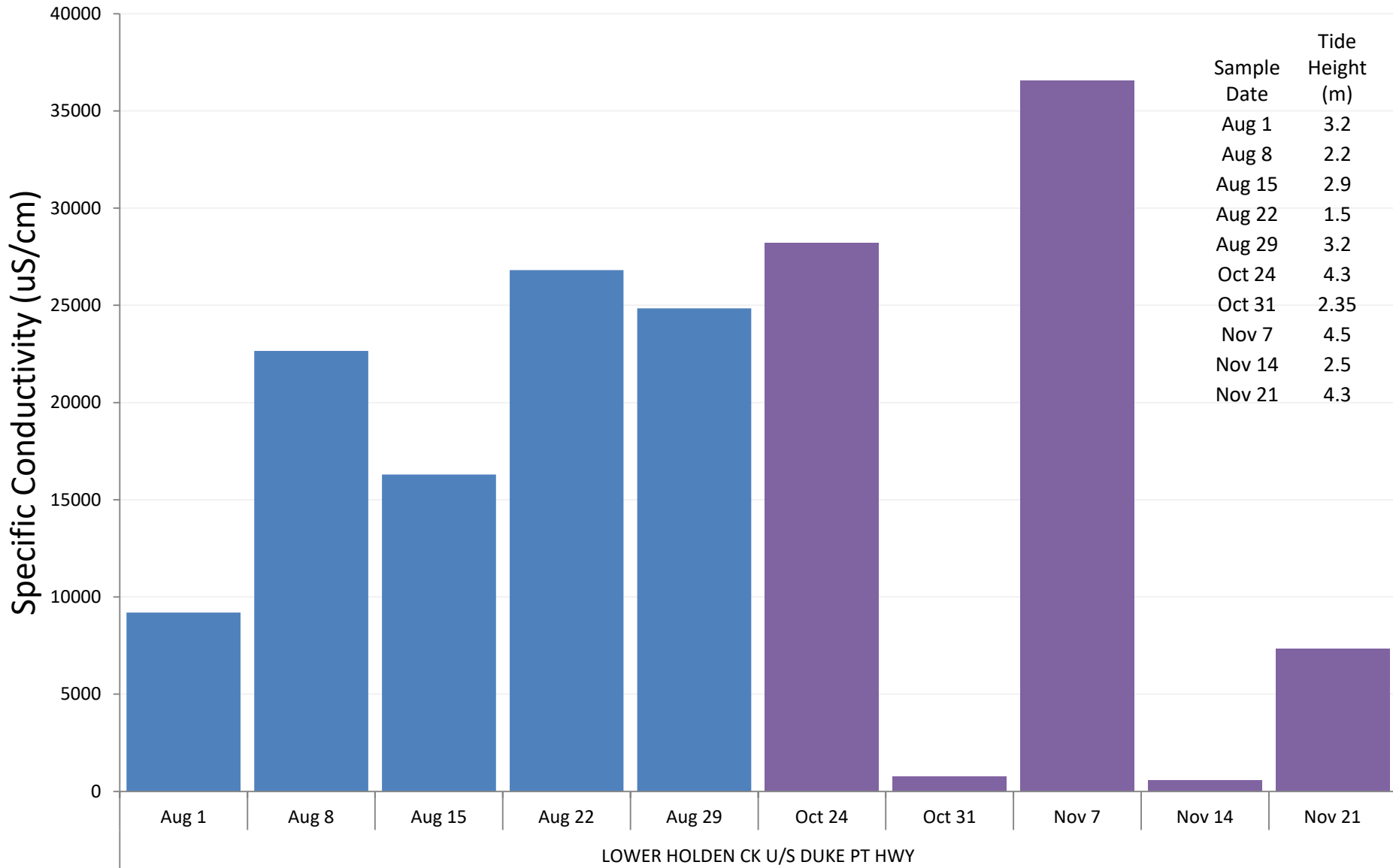


2017 Nanaimo & Area Land Trust

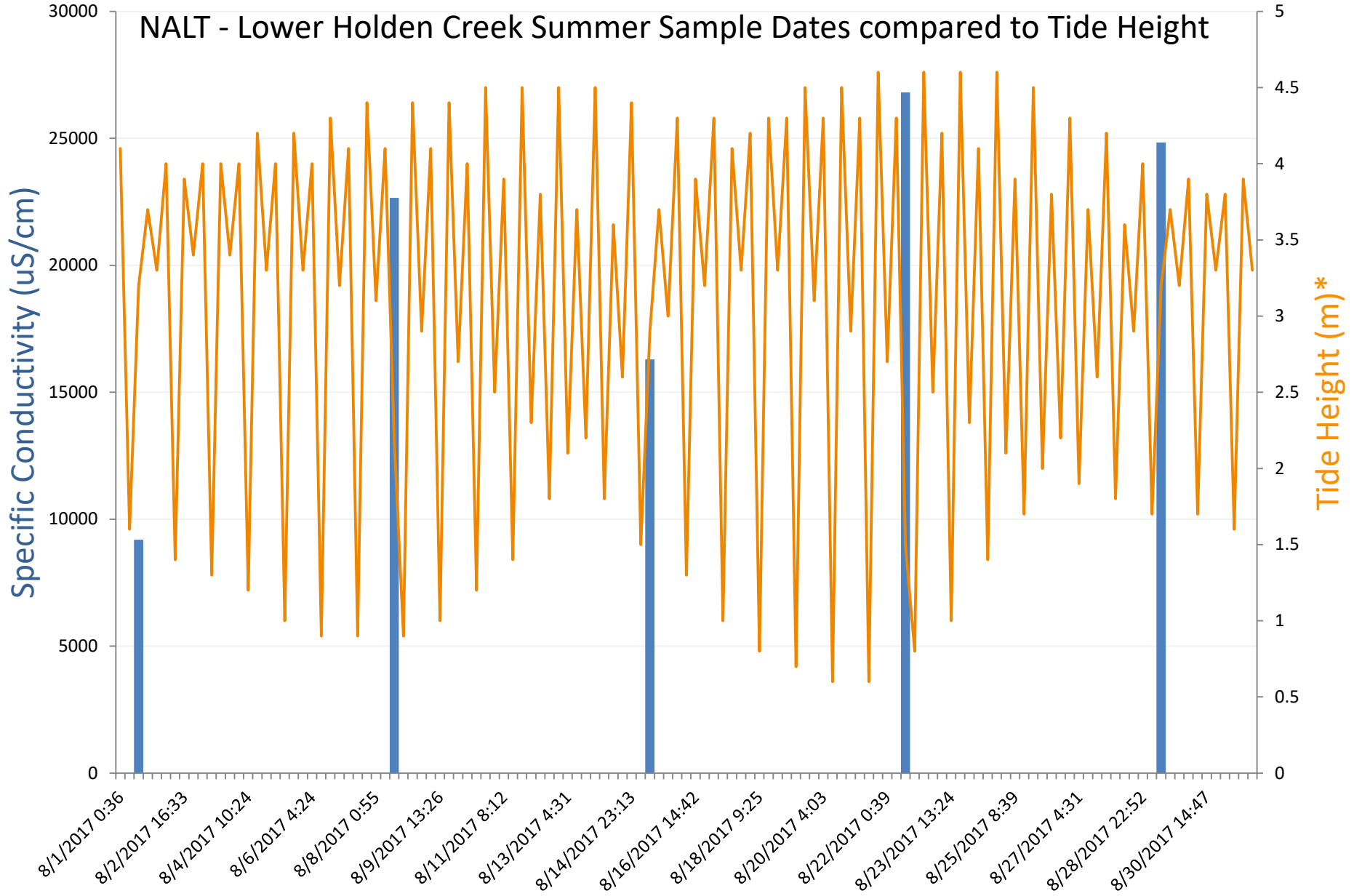


2017 Nanaimo & Area Land Trust

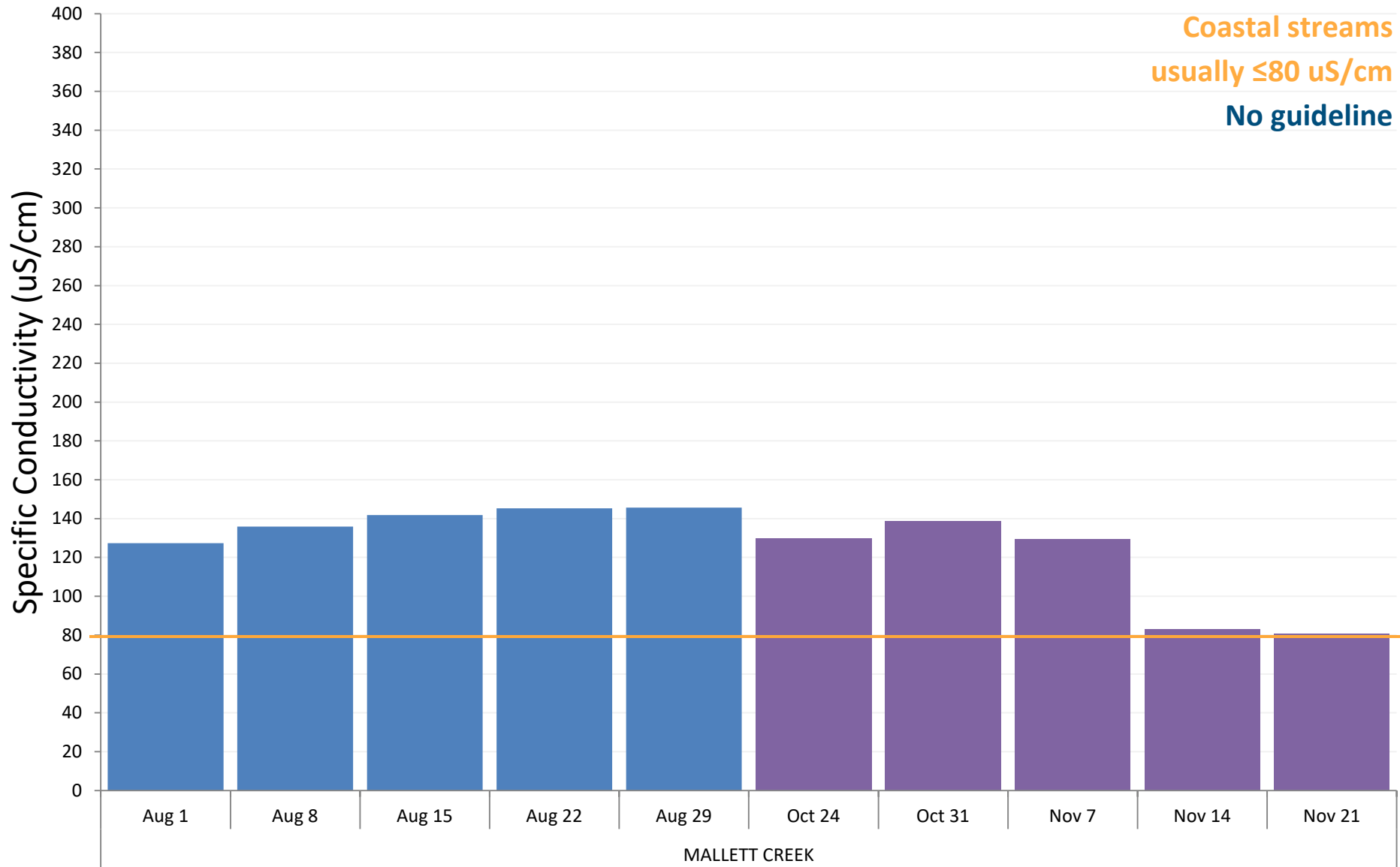
Tidal influence?



NALT - Lower Holden Creek Summer Sample Dates compared to Tide Height



2017 Gabriola Streamkeepers



Specific Conductivity

Possible groundwater influence:			
South Englishman	Annie Creek	Nanoose Creek	Walley Creek
French Creek	Cottle Creek	Mallet Creek	Shelley Creek
Swayne Creek	Centre Creek	Craig Creek	Departure Creek

Possible human contaminant influence:			
Millstone River	McGarrigle Creek	Chase River	Beach Creek
Cat Stream	Beck Creek	Holden Creek	Grandon Creek

Notes:

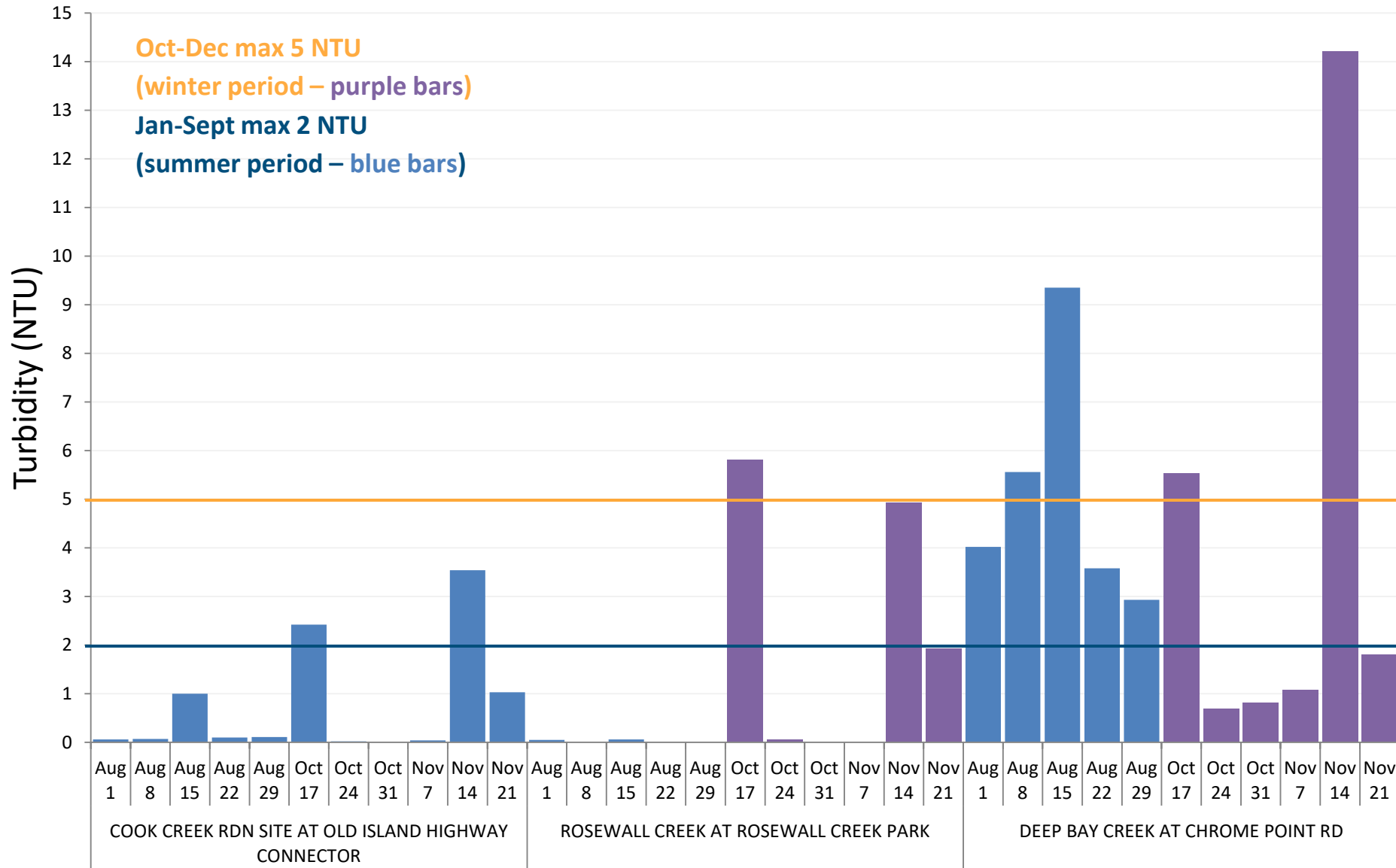
- Due to consistent rain events in the fall, turbidity increases are often seen in this period. Therefore the observations listed on this page are mostly attributed to summer season values.
- MoE knowledge of land-use contributes to consideration of human influence; most east coast Vancouver Island streams have both groundwater and human influences.

Turbidity

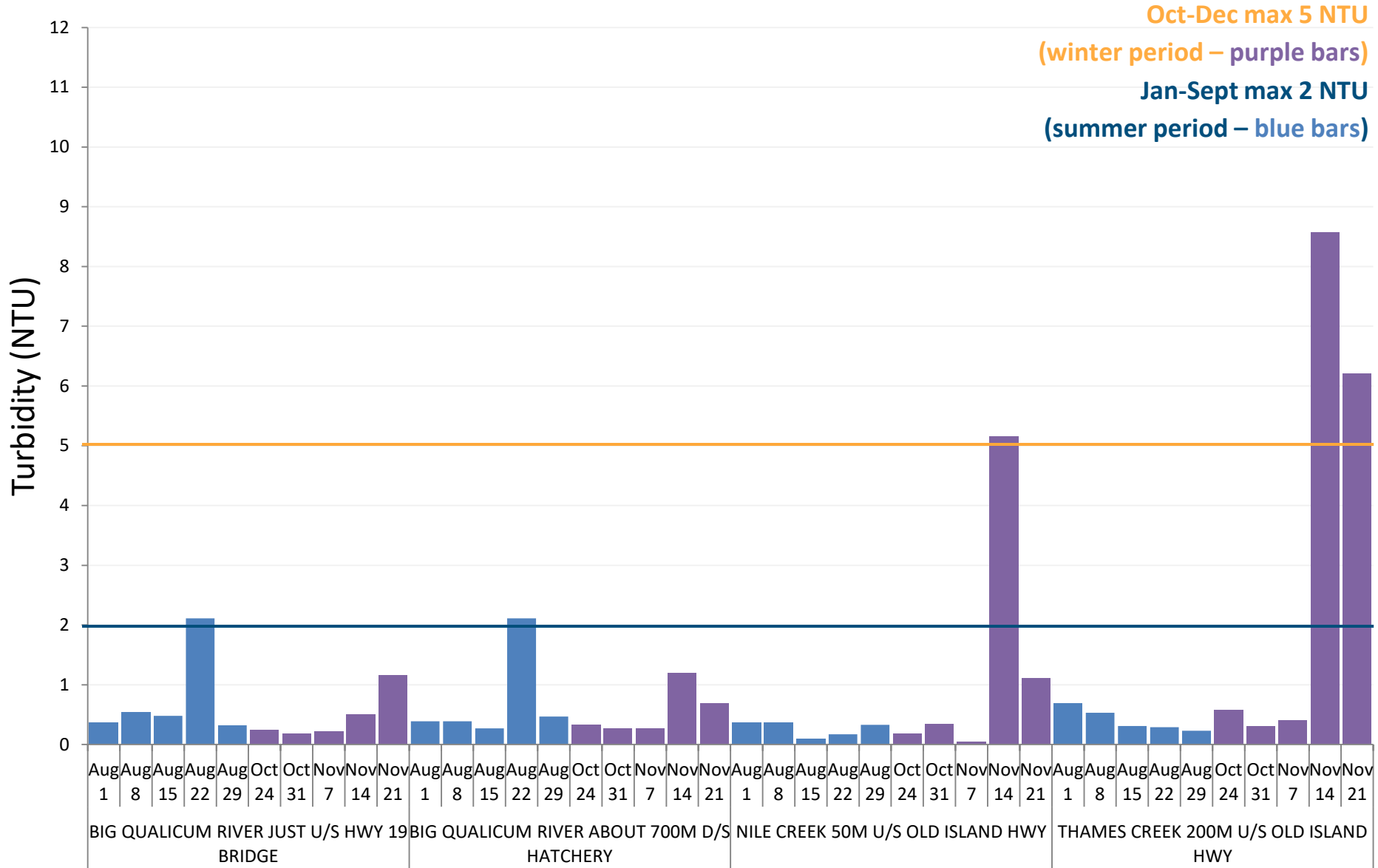


- **January to September (summer period) maximum: 2 NTU**
- **October to December (winter period) maximum: 5 NTU**

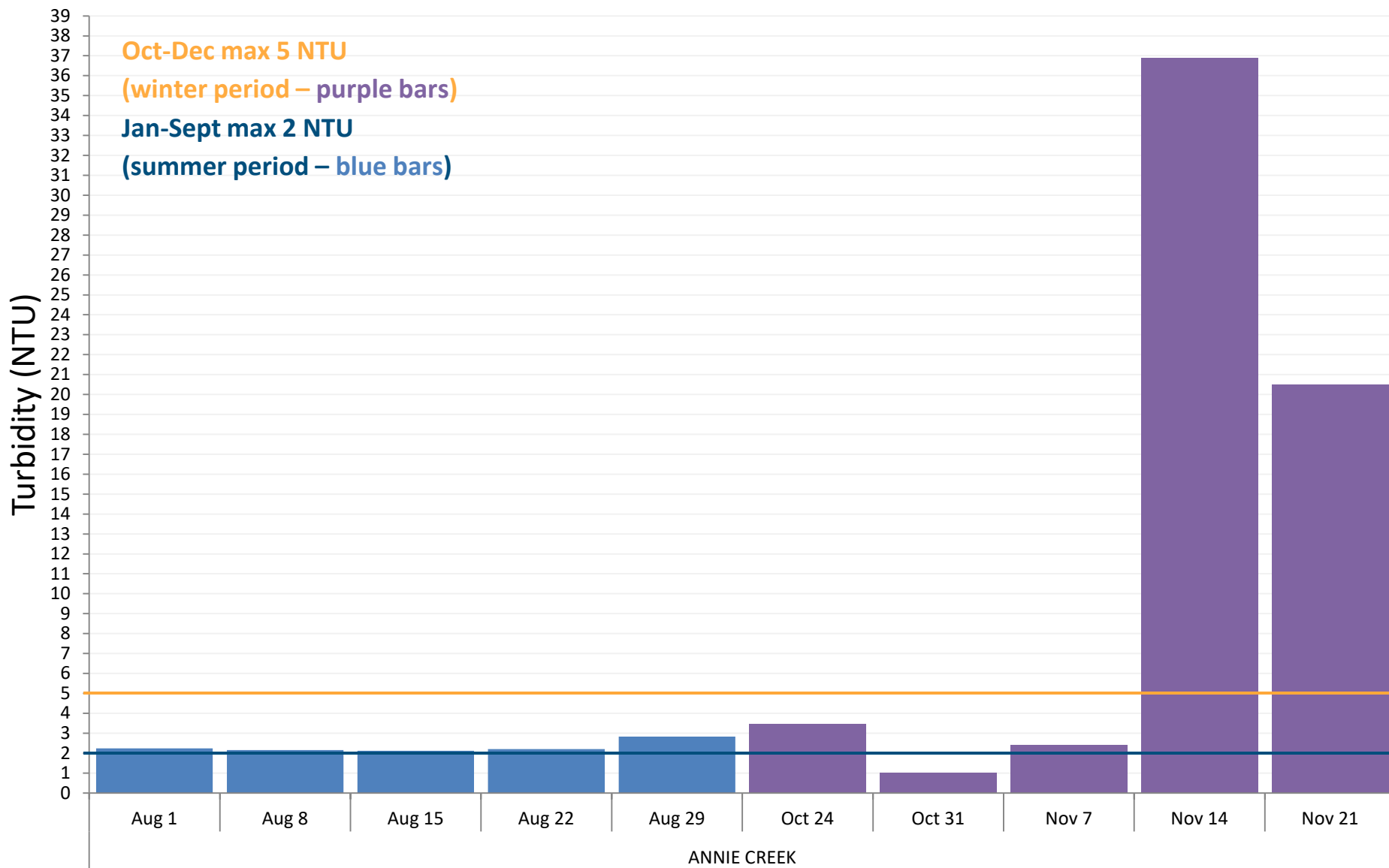
2017 Fanny Bay Salmonid Enhancement Society



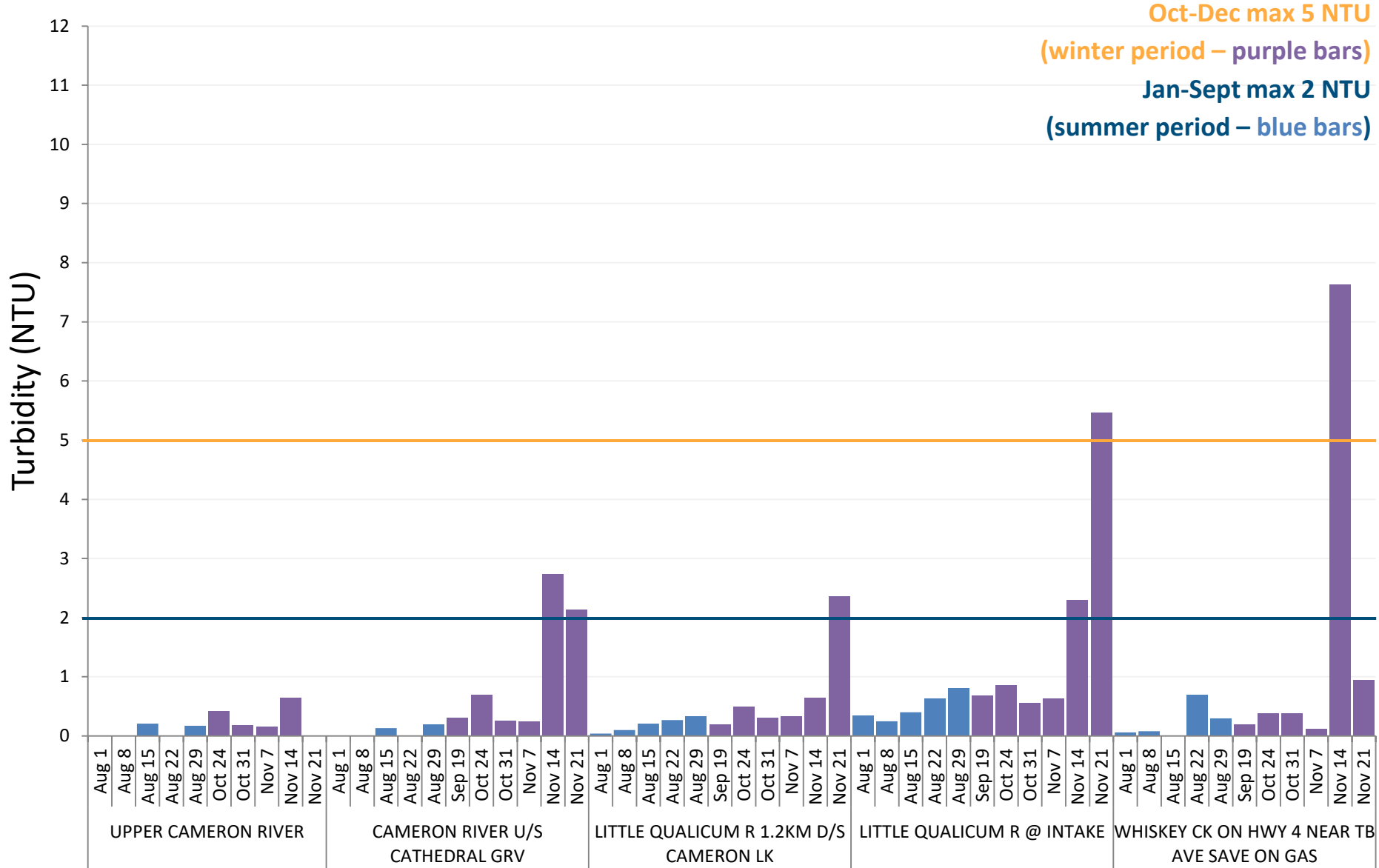
2017 Nile Creek Enhancement Society



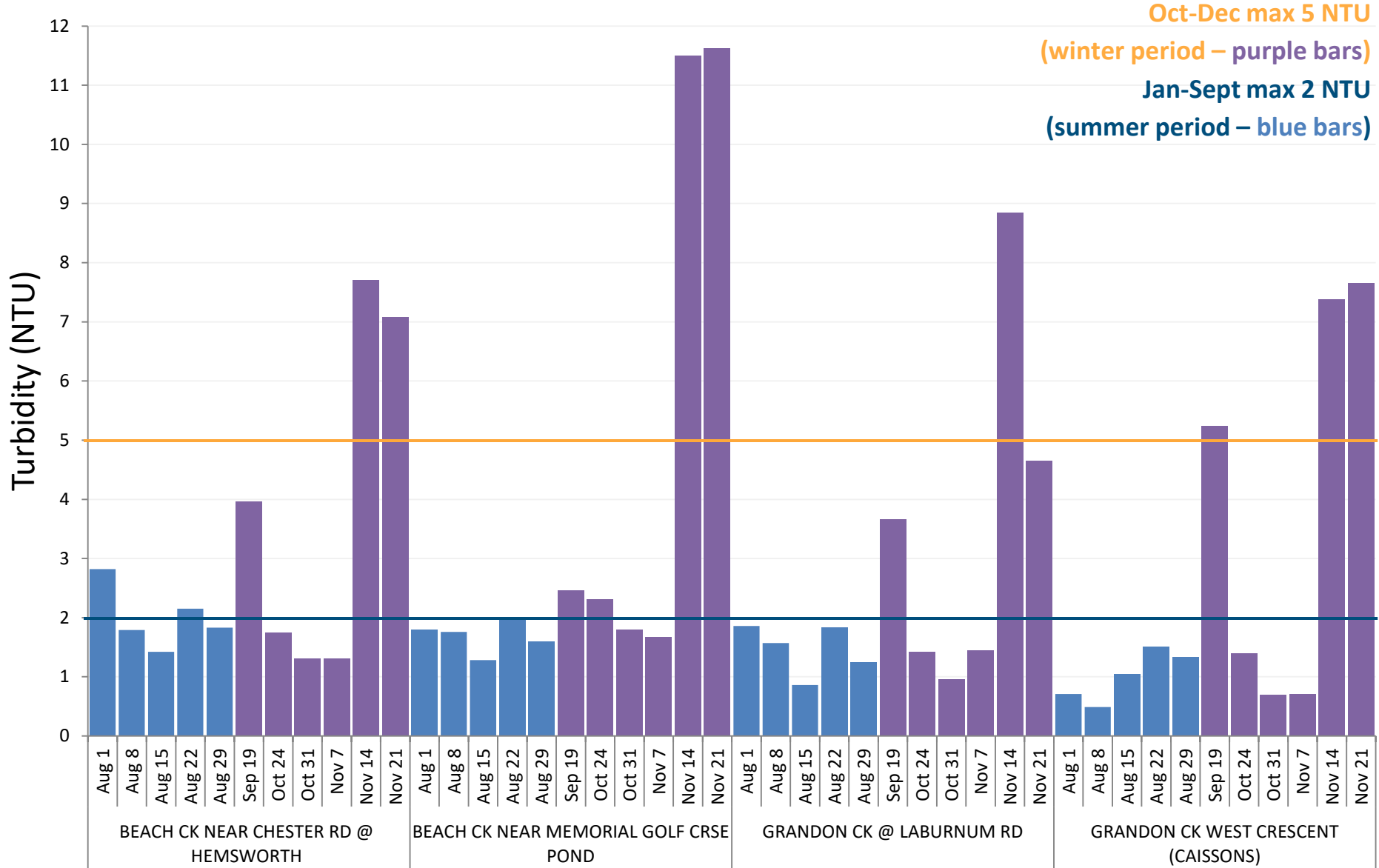
2017 Nile Creek Enhancement Society



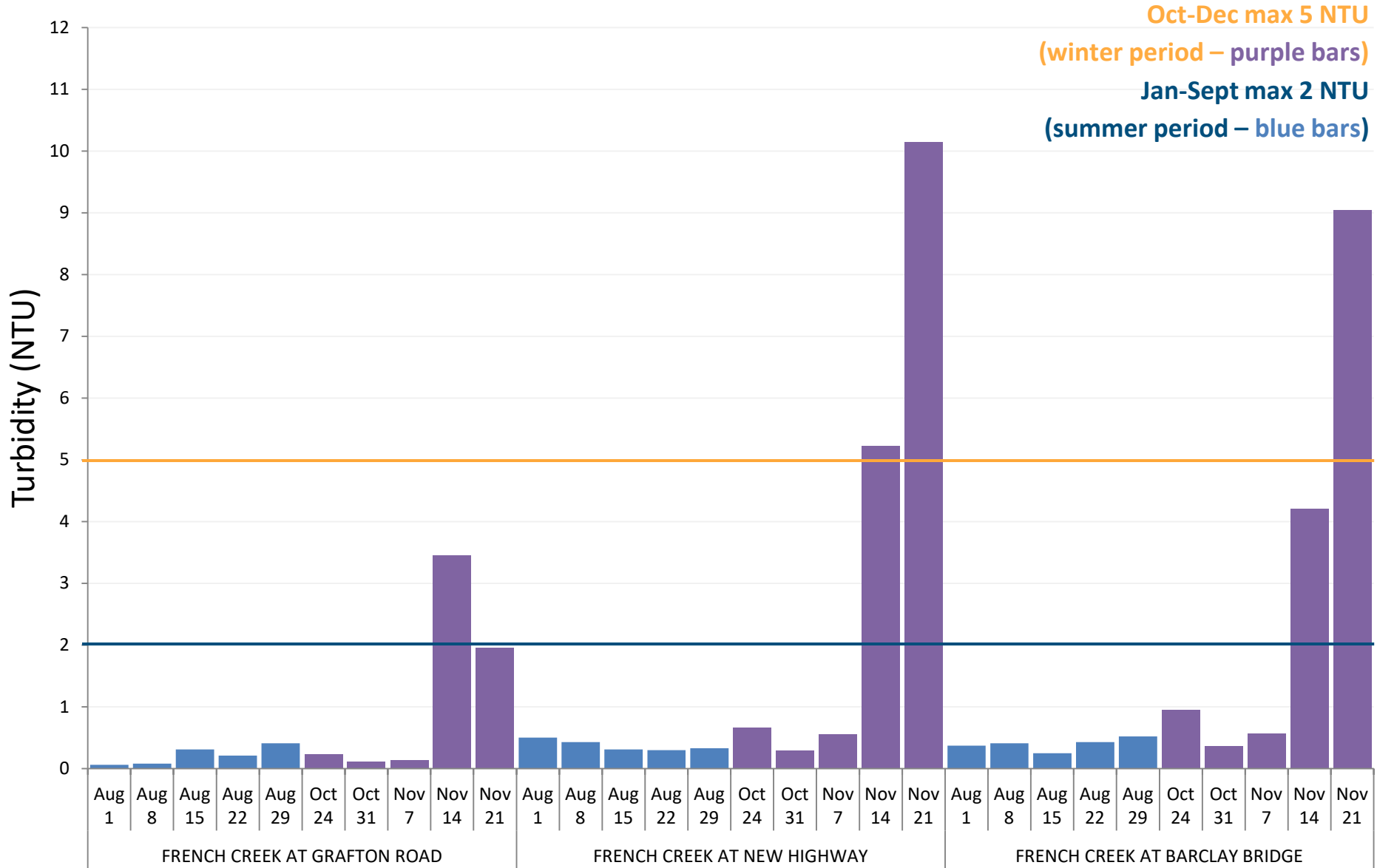
2017 Qualicum Beach Streamkeepers



2017 Qualicum Beach Streamkeepers



2017 Friends of French Creek Conservation Society



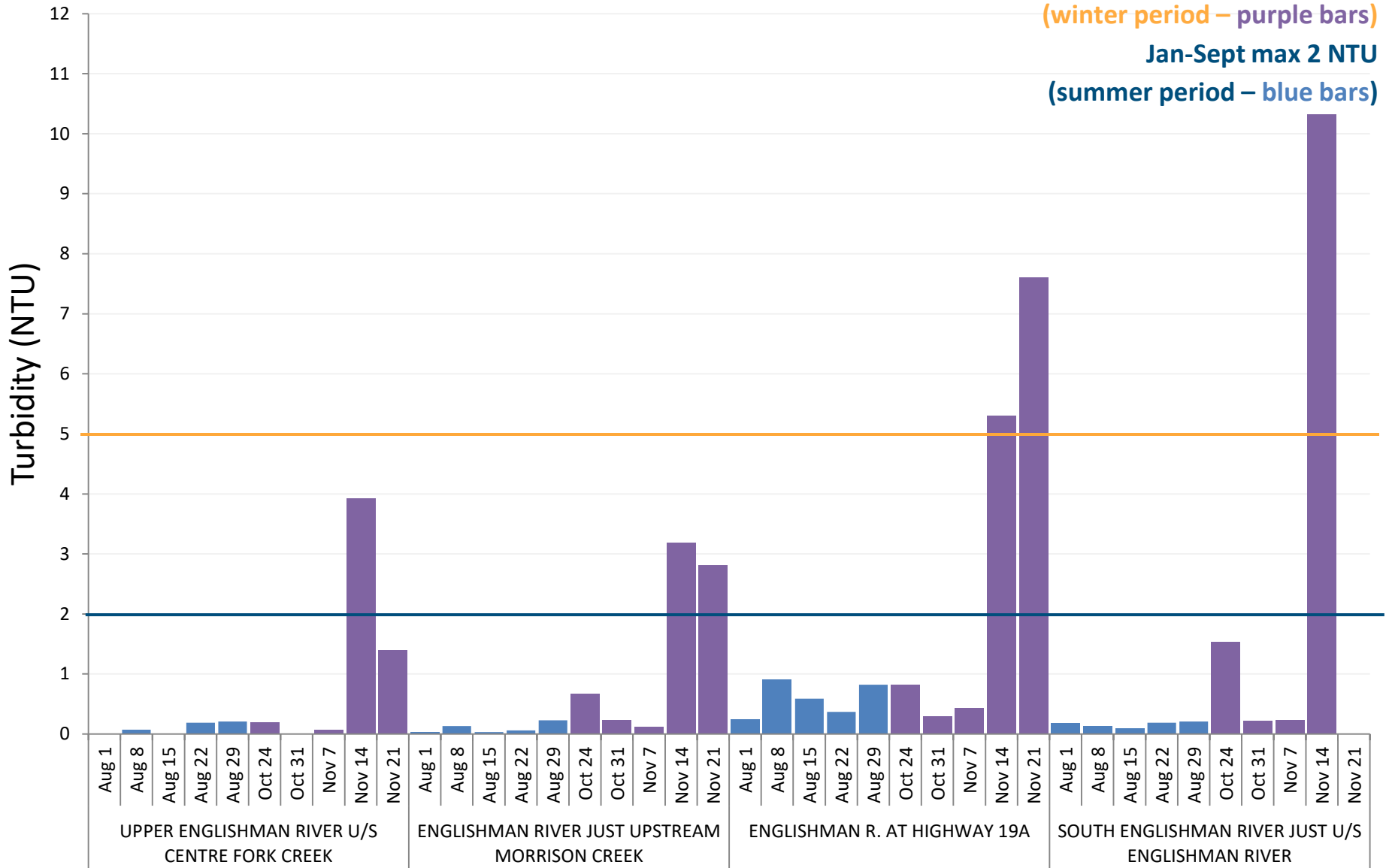
2017 Mid Vancouver Island Habitat Enhancement Society

Oct-Dec max 5 NTU

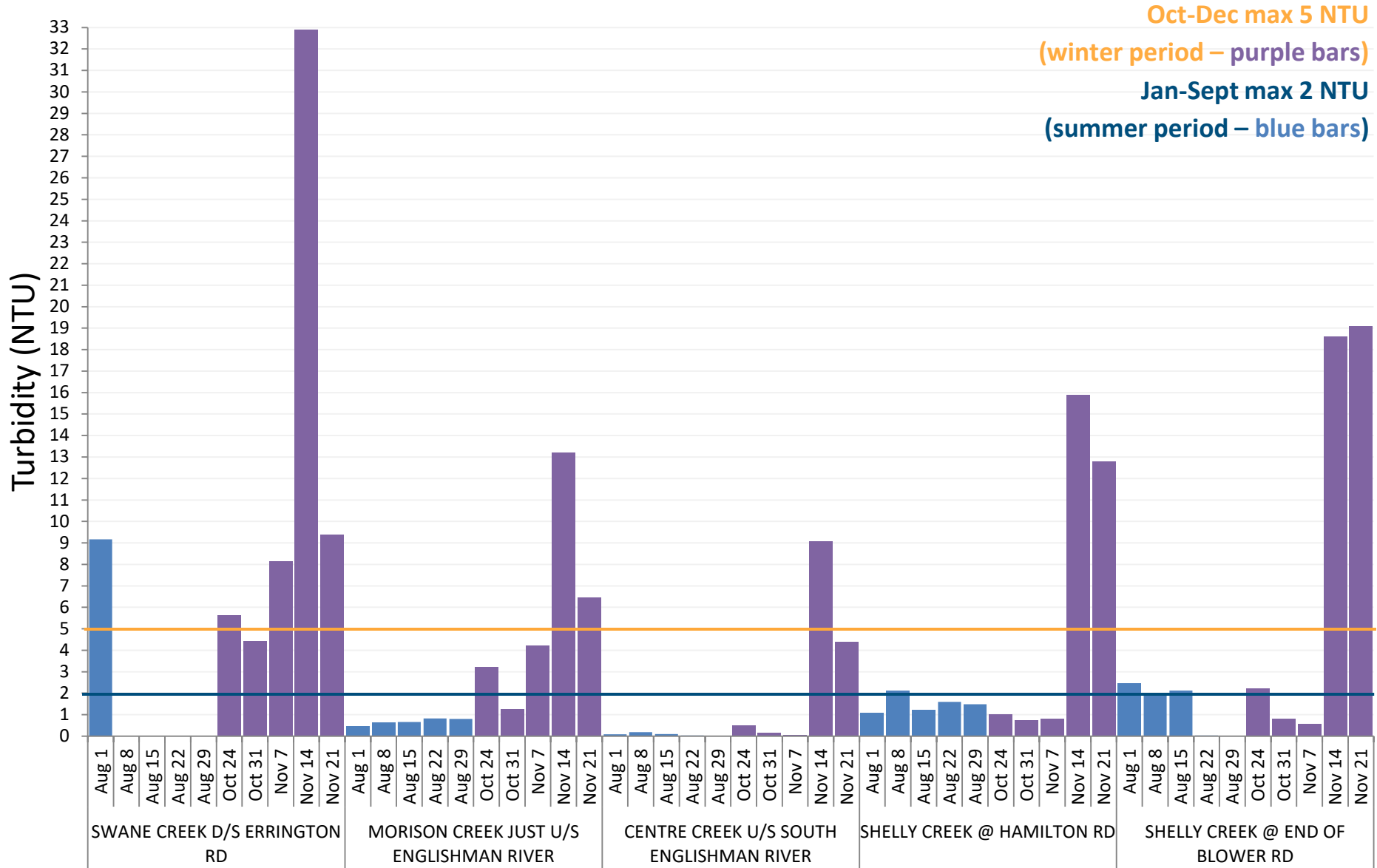
(winter period – purple bars)

Jan-Sept max 2 NTU

(summer period – blue bars)

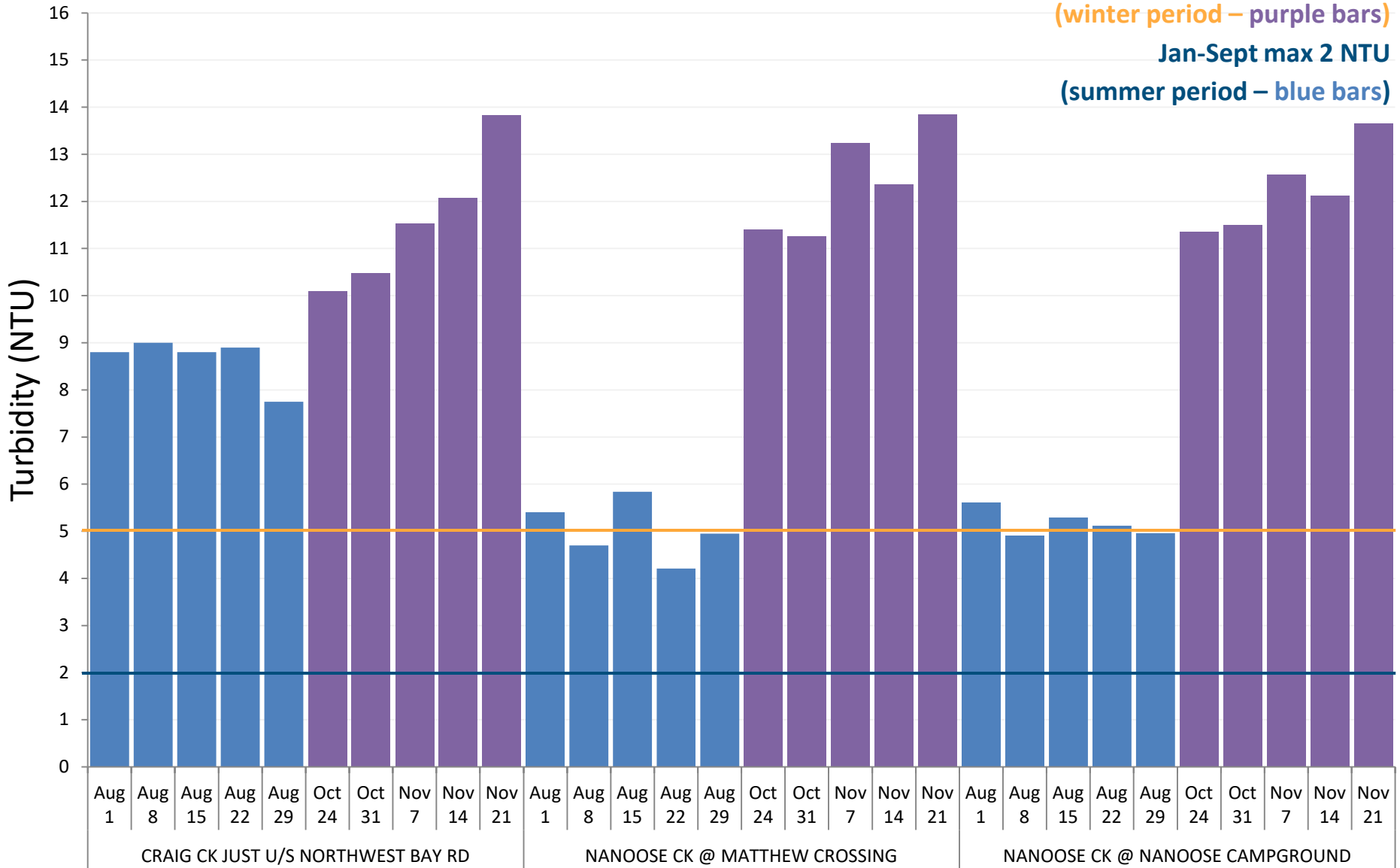


2017 Mid Vancouver Island Habitat Enhancement Society

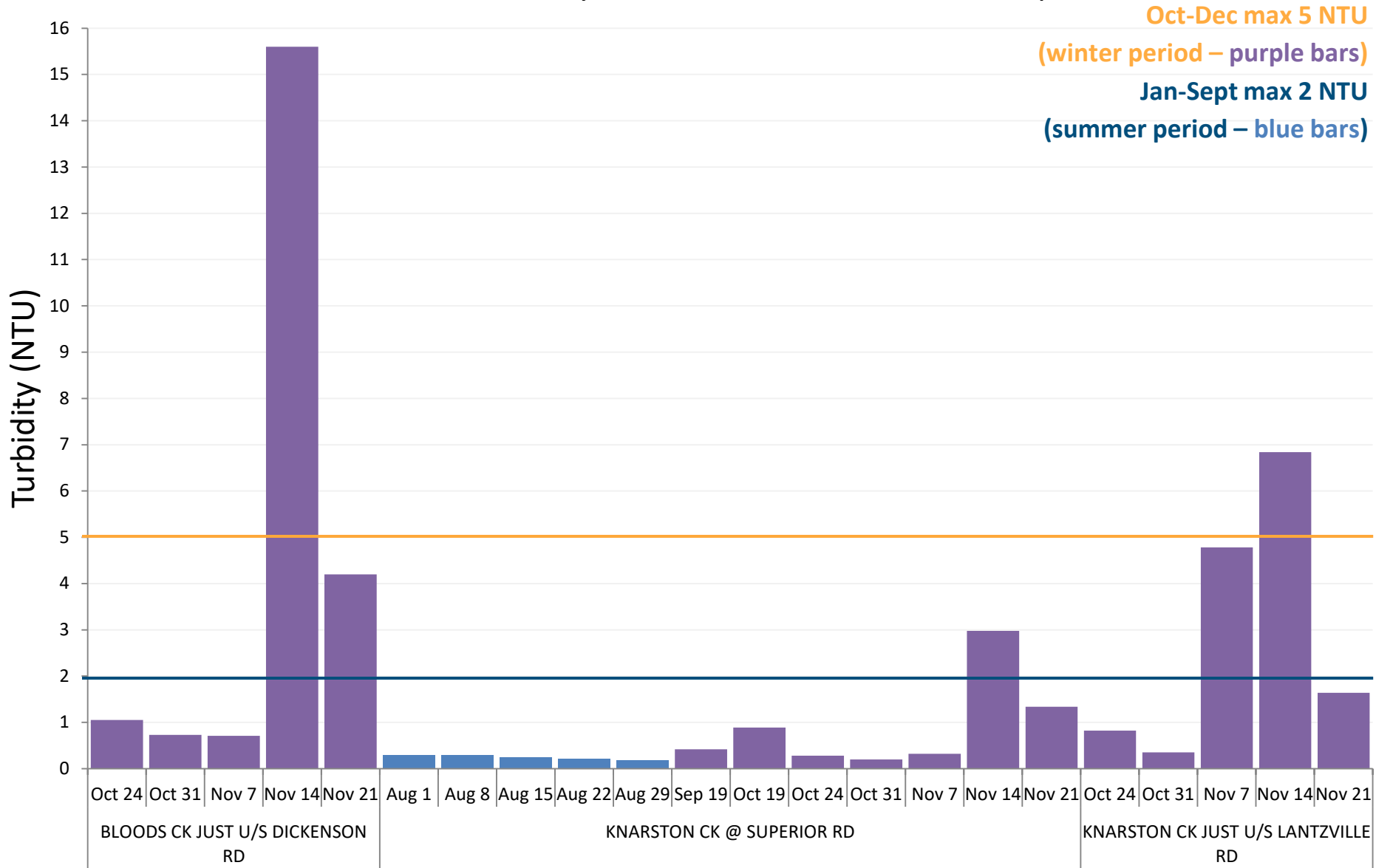


2017 Nanoose Streamkeepers Society

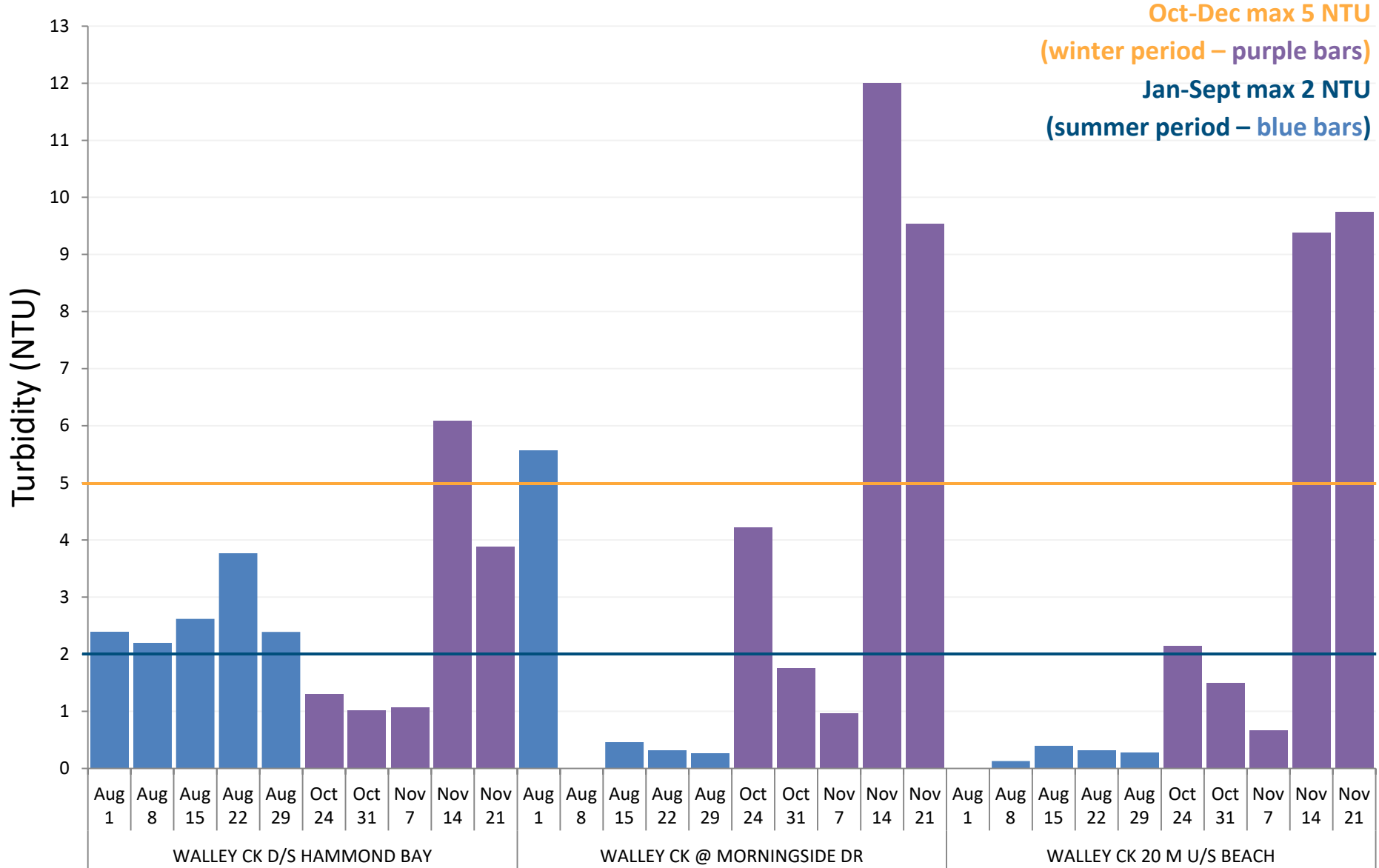
Oct-Dec max 5 NTU
 (winter period – purple bars)
 Jan-Sept max 2 NTU
 (summer period – blue bars)



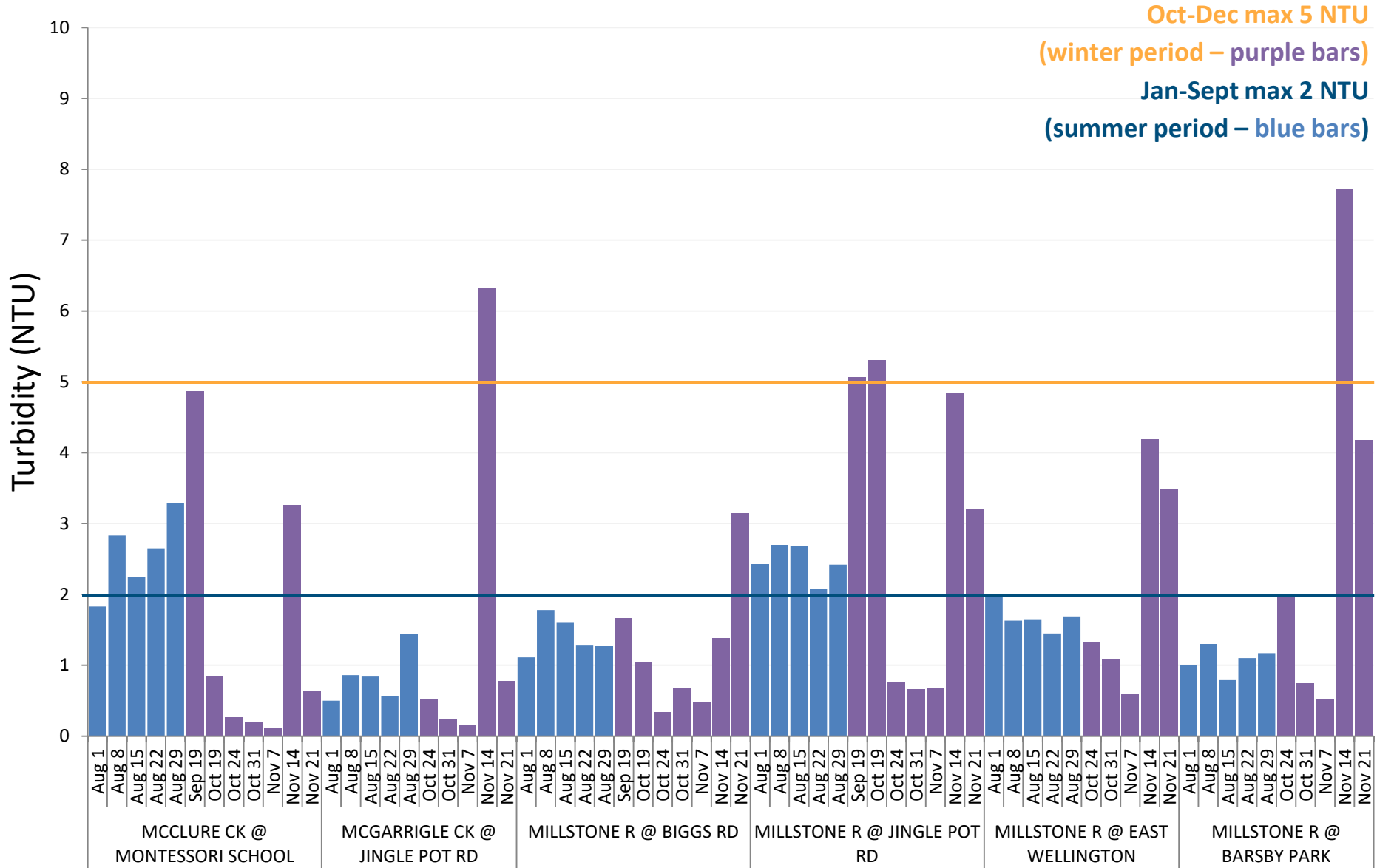
2017 Island Waters Fly Fishers & Lantzville Streamkeepers



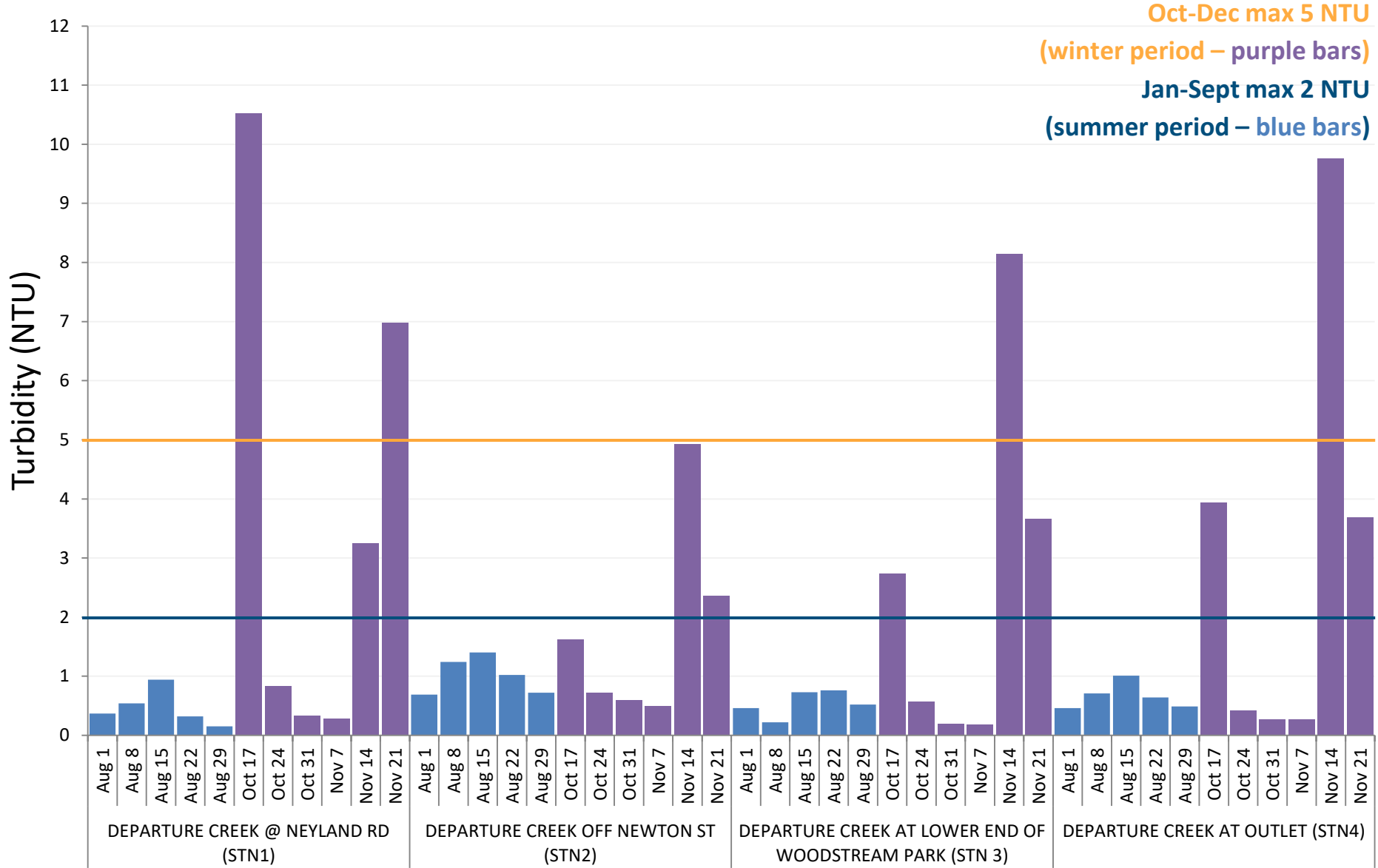
2017 Walley Creek Streamkeepers



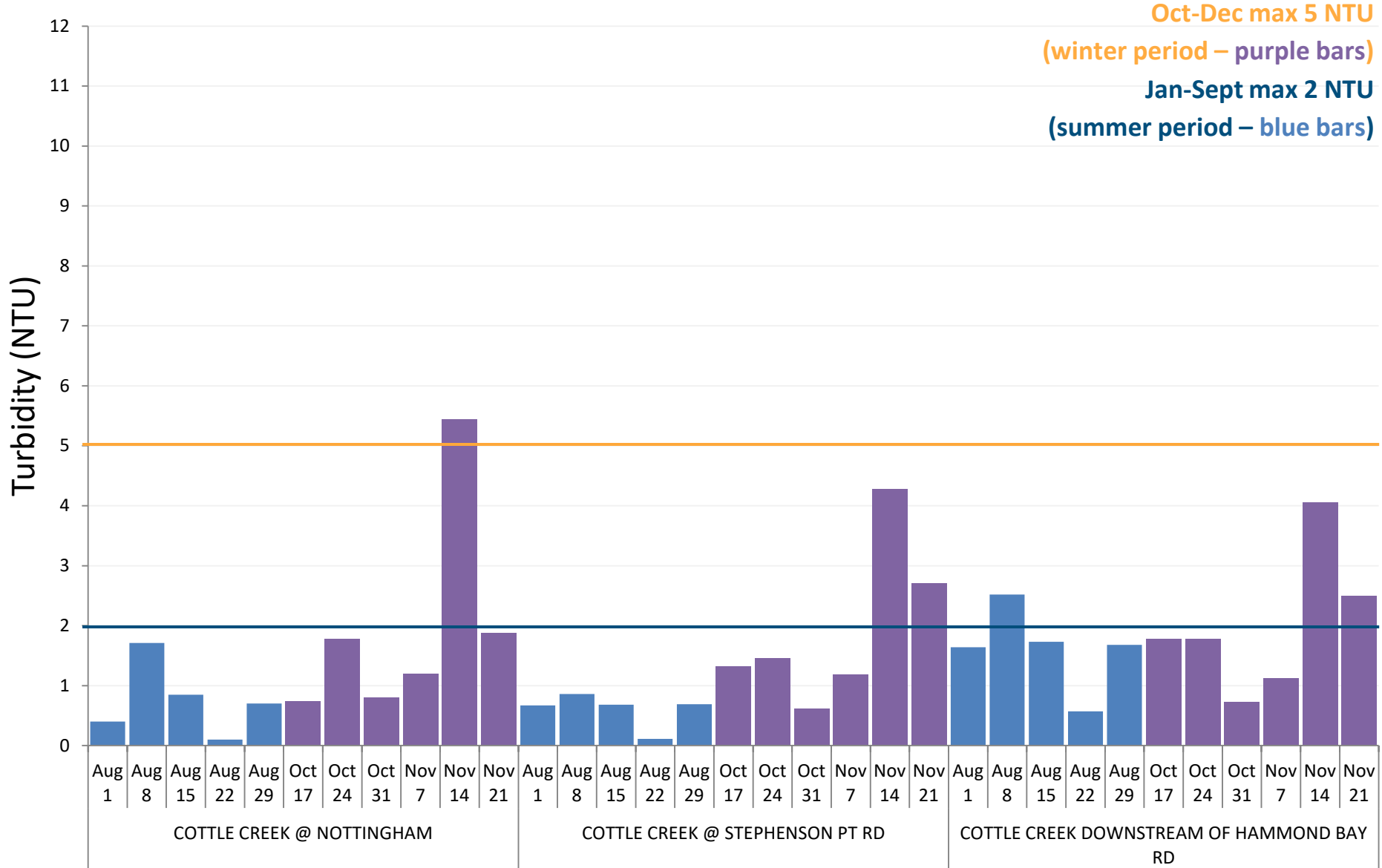
2017 Island Waters Fly Fishers



2017 Departure Creek Streamkeepers



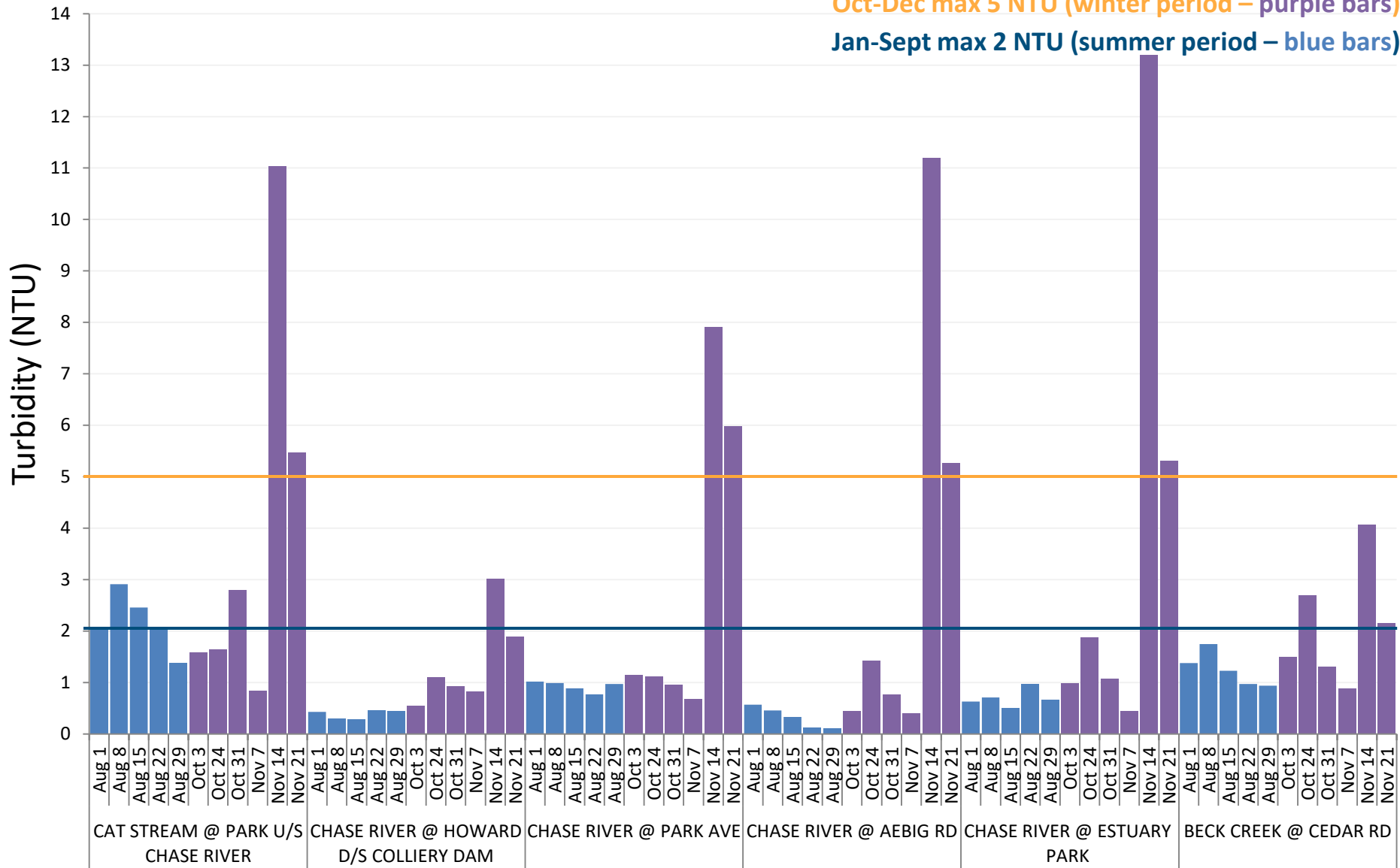
2017 Departure Creek Streamkeepers



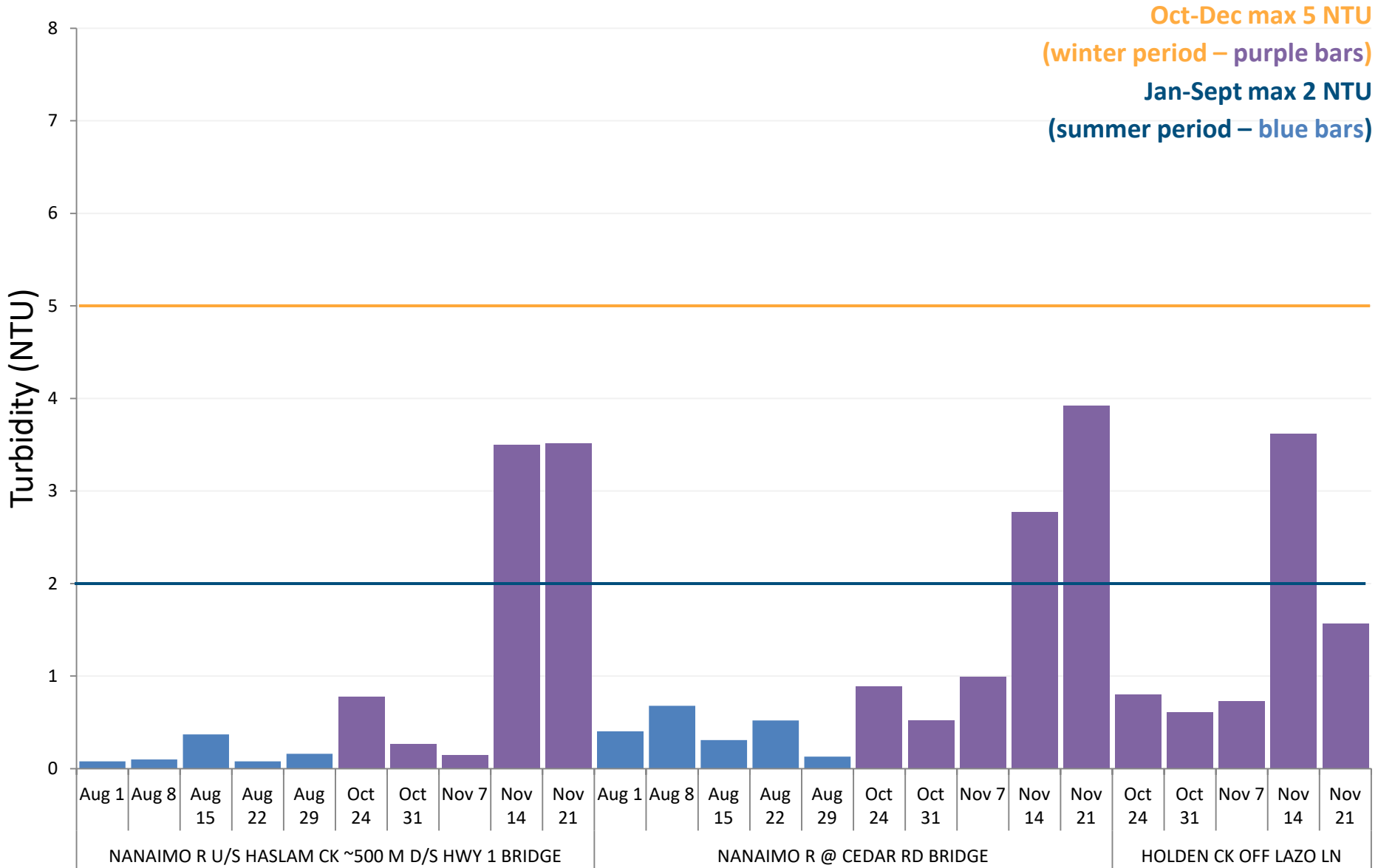
2017 Fisheries & Aquaculture Department - Vancouver Island University

Oct-Dec max 5 NTU (winter period – purple bars)

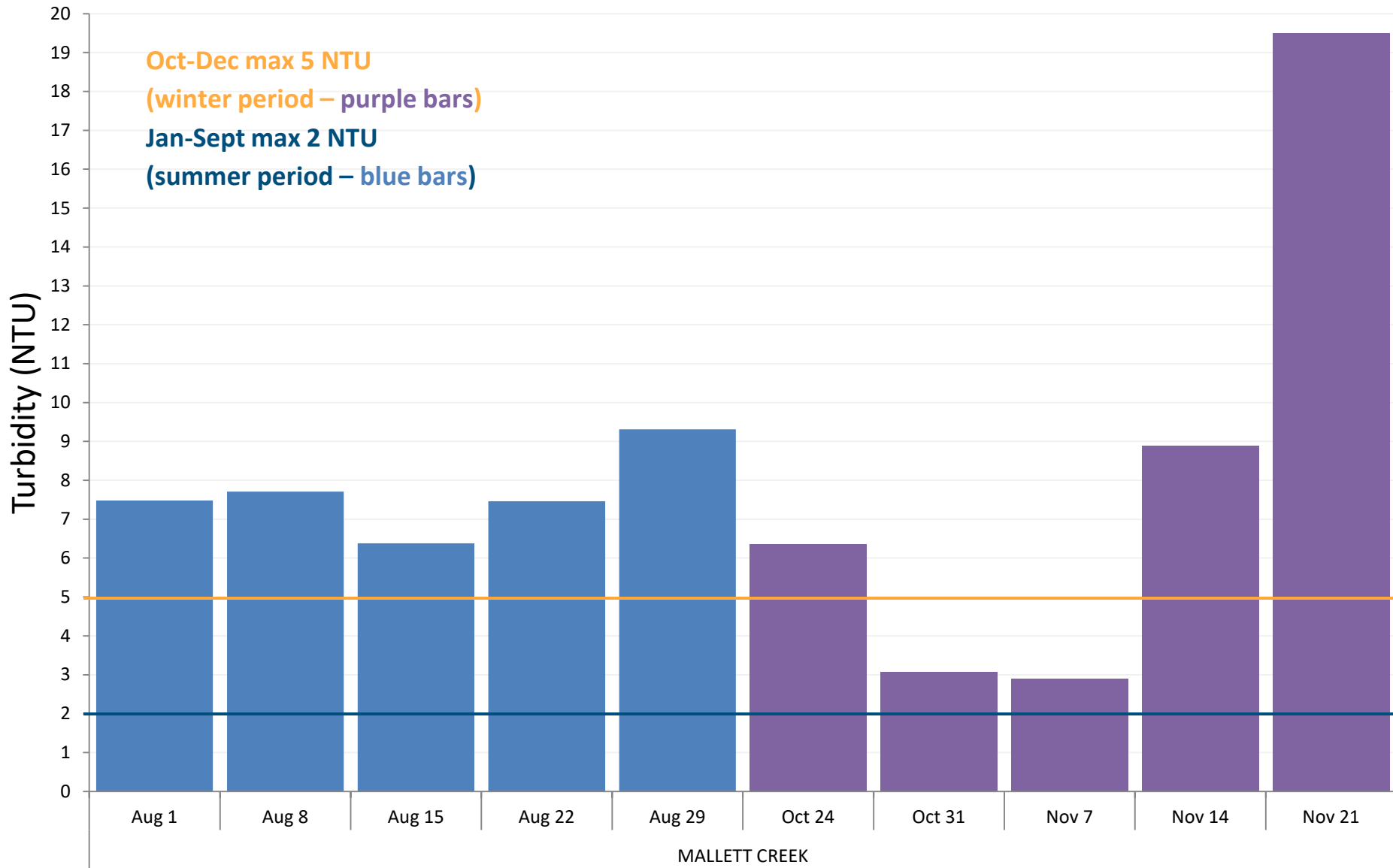
Jan-Sept max 2 NTU (summer period – blue bars)



2017 Nanaimo & Area Land Trust



2017 Gabriola Streamkeepers



Turbidity

# Exc	Jan-Sept (summer) guideline 2 NTU exceeded at:				
6	Millstone (Jingle Pot)*				
5	Mallett	Lower Holden	Annie	Deep Bay	McClure*
2-4	2 @ Shelley (Blower)		3 @ Beach (Chester)*		4 @ Cat Stream
1	Cottle (Hammond)		Beach (Memorial)*		Swane (Errington)
	Shelley (Hamilton)	Grandon*	Millstone (E Well)	Big Qualicum	

- Proximity of all creeks to developed areas suggests human inputs; some high values are explained by field observations on a given day
- Increased values often associated with rainfall events or activity instream (i.e. salmon)
- Urban streams much more difficult to interpret due to anthropogenic influences

*exceedances occurred on Sept 19

Turbidity

Oct-Dec (fall) guideline 5 NTU exceeded at:

Departure Ck (Stn 1, 3 & 4)	Cottle Ck (Nottingham)	French Ck (Hwy 19 & Barclay)
Lower Holden Ck	Mallett Ck	McGarrigle Ck
Englishman (Hwy 19A)	Morison Ck	Cat Stream
S. Englishman	Annie Ck	Thames Ck
L. Qualicum (intake)	Beach Ck (both sites)	Centre Ck
Knarston (Lantzville)	Grandon (both sites)	Cat Stream
Nanoose Ck (both sites)	Craig Ck	Nile Ck
Shelley Ck (both sites)	Swane Ck	Bloods Ck
Whiskey Ck	Deep Bay Ck	Rosewall Ck*
Chase (Estuary, Aebig & Park)	Millstone (Barsby & Jingle Pot*)	

- 53 of the 63 fall exceedances fell on Nov 14th & 21st after heavy rain events
- Streams in **blue** had exceedances on one or more of the first three fall sample dates

*Did not have exceedances on Nov 14 or 21 (heavy rain events)

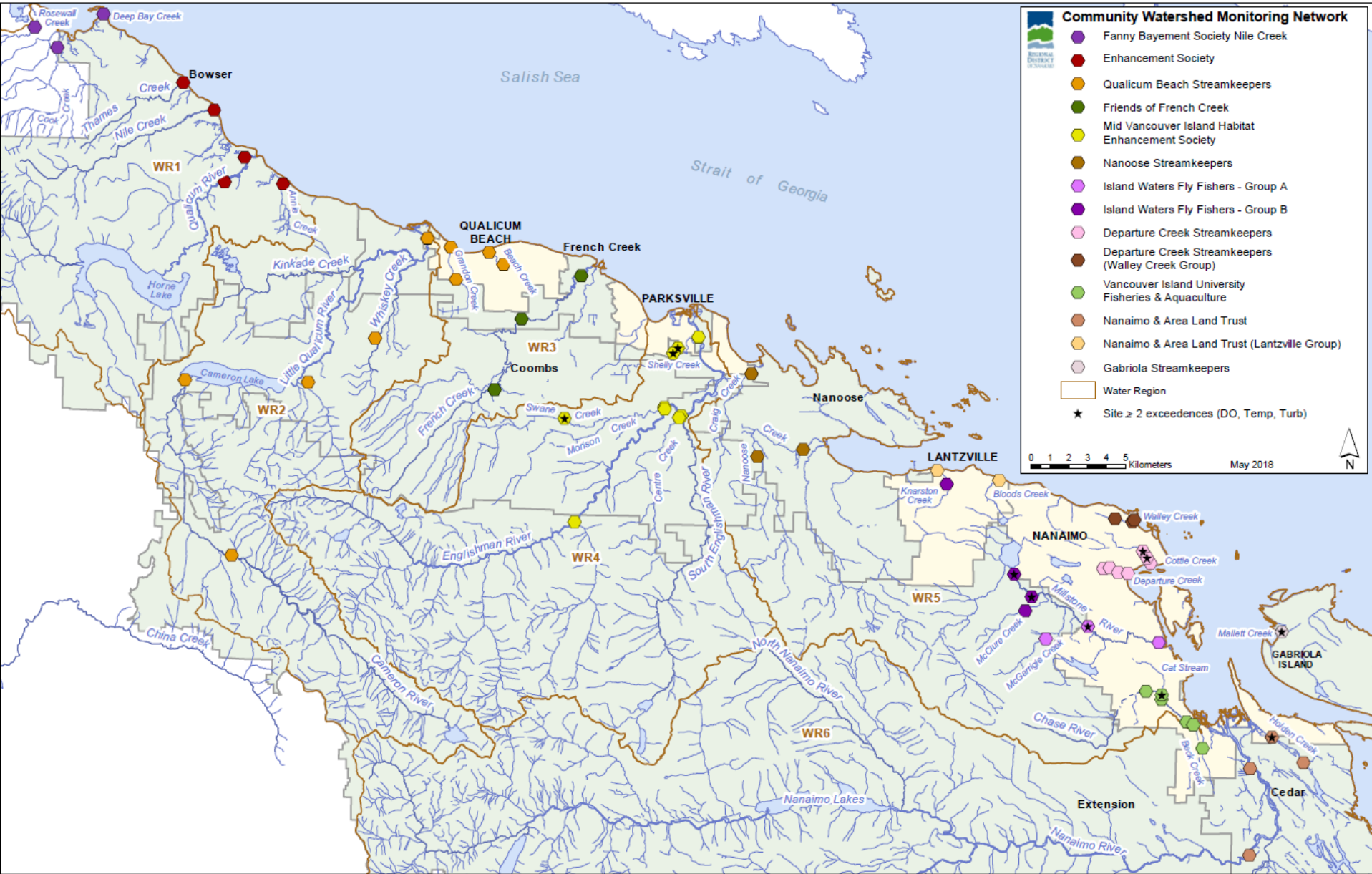
2017 Data Summary

Two or more WQO exceedances at one site
(based on: temperature, dissolved oxygen and turbidity)

Group	Watershed	Sample Location	EMS	Exceedences	Dates
VIU	Chase River	Cat Stream (Park Ave)	E290486	Temp & Turb	Aug 1, 8, 15, 22
DCS	Cottle Creek	Cottle Ck (Nottingham)	E290473	DO & Temp	Aug 8
DCS	Cottle Creek	Cottle Ck (Hemsworth)	E309186	Temp & Turb	Aug 8
GSk	Mallett Creek	Mallett Ck (Easthom)	E304070	Temp & Turb	Aug 1
IWFF	Millstone River	Millstone R (Jingle Pot)	E306294	Temp & Turb	Aug 1, 8
IWFF	Millstone River	Millstone R (Biggs)	E290478	DO & Temp	Aug 8, 22
IWFF	Millstone River	Millstone R (E Well)	E290480	Temp & Turb DO & Temp	Aug 1 Aug 8
NALT	Holden Creek	Lower Holden Ck	E309281	Temp & Turb DO, Temp & Turb	Aug 1 Aug 8, 15, 22, 29
MVIHES	Englishman R	Shelley Ck (Blower)	E290452	Temp & Turb DO & Temp DO & Turb	Aug 1 Aug 8 Aug 15
MVIHES	Englishman R	Shelley Ck (Hamilton)	E287131	Temp & Turb	Aug 8
MVIHES	Englishman R	Swane Ck (Errington)	E308186	DO & Turb	Aug 1

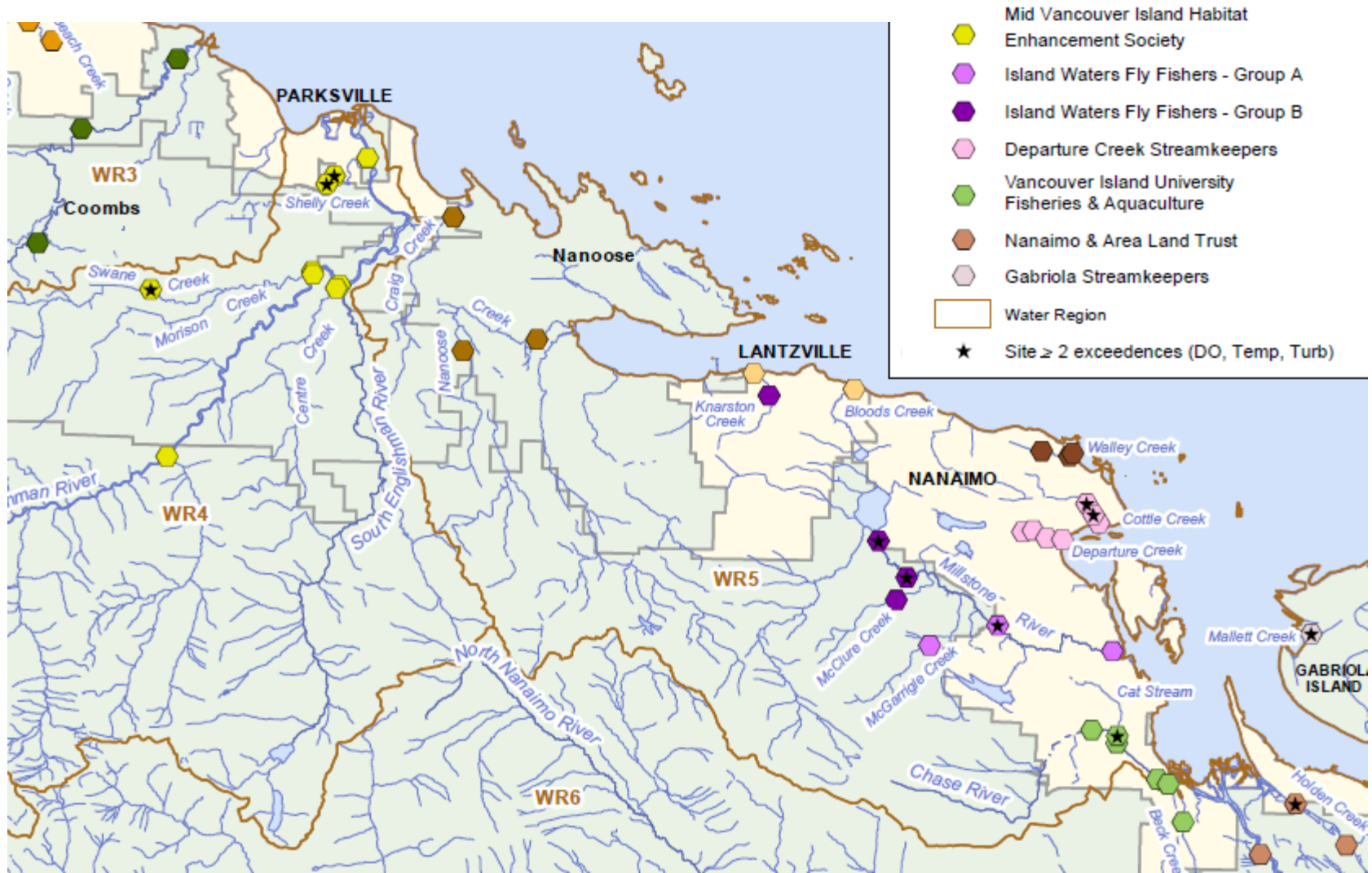
2017 Data Summary

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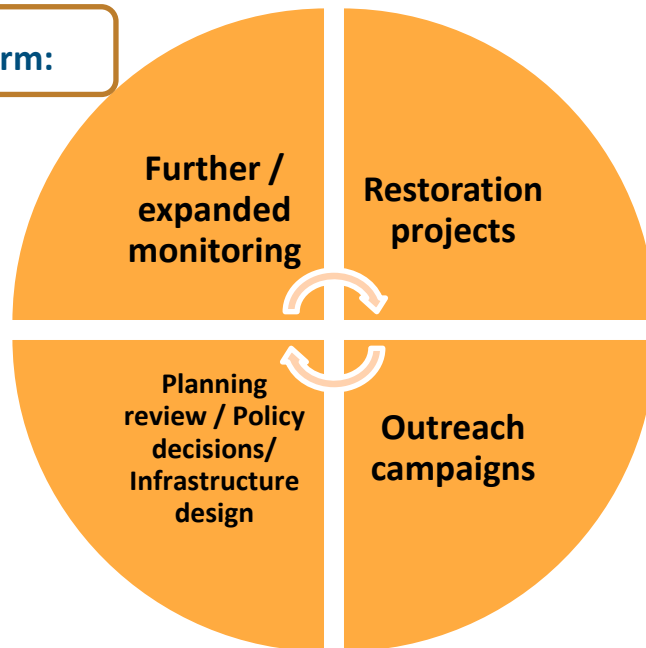


Analyzing Trends

Finding meaning in the data → Directing future action

A comprehensive analysis of the 7-year dataset is currently underway by consultants. The analysis will also look at streamflow, climate and land use data, to correlate with water quality data and investigate trends.

Help target & inform:



2017: Year Seven of the Program

Started:	2011	2012	2013	2014	2015	2016	2017
Group	NCES	IWFF	LNS	NCES added sites	GSk	FBSES	FBSES added a site
	QBS	VIU		MVIHES added sites		WCS	LNS started Lantzville sites again
	FFCCS	DCS				IWFF added a site	IWFF added a site
	MVIHES						NALT added sites
	NALT						
Trend Report:	Yes (3 year Oct 2014)	Yes (3 year June 2016)	Yes (3 year May 2017)	N/A	No	No	N/A

Comprehensive Data Trend Analysis 2011 to 2017 All Sites to be completed by Sept 2018

Related initiatives

Stream / Riparian Assessments

- Using the Provincial “Urban Salmon Habitat Program” (USHP) methodology
- In 2016/2017, took place last June with volunteers on Cat Stream and Annie Creek; in March on Morison Creek
- Helps document the physical characteristics that may be influencing DO, Temperature and Turbidity



Related initiatives

Stewardship Seed Funding

DWWP program offers seed funding for stewardship / restoration projects (\$1000- \$3000 available per project; limited funds available)

Apply now for 2018 projects!

Application form available at www.rdn.bc.ca/cwmn

Stream Restoration Tool Lending Library

- DWWP program has a tool kit to help with your streamside projects!
- Borrow it to help with your planting, invasive plant removal, etc.

2018 Training Session



Tuesday, July 24th:

- **9:30am - 12:00pm at French Creek** (Hatchery/Community Park at 815 Miller Road)
- **1:30pm - 4:00pm at Millstone River** (Bowen Park at the lower picnic shelter off of Wall Street)

Your communities and streams thank you!

