Attachment 1 to Statement of Evidence of Dr Peter Wilson (Marine ecotoxicology), 28 February 2025

Hearing Stream 2 of the Proposed Plan Change 1 to the Natural Resources Plan for the Wellington Region

Table 1: Te Awarua-o-Porirua (TAoP) Harbour sediment attribute state framework for Copper (Cu) and Zinc (Zn)

Parameter	ANZG (2018)		Attribute State			
	DGV	GV-H	A: V. Good	B: Good	C: Fair	D: Poor
			<50% DGV	50% DGV to <DGV	DGV to <GV-H	≥GV-H
Copper (mg/kg)	65	270	<32.5	32.5 to <65	65 to <270	≥270
Zinc (mg/kg)	200	410	<100	100 to <200	200 to <410	≥410

Table 2: TAoP Harbour arm wide modelled attribute state framework – Zinc

Values in red exceed the published marine Predicted no-effect concentration (**PNEC**) value for sediment Zn of 162.2 mg/kg

Scenario / Location	Arm - Average (mg/kg)	Arm - Median (mg/kg)	Arm - 95th percentile (mg/kg)
Onepoto Arm			
Zn Current Present Day	141.4	138.2	316.6
Zn Current 2040	152.7	166.3	322.1
Zn 40/40 2040	148	159.3	316.7
Zn 40/15 2040	167.1	164.6	372.5
Zn 40/0 2040	181.2	171.9	413.8
Pāuatahanui Inlet			
Zn Current Present Day	28.2	2.7	81
Zn Current 2040	31.2	3.6	95.4
Zn 40/40 2040	31.4	3.3	94.2
Zn 40/15 2040	32.1	3.3	94.7
Zn 40/0 2040	35.1	3.5	101.3

Table 3: TAoP Harbour arm wide modelled attribute state framework – Copper

Values in red exceed the published lower Median No observed effect concentration (**NOEC**) range for sediment Cu of 23.4 mg/kg

Scenario / Location	Arm - Average (mg/kg)	Arm - Median (mg/kg)	Arm - 95th percentile (mg/kg)
Onepoto Arm			
Cu Current Present Day	13	12.9	28.3
Cu Current 2040	14	15.6	29
Cu 40/40 2040	13.6	14.9	28.4
Cu 40/15 2040	15.4	15.8	33.7
Cu 40/0 2040	16.6	16.2	37
Pāuatahanui Inlet			
Cu Current Present Day	2.7	0.2	7.3
Cu Current 2040	2.9	0.3	8.7
Cu 40/40 2040	3	0.3	8.6
Cu 40/15 2040	3.1	0.3	8.9
Cu 40/0 2040	3.3	0.3	9.2

Table 4: Modelled attribute state framework – Zinc

Values in red exceed the published marine PNEC value for sediment Zn of 162.2 mg/kg

Scenario / Location	Onepoto Arm	Pāuatahanui Inlet
Intertidal average (mg/kg)		
Zn Current Present Day	105.7	17.6
Zn Current 2040	112.5	19.2
Zn 40/40 2040	107.4	19.3
Zn 40/15 2040	122.6	19.3
Zn 40/0 2040	135.2	21.7
Subtidal average (mg/Kg)		
Zn Current Present-Day	199.8	45
Zn Current 2040	216.1	50.3
Zn 40/40 2040	210.9	50.8
Zn 40/15 2040	237.6	52.4
Zn 40/0 2040	256	56.2

Table 5: Modelled attribute framework – Copper

Values in red exceed the published lower Median NOEC range for sediment Cu of 23.4 mg/kg

	Onepoto Arm	Pāuatahanui Inlet
Intertidal average (mg/kg)		
Cu Current Present Day	9.7	1.6
Cu Current 2040	10.3	1.8
Cu 40/40 2040	9.9	1.8
Cu 40/15 2040	11.4	1.9
Cu 40/0 2040	12.3	2
Subtidal average (mg/kg)		
Cu Current Present Day	18.3	4.3
Cu Current 2040	19.8	4.8
Cu 40/40 2040	19.4	4.8
Cu 40/15 2040	21.8	5.1
Cu 40/0 2040	23.4	5.4

Table 6: NOF-style 4-band attribute framework – Zinc/Copper in Onepoto Arm sub-estuary locations.
Values in red exceed the published PNEC (marine), values in **bold underline** exceed the median NOEC based on published NOEC ranges for the respective contaminant (Zn or Cu).

Onepoto Sub-estuary	Zn 50th Percentile	Zn 95th Percentile	Cu 50th Percentile	Cu 95th Percentile
Porirua				
Cu/Zn Current Present Day	276.3	287.4	24.6	25.4
Cu/Zn Current 2040	276.7	287.4	24.6	25.4
Cu/Zn 40/40 2040	269.9	274.6	24.1	24.4
Cu/Zn 40/15 2040	334.5	361.1	29.6	31.6
Cu/Zn 40/0 2040	368.6	408.6	32.7	36
Papakowhai				
Cu/Zn Current Present Day	279.9	341.3	25	29.9
Cu/Zn Current 2040	281.7	341.3	25.1	29.9
Cu/Zn 40/40 2040	274.6	330	24.5	29
Cu/Zn 40/15 2040	327.2	421.5	29.2	36.9
Cu/Zn 40/0 2040	352.2	482.4	31.3	**42.1**
Titahi				
Cu/Zn Current Present Day	272.3	330.4	24.4	29.5
Cu/Zn Current 2040	290.3	330.6	26	29.8
Cu/Zn 40/40 2040	284	325.6	25.5	29.6
Cu/Zn 40/15 2040	312.5	382.2	28.1	34.8
Cu/Zn 40/0 2040	332.2	426.3	29.7	**38.2**
Onepoto				
Cu/Zn Current Present Day	281.3	491.4	25.3	**46.2**
Cu/Zn Current 2040	301.3	**529.6**	27.1	**50.3**
Cu/Zn 40/40 2040	296	**533.4**	26.6	**50.9**
Cu/Zn 40/15 2040	322.7	**555.9**	29.5	**53.9**
Cu/Zn 40/0 2040	343.6	**609**	31.1	**57.4**
Aotea				
Cu/Zn Current Present Day	273.8	280.8	24.6	25
Cu/Zn Current 2040	275.3	281.3	24.7	25.1
Cu/Zn 40/40 2040	269.9	276.6	24.2	24.9
Cu/Zn 40/15 2040	329.6	352.6	29.6	31.2
Cu/Zn 40/0 2040	360.7	397.6	32.5	35.3
Te Onepoto				
Cu/Zn Current Present Day	205.2	274.3	19.1	26.1
Cu/Zn Current 2040	237.2	297.4	22	28.6
Cu/Zn 40/40 2040	229.7	295.7	21.4	29.1
Cu/Zn 40/15 2040	243.1	316.6	22.8	31.3
Cu/Zn 40/0 2040	255.3	336.7	23.7	32.4
Onepoto North				
Cu/Zn Current Present Day	3.1	158.9	0.2	15
Cu/Zn Current 2040	4.1	194.9	0.3	18.3
Cu/Zn 40/40 2040	3.8	186.7	0.3	17.6
Cu/Zn 40/15 2040	3.9	191.9	0.3	18.4
Cu/Zn 40/0 2040	4.1	201.6	0.3	19.1

Table 7: NOF-style 4-band attribute framework – Zinc/Copper in Pāuatahanui Inlet sub-estuary locations. Values in red exceed the published PNEC (marine), values in **bold underline** exceed the median NOEC based on published NOEC ranges for the respective contaminant (Zn or Cu).

Pāuatahanui Sub-estuary	Zn 50th Percentile	Zn 95th Percentile	Cu 50th Percentile	Cu 95th Percentile
Boatshed				
Cu/Zn Current Present Day	0.1	144	<0.1	13.5
Cu/Zn Current 2040	0.2	176.6	<0.1	16.5
Cu/Zn 40/40 2040	0.2	168.4	<0.1	15.8
Cu/Zn 40/15 2040	0.2	174.2	<0.1	16.5
Cu/Zn 40/0 2040	0.2	182.4	<0.1	17.1
Browns				
Cu/Zn Current Present Day	0.1	64	<0.1	6.1
Cu/Zn Current 2040	0.1	72.8	<0.1	6.9
Cu/Zn 40/40 2040	0.1	72.5	<0.1	6.9
Cu/Zn 40/15 2040	0.1	75.3	<0.1	7.3
Cu/Zn 40/0 2040	0.1	81.1	<0.1	7.7
Bradeys				
Cu/Zn Current Present Day	69.4	351.8	6.4	29.9
Cu/Zn Current 2040	83.3	388.4	7.7	32.7
Cu/Zn 40/40 2040	81.3	415.4	7.5	35.2
Cu/Zn 40/15 2040	82.6	386.7	7.8	35.6
Cu/Zn 40/0 2040	87	428.2	8	36.4
Duck				
Cu/Zn Current Present Day	46.7	77.6	4.4	7.1
Cu/Zn Current 2040	47.1	87.7	4.4	8
Cu/Zn 40/40 2040	47.1	89.4	4.5	8.2
Cu/Zn 40/15 2040	51.9	89.6	5.3	8.5
Cu/Zn 40/0 2040	59	98.1	5.8	8.9
Pāuatahanui				
Cu/Zn Current Present Day	0.1	17.4	<0.1	2.1
Cu/Zn Current 2040	0.1	17.4	<0.1	2.1
Cu/Zn 40/40 2040	0.1	17.7	<0.1	2.2
Cu/Zn 40/15 2040	0.1	20.8	<0.1	2.5
Cu/Zn 40/0 2040	0.1	22.3	<0.1	2.8
Horokiri				
Cu/Zn Current Present Day	0.2	14.8	<0.1	1.9
Cu/Zn Current 2040	0.3	14.8	<0.1	1.9
Cu/Zn 40/40 2040	0.3	15.5	<0.1	2
Cu/Zn 40/15 2040	0.3	18.8	<0.1	2.4
Cu/Zn 40/0 2040	0.3	20	<0.1	2.6
Lochlands				
Cu/Zn Current Present Day	0.1	14.8	<0.1	2
Cu/Zn Current 2040	0.1	15.6	<0.1	2.1
Cu/Zn 40/40 2040	0.1	14.6	<0.1	1.9
Cu/Zn 40/15 2040	0.1	21.5	<0.1	2.6
Cu/Zn 40/0 2040	0.1	19.9	<0.1	2.8

Pāuatahanui Sub-estuary	Zn 50th Percentile	Zn 95th Percentile	Cu 50th Percentile	Cu 95th Percentile
Kakaho				
Cu/Zn Current Present Day	0	22	<0.1	2.6
Cu/Zn Current 2040	0	22.1	<0.1	2.6
Cu/Zn 40/40 2040	0	22.9	<0.1	2.6
Cu/Zn 40/15 2040	0	27.5	<0.1	3.1
Cu/Zn 40/0 2040	0	29.9	<0.1	3.5
North				
Cu/Zn Current Present Day	13.9	47.9	1.4	4.7
Cu/Zn Current 2040	16.6	53.6	1.8	5.2
Cu/Zn 40/40 2040	16.3	53.6	1.6	5.2
Cu/Zn 40/15 2040	16.9	55.8	1.7	5.5
Cu/Zn 40/0 2040	17.5	59.2	1.8	5.9
Mid				
Cu/Zn Current Present Day	39.6	58	4	5.5
Cu/Zn Current 2040	41.1	66.5	4.2	6.3
Cu/Zn 40/40 2040	42.8	66	4.4	6.2
Cu/Zn 40/15 2040	46	68.1	4.7	6.6
Cu/Zn 40/0 2040	49.1	72	5	6.8