

Annex K2

## Monitoring Results for Soft Shore Ecology

**Table K2.1 Results for Horseshoe Crabs during Qualitative Walk-through Surveys in March 2023**

Sighting #	Species	Prosomal Width (cm)	Total Length (cm)
<b>Monitoring Date: 23 March 2023</b>			
<b>Monitoring Station: THW</b>			
1	<i>Tachypleus tridentatus</i>	2.7	4.9
2	<i>Tachypleus tridentatus</i>	3.5	6.9
3	<i>Tachypleus tridentatus</i>	2.6	3.1
4	<i>Tachypleus tridentatus</i>	4.0	6.9
5	<i>Tachypleus tridentatus</i>	1.0	1.6
6	<i>Tachypleus tridentatus</i>	2.6	5.3
<b>Mean (Range)</b>		<b>2.7 (1.0 – 4.0)</b>	<b>4.8 (1.6 – 6.9)</b>
<b>Monitoring Date: 24 March 2023</b>			
<b>Monitoring Station: TCB3</b>			
1	<i>Tachypleus tridentatus</i>	3.9	7.4
2	<i>Tachypleus tridentatus</i>	5.1	10.0
3	<i>Tachypleus tridentatus</i>	4.0	8.6
<b>Mean</b>		<b>4.3 (3.9 – 5.1)</b>	<b>8.7 (7.4 – 10.0)</b>

**Table K2.2 Results for Seagrass during Qualitative Walk-through Surveys in March 2023**

Sighting #	Species	Area (m <sup>2</sup> )	Area Coverage (%)	Seagrass Area (m <sup>2</sup> )
<b>Monitoring Date: 24 March 2023</b>				
<b>Monitoring Station: TCB3</b>				
1	<i>Halophila ovalis</i>	108.0	60%	64.8
2	<i>Halophila ovalis</i>	24.0	70%	16.8
3	<i>Halophila ovalis</i>	4.0	70%	2.8
4	<i>Halophila ovalis</i>	12.3	80%	9.8

**Table K2.3    Results for Other Intertidal Soft Shore Communities during Qualitative Walk-through Surveys in March 2023**

Monitoring Station	Shore Height *	No. of Species
TCB1	H	30
	M	32
	L	26
	<b>Overall</b>	<b>34</b>
TCB2	H	25
	M	23
	L	27
	<b>Overall</b>	<b>35</b>
TCB3	H	25
	M	28
	L	31
	<b>Overall</b>	<b>40</b>
THW	H	23
	M	30
	L	24
	<b>Overall</b>	<b>37</b>

\* H: +2mCD; M: +1.5mCD; L: +1mCD

**Table K2.4 Results for Other Intertidal Soft Shore Communities during Quantitative Transect Surveys in March 2023**

Monitoring Station	Shore Height *	Top Three Dominant Species	Density (ind. / m <sup>2</sup> )
TCB1	H	1 <i>Cerithidea diadjariensis</i>	139.2
		2 <i>Batillaria zonalis</i>	60.8
		3 <i>Batillaria multiformis</i>	38.4
	M	1 <i>Batillaria zonalis</i>	38.4
		2 <i>Cerithidea diadjariensis</i>	30.4
		3 <i>Monodonta labio</i>	22.4
	L	1 <i>Batillaria zonalis</i>	68.8
		2 <i>Monodonta labio</i>	3.2
		3 <i>Coecella chinensis</i> <b>and</b> <i>Cyclina sinensis</i>	2.4
TCB2	H	1 <i>Cerithidea diadjariensis</i>	200.8
		2 <i>Cerithidea cingulata</i>	22.4
		3 <i>Batillaria multiformis</i>	20.8
	M	1 <i>Cerithidea diadjariensis</i>	196.8
		2 <i>Batillaria zonalis</i>	121.6
		3 <i>Batillaria multiformis</i>	55.2
	L	1 <i>Cerithidea diadjariensis</i>	104.0
		2 <i>Cerithidea cingulata</i>	15.2
		3 <i>Batillaria multiformis</i>	3.2
TCB3	H	1 <i>Batillaria multiformis</i>	594.4
		2 <i>Cerithidea diadjariensis</i>	291.2
		3 <i>Batillaria zonalis</i>	155.2
	M	1 <i>Cerithidea diadjariensis</i>	238.4
		2 <i>Batillaria multiformis</i>	137.6
		3 <i>Batillaria zonalis</i>	81.6
	L	1 <i>Batillaria zonalis</i>	33.6
		2 <i>Batillaria multiformis</i> <b>and</b> <i>Cerithidea diadjariensis</i>	17.6
		3 <i>Sipunculus sp.</i>	5.6
THW	H	1 <i>Cerithidea diadjariensis</i>	91.2
		2 <i>Geloina erosa</i>	20.0
		3 <i>Cerithidea cingulata</i>	9.6
	M	1 <i>Cerithidea diadjariensis</i>	380.8
		2 <i>Cerithidea cingulata</i>	126.4
		3 <i>Terebralia sulcata</i>	51.2
	L	1 <i>Cerithidea diadjariensis</i>	43.2
		2 <i>Nassarius festivus</i>	41.6
		3 <i>Batillaria zonalis</i>	32.0

\* H: +2mCD; M: +1.5mCD; L: +1mCD

Group	Species	TCB1			TCB2			TCB3			THW		
		H (Qual)	M (Qual)	L (Qual)	H (Qual)	M (Qual)	L (Qual)	H (Qual)	M (Qual)	L (Qual)	H (Qual)	M (Qual)	L (Qual)
Algae	<i>Ulva sp.</i>	++	+++	++	+++	+++	+++	+++	+++	+++			
Algae	<i>Gelidium sp.</i>				+	+							
Barnacle	<i>Balanus amphitrite</i>	+	+	+	+	+	+	+	+	+	+	+	+
Bivalve	<i>Anomalocardia squamosa</i>						+						
Bivalve	<i>Barbatia virescens</i>	+	+					+	+	+			
Bivalve	<i>Coecella chinensis</i>	+	+	+				+			+	+	
Bivalve	<i>Cyclina sinensis</i>	+		+				+		+	+		
Bivalve	<i>Dosinia japonica</i>						+						+
Bivalve	<i>Ervilia sp.</i>												+
Bivalve	<i>Geloina erosa</i>		+		+		+	+	+	+	++	++	
Bivalve	<i>Hiatula diplos</i>	+	+			+		+		+			+
Bivalve	<i>Perna viridis</i>		+	+									
Bivalve	<i>Saccostrea cucullata</i>	+	++	+	+	+	+	++	++	+	+	+	+
Bivalve	<i>Septifera virgatus</i>	+	+	+				+	+	+			
Crab	<i>Hemigrapsus penicillatus</i>	+	+		++	+		+			++	++	++
Crab	<i>Hemigrapsus sanguineus</i>		+				+			+			
Crab	<i>Macrophthalmus sp.</i>									+			
Crab	<i>Metapagrus frontalis</i>	+	+	+	+	+	+				+	+	+
Crab	<i>Metapagrus quadridematus</i>	+	+	+	++	+	+	+	+	+	+	+	+
Crab	<i>Perisesarma bidens</i>							+		+			+
Crab	<i>Philyra pisum</i>								+		+	+	+
Crab	<i>Portunus pelagicus</i>									+			
Crab	<i>Scopimera globosa</i>								+				
Crab	<i>Uca borealis</i>	++	++	++	+	+	+						
Crab	<i>Uca lactea</i>	+++	+++	++		++	+	+			++	+++	+++
Fish	<i>Gobiidae</i>										+	+	+
Fish	<i>Periophthalmus modestus</i>	+	+	+	+	+	+	+	+	+	++	++	+
Gastropod	<i>Batillaria multiformis</i>	++	+	+	++	+++	+	+++	++	++	+	+	+
Gastropod	<i>Batillaria zonalis</i>	++	++	+	+	+++	+	+++	++	++	+	+++	++
Gastropod	<i>Cellana toreuma</i>									+			
Gastropod	<i>Cerithidea cingulata</i>	++	++	+	++	+	+	++	++	+	++	++	+
Gastropod	<i>Cerithidea diadjiariensis</i>	+++	++	+	+++	+++	++	+++	+++	++	+++	+++	++
Gastropod	<i>Cerithidea rhizophorarum</i>	+	+		+	+							+
Gastropod	<i>Clithon spp.</i>							+	+		+	+	+
Gastropod	<i>Echinolittorina radiata</i>	+	+	+	+								
Gastropod	<i>Littoraria articulata</i>	+	+	+	+	+				+			
Gastropod	<i>Littoraria melanostoma</i>							+				++	
Gastropod	<i>Lunella coronata</i>	+	+	+	+	+	+	+	+	+			+
Gastropod	<i>Monodonta labio</i>	++	+++	+++	++	+	+	+	+	+		+	+
Gastropod	<i>Monodonta neritooides</i>									+			
Gastropod	<i>Nassarius festivus</i>	+	+					++	++	+		+	++
Gastropod	<i>Nerita albicilla</i>						+	+	+	+		+	+
Gastropod	<i>Nerita polita</i>				+		+	+	+	+	+	+	+
Gastropod	<i>Patelloidea pygmaea</i>	+	+	++		+							
Gastropod	<i>Planaxis sulcatus</i>										+	+	
Gastropod	<i>Terebralia palustris</i>											++	++
Gastropod	<i>Terebralia sulcata</i>											+++	+++
Gastropod	<i>Thais clavigera</i>							+	+	+		+	
Hermit Crab	<i>Clibanarius sp.</i>	+	+	+	+	+	+	+	+	+		+	+
Hermit Crab	<i>Diogenes sp.</i>	+	+	+			+		+				
Hermit Crab	<i>Pagurus sp.</i>	+	+	+				+	+	+	+	+	+
Horseshoe Crab	<i>Tachypleus tridentatus</i>												
Seagrass	<i>Halophila ovalis</i>							+	++	++			
Seaslug	<i>Onchidium sp.</i>												
Worm	<i>Ceratonereis sp.</i>				+								
Worm	<i>Oligochaete sp.</i>	+			+	+	+	+	+	+		+	
Worm	<i>Siphonosoma sp.</i>	+	+		++	+	+	+	+	+			
Worm	<i>Sipunculus sp.</i>	+	+	++	+	+	+	+	+	+			+
Worm	Ribbon Worm sp.				+					+			

Group	Species	TCB1																		
		H1 H2 H3 H4 H5					Density (ind. / m <sup>2</sup> or % cover)	M1 M2 M3 M4 M5					Density (ind. / m <sup>2</sup> or % cover)	L1 L2 L3 L4 L5					Density (ind. / m <sup>2</sup> or % cover)	
		10%	10%	5%	15%	15%		20%	55%	90%	85%	90%		5%	<5%	10%	25%	8%		
Algae	<i>Ulva sp.</i>	10%	10%	5%	15%	15%	11%	20%	55%	90%	85%	90%	68%	5%	<5%	10%	25%	8%		
Barnacle	<i>Balanus amphitrite</i>						0%						0%						0%	
Bivalve	<i>Coecella chinensis</i>	1	1				1.6	2					1.6				2	1	2.4	
Bivalve	<i>Cyclina sinensis</i>						0						0				1	2	2.4	
Bivalve	<i>Dosinia japonica</i>						0						0						0	
Bivalve	<i>Ervilia sp.</i>						0						0						0	
Bivalve	<i>Geloina erosa</i>						0		2				1.6						0	
Bivalve	<i>Hiatula diphos</i>			2	1	2.4			1				0.8						0	
Bivalve	<i>Saccostrea cucullata</i>	<5%				5%	1%		30%	60%	15%		21%					15%	3%	
Crab	<i>Hemigrapsus penicillatus</i>						0						1	0.8					0	
Crab	<i>Hemigrapsus sanguineus</i>						0						1	0.8					0	
Crab	<i>Metapagropsus quadridematus</i>						0					2	1.6						0	
Crab	<i>Perisesarma bidens</i>						0						0						0	
Crab	<i>Uca borealis</i>	1					0.8						0						0	
Crab	<i>Uca lactea</i>						0						0						0	
Gastropod	<i>Batillaria multiformis</i>	4	4	36		4	38.4			2			1.6						0	
Gastropod	<i>Batillaria zonalis</i>	16			8	52	60.8	6	8	8	18	8	38.4	22	20	44			68.8	
Gastropod	<i>Cerithidea cingulata</i>	8	4		8	6	20.8		2	4	2	2	8		2				1.6	
Gastropod	<i>Cerithidea diadjariensis</i>	102	12	10	4	46	139.2		8	10	16	4	30.4			2			1.6	
Gastropod	<i>Cerithidea rhizophorarum</i>		4			4	6.4			2			1.6						0	
Gastropod	<i>Clithon spp.</i>						0						0						0	
Gastropod	<i>Littoraria articulata</i>						0				2		1.6						0	
Gastropod	<i>Lunella coronata</i>				2		1.6			2			1.6		2				1.6	
Gastropod	<i>Monodonta labio</i>		10				8		2	2	22	2	22.4			4			3.2	
Gastropod	<i>Nassarius festivus</i>						0				2	4	4.8	2					1.6	
Gastropod	<i>Nerita albicilla</i>						0						0						0	
Gastropod	<i>Nerita polita</i>						0						0						0	
Gastropod	<i>Patelloida pygmaea</i>						0			2	4		4.8						0	
Gastropod	<i>Terebralia palustris</i>						0						0						0	
Gastropod	<i>Terebralia sulcata</i>						0						0						0	
Gastropod	<i>Thais clavigera</i>						0						0						0	
Hermit Crab	<i>Clibanarius sp.</i>		8				6.4						0						0	
Hermit Crab	<i>Diogenes sp.</i>						0						0						0	
Hermit Crab	<i>Pagrurus sp.</i>						0				1		0.8						0	
Seaslug	<i>Onchidium sp.</i>						0						0						0	
Worm	<i>Ceratonereis sp.</i>						0						0						0	
Worm	Oligochaete sp.			1			0.8						0						0	
Worm	<i>Siphonosoma sp.</i>					6	4.8					1	0.8						0	
Worm	<i>Sipunculus sp.</i>					2	1.6					1	0.8						0	
Worm	Ribbon Worm sp.						0						0						0	

Group	Species	TCB2																	
		H1 H2 H3 H4 H5					Density (ind. / m <sup>2</sup> or % cover)	M1 M2 M3 M4 M5					Density (ind. / m <sup>2</sup> or % cover)	L1 L2 L3 L4 L5					Density (ind. / m <sup>2</sup> or % cover)
Algae	<i>Ulva sp.</i>	25%	25%	30%	25%	20%	25%	10%	15%	25%	40%	50%	28%	20%	15%	5%	10%	5%	11%
Barnacle	<i>Balanus amphitrite</i>			<5%			<5%						0%						0%
Bivalve	<i>Coecella chinensis</i>						0						0						0
Bivalve	<i>Cyclina sinensis</i>						0						0			1			0.8
Bivalve	<i>Dosinia japonica</i>						0						0			1			0.8
Bivalve	<i>Ervilia sp.</i>						0						0						0
Bivalve	<i>Geloina erosa</i>		1				0.8						0		2				1.6
Bivalve	<i>Hiatula diphos</i>						0		1				0.8						0
Bivalve	<i>Saccostrea cucullata</i>						0%						0%		5%		<5%		1%
Crab	<i>Hemigrapsus penicillatus</i>				1	0.8		2					1.6						0
Crab	<i>Hemigrapsus sanguineus</i>						0						0						0
Crab	<i>Metapagrus quadridentatus</i>						0						0						0
Crab	<i>Perisesarma bidens</i>						0						0						0
Crab	<i>Uca borealis</i>						0						0						0
Crab	<i>Uca lactea</i>						0						0						0
Gastropod	<i>Batillaria multiformis</i>		24			2	20.8	2	62	4		1	55.2					4	3.2
Gastropod	<i>Batillaria zonalis</i>	10		2			9.6	14		58	32	48	121.6		2				1.6
Gastropod	<i>Cerithidea cingulata</i>	10	4	4	6	4	22.4	2	2	4		8	12.8		3		10	6	15.2
Gastropod	<i>Cerithidea diadariensis</i>	62	68	41	30	50	200.8	58	38	88	10	52	196.8		16		106	8	104
Gastropod	<i>Cerithidea rhizophorarum</i>	2		6		4	9.6		4	6	2		9.6						0
Gastropod	<i>Clithon spp.</i>						0						0						0
Gastropod	<i>Littoraria articulata</i>						0						0						0
Gastropod	<i>Lunella coronata</i>						0						0						0
Gastropod	<i>Monodonta labio</i>						0						0		1			2	2.4
Gastropod	<i>Nassarius festivus</i>						0						0						0
Gastropod	<i>Nerita albicilla</i>						0						0			1		1	1.6
Gastropod	<i>Nerita polita</i>						0						0						0
Gastropod	<i>Patelloidea pygmaea</i>						0						0						0
Gastropod	<i>Terebralia palustris</i>						0						0						0
Gastropod	<i>Terebralia sulcata</i>						0						0						0
Gastropod	<i>Thais clavigera</i>						0						0						0
Hermit Crab	<i>Clibanarius sp.</i>						0			1	1		1.6						0
Hermit Crab	<i>Diogenes sp.</i>						0						0						0
Hermit Crab	<i>Pagrurus sp.</i>						0						0						0
Seaslug	<i>Onchidium sp.</i>						0						0						0
Worm	<i>Ceratonereis sp.</i>		2				1.6						0						0
Worm	Oligochaete sp.				2	1.6			3			2.4			1		2	2.4	
Worm	<i>Siphonosoma sp.</i>					0							0						0
Worm	<i>Sipunculus sp.</i>			1		0.8							0			1			0.8
Worm	Ribbon Worm sp.					0							0						0

Group	Species	TCB3																			
		H1 H2 H3 H4 H5					Density (ind. / m <sup>2</sup> or % cover)	M1 M2 M3 M4 M5					Density (ind. / m <sup>2</sup> or % cover)	L1 L2 L3 L4 L5					Density (ind. / m <sup>2</sup> or % cover)		
Algae	<i>Ulva</i> sp.	50%	15%	50%	10%	15%		28%	30%	20%	80%	25%	20%	35%	50%	50%	25%	70%	10%	41%	
Barnacle	<i>Balanus amphitrite</i>						0%							0%							0%
Bivalve	<i>Coecella chinensis</i>		1				0.8							0							0
Bivalve	<i>Cyclina sinensis</i>						0							0			1				0.8
Bivalve	<i>Dosinia japonica</i>						0							0							0
Bivalve	<i>Ervilia</i> sp.						0							0							0
Bivalve	<i>Geloina erosa</i>	1					0.8							0			1		1	1.6	
Bivalve	<i>Hiatala diphos</i>	2	3	2			5.6							0	1		1				1.6
Bivalve	<i>Saccostrea cucullata</i>	<5%	<5%		<5%	10%	2%	<5%	10%	5%				3%		<5%					0%
Crab	<i>Hemigrapsus penicillatus</i>			1		2	2.4							0							0
Crab	<i>Hemigrapsus sanguineus</i>						0							0							0
Crab	<i>Metapagropsus quadridemtatus</i>						0							0							0
Crab	<i>Perisesarma bidens</i>						0							0		1	1			1.6	
Crab	<i>Uca borealis</i>						0							0							0
Crab	<i>Uca lactea</i>						0						1	0.8							0
Gastropod	<i>Batillaria multiformis</i>	46	144	201	240	112	594.4	36	14	30	16	76	137.6		12	8	2	17.6			
Gastropod	<i>Batillaria zonalis</i>	14	40	22	92	26	155.2	20	24	36	14	8	81.6	2	20	12	2	6	33.6		
Gastropod	<i>Cerithidea cingulata</i>	8	8	4	12	10	33.6	14	4	4	10	12	35.2		2					1.6	
Gastropod	<i>Cerithidea diadjariensis</i>	52	66	84	80	82	291.2	86	22	50	36	104	238.4			10	8	4	17.6		
Gastropod	<i>Cerithidea rhizophorarum</i>						0							0							0
Gastropod	<i>Clithon</i> spp.			2			1.6							0							0
Gastropod	<i>Littoraria articulata</i>						0							0							0
Gastropod	<i>Lunella coronata</i>						0							0			2			1.6	
Gastropod	<i>Monodonta labio</i>						0				2			1.6		2	2	2	4.8		
Gastropod	<i>Nassarius festivus</i>	8	38	48	24	4	97.6	34		6				32				2			1.6
Gastropod	<i>Nerita albicilla</i>						0							0							0
Gastropod	<i>Nerita polita</i>						0							0							0
Gastropod	<i>Patelloida pygmaea</i>						0							0							0
Gastropod	<i>Terebralia palustris</i>						0							0							0
Gastropod	<i>Terebralia sulcata</i>						0							0							0
Gastropod	<i>Thais clavigera</i>						0		2					1.6			2			1.6	
Hermit Crab	<i>Clibanarius</i> sp.						0							0							0
Hermit Crab	<i>Diogenes</i> sp.						0		100%					0.8							0
Hermit Crab	<i>Pagurus</i> sp.		1				0.8							0							0
Seaslug	<i>Onchidium</i> sp.						0							0							0
Worm	<i>Ceratonereis</i> sp.						0							0							0
Worm	Oligochaete sp.						0							0	2		2			3.2	
Worm	<i>Siphonosoma</i> sp.						0							0							0
Worm	<i>Sipunculus</i> sp.						0	4	1		1			4.8	4		2	1	5.6		
Worm	Ribbon Worm sp.						0							0	6					4.8	

Group	Species	THW															Density (ind. / m <sup>2</sup> or % cover)	
		H1 H2 H3 H4 H5					M1 M2 M3 M4 M5					L1 L2 L3 L4 L5						
Algae	<i>Ulva sp.</i>						0%					0%					0%	
Barnacle	<i>Balanus amphitrite</i>						0%		<5%			<5%					0%	
Bivalve	<i>Coecella chinensis</i>						0			1		0.8		1			0.8	
Bivalve	<i>Cyclina sinensis</i>						0					0					0	
Bivalve	<i>Dosinia japonica</i>						0					0				1	0.8	
Bivalve	<i>Ervilia sp.</i>	1					0.8			1		0.8					0	
Bivalve	<i>Geloina erosa</i>	6	9	2	8		20	4	3	5	2	4	14.4				0	
Bivalve	<i>Hiatula diphos</i>						0			1		0.8					0	
Bivalve	<i>Saccostrea cucullata</i>		<5%	10%	<5%	2%			10%		<5%	2%					0%	
Crab	<i>Hemigrapsus penicillatus</i>	1	1				1.6					0					0	
Crab	<i>Hemigrapsus sanguineus</i>						0					0					0	
Crab	<i>Metapagrus quadridermatus</i>						0					0					0	
Crab	<i>Perisesarma bidens</i>						0	1				0.8					0	
Crab	<i>Uca borealis</i>						0					0					0	
Crab	<i>Uca lactea</i>						0					0					0	
Gastropod	<i>Batillaria multiformis</i>						0	2				1.6					0	
Gastropod	<i>Batillaria zonalis</i>						0		12	12		19.2	40				32	
Gastropod	<i>Cerithidea cingulata</i>	2	4	4	2	9.6	14	14	116	2	12	126.4			2		1.6	
Gastropod	<i>Cerithidea diadariensis</i>	16	40	10	48		91.2	112	86		178	100	380.8	48			6	43.2
Gastropod	<i>Cerithidea rhizophorarum</i>						0					0					0	
Gastropod	<i>Clithon spp.</i>						0					0					0	
Gastropod	<i>Littoraria articulata</i>						0					0					0	
Gastropod	<i>Lunella coronata</i>						0					0					0	
Gastropod	<i>Monodonta labio</i>						0					0					0	
Gastropod	<i>Nassarius festivus</i>						0					0		44	8		41.6	
Gastropod	<i>Nerita albicilla</i>						0					0					0	
Gastropod	<i>Nerita polita</i>		1				0.8					0	1		2		2.4	
Gastropod	<i>Patelloida pygmaea</i>						0					0					0	
Gastropod	<i>Terebralia palustris</i>						0	4	4	2		8					0	
Gastropod	<i>Terebralia sulcata</i>			2	1.6		14	42	6		2	51.2					0	
Gastropod	<i>Thais clavigera</i>						0					0					0	
Hermit Crab	<i>Clibanarius sp.</i>						0					0					0	
Hermit Crab	<i>Diogenes sp.</i>						0					0					0	
Hermit Crab	<i>Pagurus sp.</i>		1				0.8					0					0	
Seaslug	<i>Onchidium sp.</i>			1	1		1.6				1	0.8					0	
Worm	<i>Ceratonereis sp.</i>						0					0					0	
Worm	Oligochaete sp.						0				1	0.8					0	
Worm	<i>Siphonosoma sp.</i>						0					0					0	
Worm	<i>Sipunculus sp.</i>						0					0					0	
Worm	Ribbon Worm sp.						0					0					0	