Commentary on our big day out May 2nd 2015

Good first day out by some new teams, it is very pleasing to see that some teams are having a good look at the biology of their areas, well done.
Site 89, Somerville's creek, is problematic in how we test the water..if the tide is low should we test above the bridge in deeper water ???

What was the day like?

Air temperature was close to 11 °C, it was cool day with light wind, W/NW about 5-10 knots The sky was clear, mostly 0% ccv.
** Recommend we purchase proper field note books!!! Water proof , keep thinking about this!!!

Tide and harbour conditions.

All observations and sample collection occurred between 0936 and 1200. Low water at Dunedin was at 0930. The tide was very low esp at Anderson bay inlet,.All samples and observations were carried out on an ebbing tide and close to low water. This was a good day to observe what is going on in the intertidal zone.
6.5 mm of rain has fallen over the last 10 days, little extra point and non point freshwater/storm water flowing into the harbour.
Water flow from the Leith was normal , about 0.314 cumecs. This is close to the the median flow.

Is there anything unusual ?

Litter observed at #83 (Sawdust) and #84 (broken glass and plastics)
A green film noted on the surface out from the mouth of the Leith.

Seaweeds. Well done some very good observations at #81/2/3/4/5/6.

Check the data

Animals

Check the data

Conditions of the surface water and does the water have any real or apparent colour?

Surface conditions again calm with slight ripples, #87 mirro like calm. These condtions would not mix the water in the water column with sediment. We would not expect the sediments mixing. There was nothing unusual about the colour at the surface of the water.

Water temperature

The water temperature ranged from.7.8 °C (#88) – 11.5 °C (#81/2). Many readings around 10 °C. The water temperatures are cooler than March 23rd. The temperature pattern shows the upper harbour cooling down more compared with the harbour mouth.

[March 23rd .11.0 °C (#88) – 13.8 °C (#89)]

Salinity

Sites that are directly impacted on by the tidal flow showed a range of 33.70 (#84) -34.41 ppt (#83) .
The pattern is normal, it is still tricky measuring the salinity at the mouth of the Leith, as the freshwater mixes with the seawater.
[March 23rd 34.03 (#87) -34.71 ppt (#81/2)]
Open sea salinity 34.998 ppt!!!
Salinity readings more accurate.

pH

All sites tested. Range was 7.58 (#81/2) – 8.38 (#88)
pH range narrower than our March readings.
 [March 23rd 6.64 (#86) – 8.46 (#88)]

Turbidity

All sites tested. Range was 1.5 NTU (#83) – 15.07 NTU (#89).
The range was similar to March 23rd readings, this is not suprising as the wind was less and the water column not being agitated as much at the surface. Samples exposed directly to the tidal changes had readings around 2 NTU. The samplers have to be careful collecting their samples at low tide and avoid including sediment in their samples. It was difficult to collect a sample from #89 as the water was very shallow.
 [March 23rd 2.07 NTU (#87) – 17.4 NTU (#86)]

** Why is turbidity important?? .
 Light is essential for photosynthesis, increased turbidity will inhibit PS deeper in the water column.
Increased surface area will increase the solubility of nutrients?especially phosphates/heavy metals.
Presence of significant amounts of fine particles in the water column will act against filter feeders!!,
may block up their siphons/filters.

Guideline values </= 5.6 NTU ANZECC&ARMCANZ (2000)
2 sites   #84/9 exceeded this value

Dissolved oxygen (DO) mg L^{-1} and % saturation.

The range of DO readings shows a range from all sites 8.11 mg L^{-1} (#83)- 11.88 mg L^{-1}(#88)
Some of the open water sites have high concentration of dissolved oxygen.
% saturation range 66.2% (#89) – 110.1 % (#86)
Similar range and values for March 23rd with the exceptions of #89, this has been observed at this site before. .Generally the water was well oxygenated and saturated with oxygen. All sites have DO concentrations that will support as healthy biological community.
[March 23rd 5.5 mg L^{-1} (#89)- 10.61 mg L^{-1}(#88) and 61.0% (#89) – 106.5 % (#81/2)]

Chlorophyll a.

Range 1.02 μg/L (#87) – 3.58(#84)/4.01 μg/L (#89)
The readings have a similar range to March 23rd , 7 sites have **low** readings around 1 μg/L, the rest are medium values. noted at #84 (Mussel bay), and #89 (Somerville's creek).

#82 had a medium value, while #81 was low, was there sediment in the sample, sometimes sediments will had extra chlorophyll to the samples. Both are taken from the same site.??

Values above 5.0 are classified in estuaries as a matter for concern, possible algal blooms???

 [March 23rd   0.70 µg/L (#87) – 4.60 µg/L (#86)]

LOW ENVIRONMENTAL HEALTH CATEGORY for open water

 0-2 (µg L^{-1}) low
 >2-5 medium
 >5-10 high
 >10 very high

DRP (dissolved reactive phosphate)

Range of 0.45 µmol L^{-1}(#84) – 1.01 µmol L^{-1} (#88). The exception is #89 which has a reading of 15.40 µmol L^{-1} , this usually exceeds others but not by this amount. It was difficult to collect the sample, so did sediment contribute to this reading. ???

Most of the values are similar to March 23rd concentrations, slightly lower possibly.

#8/9 exceeded   Guideline values. !!!**.**

[March 23rd 0.59 µmol L^{-1}(#84) – 1.93 µmol L^{-1} (#89)].

GUIDELINE value 0.11 µ mol L^{-1} (= 0.010 mg P/ PO$_4$$^{3-}$ L^{-1})
HIGH ENVIRONMENTAL HEALTH CATEGORY
** We need to be careful with the prep of the mixed reagent, at the first attempt, colour looked good, reaction occurred but the readings kept climbing, suggesting the reaction was continuing.

NNN (total dissolved nitrates and nitrites)

Variable readings from different sites.
1.66 µmol L^{-1} (#85) – 2.93 µmol L^{-1}(#87) Open water sites . Most sites around 1-2 µmol L^{-1}, similar to March 23rd readings.
2.77 µmol L^{-1}(#86) – 18.00 µmol L^{-1}(#88)/ 42.17 µmol L^{-1}(#89) Storm water /discharge sites higher than March 23rd

Assume that more NNN being utilised by the phytoplankton. Chloro a levels are low reflecting the low concentration of nutrients. ?? Hypothesis.
The phytoplankton will draw down the NNN in the water, is there biological activity developing in the harbour??

[March 23rd 0.22 µmol L^{-1} (#84) – 20.09 µmol L^{-1}(#83) Open water sites

5.06 μmol L^{-1}(#89) – 13.67 μmol L^{-1}(#88)   Discharge sites]

#83/88 exceed guidelines.
GUIDELINE value 7.161 μ mol L^{-1} (=0.444 mg NO$_3^{-1}$ L^{-1})
LOW/MED ENVIRONMENTAL HEALTH CATEGORY !!!!!!

Enterococci
 All sites were below the guideline values except for sites #88 (Macbay storm water) and #89 (Somervilles stream), 540 and 150 cells per 100mL respectively. #86 number was unsure.
Guideline value 140 cells per 100mL of sample indicated *Enterococci* bacteria

SUMMARY OF DATA.

DATE: **02/04/2015**

What is the weather like? • *Air temperature* • *Wind speed and direction* • *Cloud cover*	#81 10oC, light SSW, 0% ccv #82 #83 11oC, south calm,0% ccv #84 11oC,SW breeze, 0%ccv 12/13oC, 5-10 km/hr S, #85 2%ccv #86 12.5oC, 2% ccv #87 9oC,calm,0%ccv #88 8.4oC,5kph,NE,0% ccv #89 11.3oC, no wind or cloud #810 light westerly breeze

What is the time, and what stage is the tide?
What is the condition of the Leith ?
Check websites (Met service and Port otago)
	#81 0936 low water
	  #82
	  #83 1007
	  #84 1025 close to low water
	  #85 1130, flooding tide
	  #86 1200, incoming tide,sig flow of water down the leith
	
	  #87 0935, low tide
	  #88 1000
	  #89 1020, low tide almost out
	  #810 very low tide

Is there anything unusual to report (dead crabs, nasty smell, coloured sheen on the water)? • **Discharge pipes** • **Any star fish/other animals ??** • **Rubbish or litter.**	#81 none #82 #83 Saw dust litter #84 broken glassd and plastics #85 #86 green film on the surface 2m from shore occasional leaf litter #87 _ #88 _ #89 water v low, b discol and muddy #810 lots of rocks and exposed seaweeds

• ***Special seaweeds***
    f=few
      s=some
        m=many
	See data sheets

Animals	See data sheets
What condition is the surface of the water?	#81 calm, sl ripples #82 #83 calm, sl ripples #84 ripple #85 reasonably smooth, #86 flat murky film #87 mirror-like calm #88 stream like #89 clean #810 clear
Does the water have any real, or apparent colour?	#81 blue #82 #83 green/blue #84 clear blue #85 teal-green colour #86 pale green/grey

#87	grey green
#88	brown
#89	clear blue
#810	clear

Understanding Estuarine Processes

SITE: _____ DATE:

What is the water temperature ?	#81 and
	2 11.5
	#82
	#83 10.5
	#84 9.9
	#85 10.1
	#86 10.6
	#87 9.3
	#88 7.8
	#89 8.4
	#810 9.5
	°C
What is the salinity of the sample ?	#81 and
	2 34.307
	#82
	#83 34.4085
	#84 33.698
	#85 34.347
	#86 34.24
	#87 34.347
	#88 0.107
	#89 4.601
	#810 33.919
	ppt
What is the electrical conductivity of the sample ? *NOTE: record the first conductivity, this is the actual*	#81 and
	2 38.90/_
	#82
	#83 37.99/_
	#84 36.03/_
	#85 37.72/52.86

conductivity at this temperature, the next reading is the specific conductance, the conductivity adjusted by the instrument to 25 °C	#86 38.16/52.64 #87 37.0/52.79 #88 0.12/0.31 #89 7.0/7.26 #810 36.59/52.27 mS/cm
What is the pH of the sample ?	#81 and 2 7.58 #82 7.79 #83 7.84 #84 7.88 #85 _ #86 _ #87 7.79 #88 8.38 #89 8.11 #810 7.67
What is the water turbidity?	#81 and 2 1.95 #82 1.77 #83 1.5 #84 7.58 #85 1.67 #86 3.52 #87 2.61 #88 5.46 #89 15.07 #810 1.9 NTU
What is the oxygen concentration of your sample ? *Measure both methods mg/L and % saturation*	#81 and 2 9.49 #82 #83 8.11 #84 9.38 #85 9.58 #86 10.09 #87 8.23 #88 11.88 #89 9.26 #810 8.85

	mg/L
#81 and 2	106.7
#82	
#83	90.3
#84	100.1
#85	104
#86	110.1
#87	88.8
#88	100.2
#89	66.2
#810	94.1
	% saturation

What is the chlorophyll a concentration of the sample ? • *Record the volume of water filtered*	
#81 and 2	2.30
#82	1.02
#83	1.09
#84	3.58
#85	0.93
#86	2.00
#87	1.07
#88	1.05
#89	4.01
#810	1.21
	µg/L
0-2 low >2-5 medium >5-10 high >10 very high	

****NNN	
#81 and 2	2.91
#82	2.91
#83	2.58
#84	1.88
#85	1.66
#86	2.77
#87	2.93
#88	18.00
#89	42.17
#810	2.57
	µmol/L

****DRP	#81 and
	2 0.46
	#82 0.45
	#83 0.54
	#84 0.92
	#85 0.61
	#86 0.63
	#87 0.49
	#88 1.01
	#89 15.40
	#810 0.72
	µmol/L
What is the enterococci count in the sample ?	#81 and
	2 1
	#82 1
	#83 25
	#84 24
	#85 0
	#86 42
	#87 19
	#88 300
	#89 450
	#810 4
	colonies indicated /100mL