

Annex H2

Monitoring Results for Soft Shore Ecology

Table H2.1 Results for Horseshoe Crabs during Qualitative Walk-through Surveys in March 2019

Sighting #	Species	Prosomal Width (cm)	Total Length (cm)
Monitoring Date: 20 March 2019 12:00-15:30			
Monitoring Station: THW			
1	<i>Tachypleus tridentatus</i>	1.1	1.9
2	<i>Tachypleus tridentatus</i>	3.1	5.9
3	<i>Tachypleus tridentatus</i>	2.3	3.6
4	<i>Tachypleus tridentatus</i>	0.9	1.1
5	<i>Tachypleus tridentatus</i>	1.1	1.3
6	<i>Tachypleus tridentatus</i>	2.8	5.4
	Mean (Range)	1.9 (0.9-3.1)	3.2 (1.1-5.9)
Monitoring Date: 21 March 2019 13:00-16:00			
Monitoring Station: TCB1			
1	<i>Tachypleus tridentatus</i>	1.0	1.5
2	<i>Tachypleus tridentatus</i>	1.1	1.6
3	<i>Tachypleus tridentatus</i>	0.6	0.5
4	<i>Tachypleus tridentatus</i>	4.1	6.0
	Mean (Range)	1.7 (0.6-4.1)	2.4 (0.5-6.0)
Monitoring Date: : 21 March 2019 13:00-16:00			
Monitoring Station: TCB3			
1	<i>Tachypleus tridentatus</i>	5.1	10.0
	Mean (Range)	- (-)	- (-)

Table H2.2 *Results for Other Intertidal Soft Shore Communities during Qualitative Walk-through Surveys in March 2019*

Monitoring Station	Shore Height *	No. of Species
TCB1	H	35
	M	33
	L	34
	Overall	46
TCB2	H	33
	M	34
	L	33
	Overall	43
TCB3	H	24
	M	28
	L	25
	Overall	38
THW	H	34
	M	29
	L	33
	Overall	45

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

Table H2.3 Results for Other Intertidal Soft Shore Communities during Quantitative Transect Surveys in March 2019

Monitoring Station	Shore Height *	Top Three Dominant Species	Density (ind./m ²)
TCB1	H	1 <i>Cerithidea diadjariensis</i>	450.4
		2 <i>Batillaria multiformis</i>	131.2
		3 <i>Batillaria zonalis</i>	72.8
	M	1 <i>Cerithidea diadjariensis</i>	242.4
		2 <i>Batillaria zonalis</i>	81.6
		3 <i>Batillaria multiformis</i>	53.6
	L	1 <i>Lunella coronata</i>	19.2
		2 <i>Oligochaete sp.</i>	17.6
		3 <i>Batillaria zonalis</i>	5.6
TCB2	H	1 <i>Cerithidea diadjariensis</i>	55.2
		2 <i>Batillaria multiformis</i>	52.0
		3 <i>Batillaria zonalis</i>	28.0
	M	1 <i>Cerithidea diadjariensis</i>	81.6
		2 <i>Batillaria zonalis</i>	22.4
		3 <i>Cerithidea cingulata</i>	6.4
	L	1 <i>Cerithidea diadjariensis</i>	25.6
		2 <i>Batillaria zonalis</i>	9.6
		3 <i>Oligochaete sp.</i>	2.4
TCB3	H	1 <i>Batillaria multiformis</i>	256.8
		2 <i>Cerithidea diadjariensis</i>	96.8
		3 <i>Cerithidea cingulata</i>	12.8
	M	1 <i>Cerithidea diadjariensis</i>	142.4
		2 <i>Batillaria zonalis</i>	36.0
		3 <i>Batillaria multiformis</i>	30.4
	L	1 <i>Cerithidea diadjariensis</i>	1.6
		2 <i>Batillaria zonalis</i> / <i>Lunella coronata</i> / <i>Monodonta labio</i> / <i>Nassarius festivus</i> / <i>Dosinia japonica</i>	0.8
		3 -	
THW	H	1 <i>Cerithidea diadjariensis</i>	201.6
		2 <i>Batillaria zonalis</i>	35.2
		3 <i>Geloina erosa</i>	24.8
	M	1 <i>Cerithidea diadjariensis</i>	324.0
		2 <i>Batillaria zonalis</i>	53.6
		3 <i>Geloina erosa</i>	15.2
	L	1 <i>Cerithidea diadjariensis</i>	311.2
		2 <i>Batillaria zonalis</i>	147.2
		3 <i>Cerithidea cingulata</i>	73.6

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

Group	Species	TCB1			TCB2			TCB3			THW		
		H	M	L	H	M	L	H	M	L	H	M	L
Algae	<i>Enteromorpha</i> spp.	++			++			+					
Barnacle	<i>Balanus amphitrite</i>	++	+	+	+	+	+	++	+	+	+	+	+
Bivalve	<i>Anomalocardia squamosa</i>			+		+	+						+
Bivalve	<i>Barbatia virescens</i>			+					+	+			
Bivalve	<i>Circe</i> sp.												+
Bivalve	<i>Coecella chinensis</i>			+									
Bivalve	<i>Corbula erythrodon</i>									+			
Bivalve	<i>Cyclina sinensis</i>											+	+
Bivalve	<i>Dosinia japonica</i>							+					
Bivalve	<i>Ervilia</i> sp.									+	+	+	+
Bivalve	<i>Geloina erosa</i>	+	+	+	+	+	+	+			++	+	+
Bivalve	<i>Gafrarium tumidum</i>					+							
Bivalve	<i>Hiatula diphos</i>										+	+	
Bivalve	<i>Laternula anatina</i>				+	+	+						
Bivalve	<i>Saccostrea cucullata</i>	++	++	++	++	++	++	++	++	++	+	+	+
Bivalve	<i>Septifer virgatus</i>	+	+	+		+	+		+				
Bivalve	<i>Venerupis aspera</i>	+					+	+					
Bivalve	<i>Venerupis philippinarum</i>									+			
Chiton	<i>Acanthopleura japonica</i>			+									
Crab	<i>Clistocoeloma</i> sp.			+	+						+		
Crab	<i>Hemigrapsus sanguineus</i>	+	+		+	+	+	+	+		++	+	+
Crab	<i>Ilyoplax</i> spp.												+
Crab	<i>Macrophthalmus</i> sp.	+	+	+	+	+	+		+	+	+	+	+
Crab	<i>Metaplax longipes</i>										+		+
Crab	<i>Metapograpus frontalis</i>	+	+	+	+	+	+		+	+	+	+	+
Crab	<i>Parasesarma pictum</i>										+	+	
Crab	<i>Perisesarma bidens</i>	++	+		+	+	+		+		+	+	+
Crab	<i>Scopimera globosa</i>	+	+	+	+	++	+	+	+	+	+	+	+
Crab	<i>Uca borealis</i>	+	+	+		+		+				+	+
Crab	<i>Uca lactea</i>	++	++		++	++	++	++	++		++	++	++
Crab	<i>Uca paradussumieri</i>										+		
Crab	<i>Uca splendida</i>				+								
Crab	<i>Varuna litterata</i>											+	
Fish	<i>Terapon jarbua</i>				+	+					+	+	+
Fish	<i>Periophthalmus cantonensis</i>	+	+	+	++	++	+	+	+		+	+	+
Gastropod	<i>Batillaria multiformis</i>	++	+	+	++	++	++	++	++	++	++	++	++
Gastropod	<i>Batillaria zonalis</i>	+	++	++	+	+	+	+	++	+	++	++	++
Gastropod	<i>Cellana grata</i>	+	+	+	+	+	+	+	+	+	+		+
Gastropod	<i>Cerithidea cingulata</i>	+	+	+	+	+	+	+	+	+	++	++	++
Gastropod	<i>Cerithidea diadjariensis</i>	++	++	+	++	+	+	+	++		++	++	++
Gastropod	<i>Cerithidea microptera</i>			+	+						+	+	+
Gastropod	<i>Cerithidea rhizophorarum</i>		+										+
Gastropod	<i>Clithon</i> spp.	+	+	+	+		+	+	+	+	+	+	+
Gastropod	<i>Echinolittorina radiata</i>						+						
Gastropod	<i>Echinolittorina malaccana</i>									+			
Gastropod	<i>Littoraria articulata</i>	++	+	+	++	+	+	++	+	+	+		
Gastropod	<i>Littoraria melanostoma</i>	+			+	+	+	+	+		+		
Gastropod	<i>Lunella coronata</i>	+	+	+		+	+	+	+	+			
Gastropod	<i>Monodonta labio</i>	++	++	++	++	+	+	+	++	+			
Gastropod	<i>Nassarius festivus</i>	+	+	+	+	+	+		+	+	+	+	+
Gastropod	<i>Nerita polita</i>	+	+	+	+	+	+	+	+	+	+	+	+
Gastropod	<i>Nipponacmea concinna</i>		+	+									
Gastropod	<i>Patelloida pygmaea</i>	+	+										
Gastropod	<i>Peasiella</i> spp.						+						
Gastropod	<i>Planaxis sulcatus</i>	+	+		+	+				+	+		
Gastropod	<i>Terebralia palustris</i>										+		
Gastropod	<i>Terebralia sulcata</i>	+	+	+	+	+	+	+	+	+	+	+	
Gastropod	<i>Thais clavigera</i>			+									
Hermit Crab	<i>Clibanarius</i> sp.	+	+	+	+	+	+	+	+	+	+	+	+
Horseshoe Crab	<i>Carcinoscorpius rotundicauda</i>					+							
Horseshoe Crab	<i>Tachypleus tridentatus</i>	+	+						+	+		+	+
Sea Slater	<i>Ligia oceanica</i>	+			+	+						+	+
Seaslug	<i>Onchidium</i> sp.	+	+								+		
Worm	<i>Echiura</i> spp.												+
Worm	<i>Oligochaete</i> sp.	+	+	+	+	+	+						+
Worm	<i>Siphonosoma</i> sp.								+				
Worm	<i>Sipunculus</i> sp.	+	+	+	+	+	+		+	+	+		
Worm	Ribbon Worm sp.			+		+							
Anemone	<i>Haliplanella lineata</i>			+									

Remark: '+' denotes the species was relatively rare at the area;
 '++' denotes the species was relatively abundant at the area.

Group	Species	TCB1																	
		H1	H2	H3	H4	H5	Density (ind. / m ² or % cover)	M1	M2	M3	M4	M5	Density (ind. / m ² or % cover)	L1	L2	L3	L4	L5	Density (ind. / m ² or % cover)
Algae	<i>Enteromorpha</i> spp.																		
Barnacle	<i>Balanus amphitrite</i>								<5%			<5%	<5%		<5%	<5%	<5%		<5%
Bivalve	<i>Anomalocardia squamosa</i>								1										0.8
Bivalve	<i>Coecella chinensis</i>														1	1			1.6
Bivalve	<i>Corbula erythrodon</i>																		
Bivalve	<i>Cyclina sinensis</i>				1	1	1.6		1	1	1	1							3.2
Bivalve	<i>Dosinia japonica</i>																		
Bivalve	<i>Ervilia</i> sp.																		
Bivalve	<i>Geloina erosa</i>		2			1	2.4		2	1	1								3.2
Bivalve	<i>Saccostrea cucullata</i>			<5%		<5%	<5%			10%		<5%	5%		20%	5%	20%		20%
Bivalve	<i>Septifer virgatus</i>		<5%				<5%			<5%					<5%	<5%	<5%		<5%
Bivalve	<i>Tapes variegatus</i>														1				0.8
Crab	<i>Clistocoeloma</i> sp.																		1
Crab	<i>Eriphia</i> sp.															1			0.8
Crab	<i>Hemigrapsus sanguineus</i>				1		0.8												
Crab	<i>Macrophthalmus</i> sp.											1							0.8
Crab	<i>Metaplazx longipes</i>																		
Crab	<i>Metapograpsus frontalis</i>														4				3.2
Crab	<i>Parasesarma pictum</i>																		
Crab	<i>Perisesarma bidens</i>				2		1.6												
Crab	<i>Scopimera globosa</i>																1	2	2.4
Crab	<i>Uca borealis</i>																		
Crab	<i>Uca lactea</i>											1							0.8
Gastropod	<i>Batillaria multiformis</i>	118	36	8	1	1	131.2		1	9		1	56		6				4.8
Gastropod	<i>Batillaria zonalis</i>	16	51	1	19	4	72.8		2	8	28	36	28		7				5.6
Gastropod	<i>Cellana grata</i>								1	8					2		2		3.2
Gastropod	<i>Cerithidea cingulata</i>				2	3	4.0		5	3	15	2							20.0
Gastropod	<i>Cerithidea diadjarimensis</i>	1	198	5	172	187	450.4		97		107	98	1						242.4
Gastropod	<i>Clithon</i> spp.		5			6	8.8		1	2	2	10							12.0
Gastropod	<i>Littoraria articulata</i>	12					9.6										1		0.8
Gastropod	<i>Lunella coronata</i>				1	2	2.4			8		11	1		13	1	10		19.2
Gastropod	<i>Monodonta labio</i>	5			25	2	25.6		1	25	1	4	19		1				0.8
Gastropod	<i>Nassarius festivus</i>				9		7.2		1		2	2				2		1	2.4
Gastropod	<i>Nerita polita</i>				1		0.8								1				0.8
Gastropod	<i>Patelloida pygmaea</i>									1									0.8
Gastropod	<i>Planaxis sulcatus</i>																		
Gastropod	<i>Terebralia sulcata</i>																		
Gastropod	<i>Thais clavigera</i>															1	1		1.6
Hermit Crab	<i>Clibanarius</i> sp.											1							0.8
Horseshoe Crab	<i>Tachypleus tridentatus</i>									2									1.6
Worm	<i>Oligochaete</i> sp.	7					5.6				1				5			13	4
Worm	<i>Siphonosoma</i> sp.																		
Worm	<i>Sipunculus</i> sp.					1	0.8		1	2					6				4.8
Worm	Ribbon Worm sp.																1		0.8
Anemone	<i>Haliplanella lineata</i>														1				0.8

Group	Species	TCB2																	
		H1	H2	H3	H4	H5	Density (ind. / m ² or % cover)	M1	M2	M3	M4	M5	Density (ind. / m ² or % cover)	L1	L2	L3	L4	L5	Density (ind. / m ² or % cover)
Algae	<i>Enteromorpha</i> spp.	<5%	<5%	<5%	20%	40%	12%												
Barnacle	<i>Balanus amphitrite</i>	5%		5%			<5%				<5%		<5%						
Bivalve	<i>Anomalocardia squamosa</i>																		
Bivalve	<i>Coecella chinensis</i>																		
Bivalve	<i>Corbula erythrodon</i>							1					0.8						
Bivalve	<i>Cyclina sinensis</i>																		
Bivalve	<i>Dosinia japonica</i>														2				
Bivalve	<i>Ervilia</i> sp.																		
Bivalve	<i>Geloina erosa</i>				1		0.8		1				0.8						
Bivalve	<i>Saccostrea cucullata</i>	10%	5%	10%			5%				25%		0.2				5%	20%	5%
Bivalve	<i>Septifer virgatus</i>																		
Bivalve	<i>Tapes variegatus</i>																		
Crab	<i>Clistocoeloma</i> sp.																		
Crab	<i>Eriphia</i> sp.																		
Crab	<i>Hemigrapsus sanguineus</i>																		
Crab	<i>Macrophthalmus</i> sp.										1		0.8						
Crab	<i>Metaplax longipes</i>																		
Crab	<i>Metapograpsus frontalis</i>																		
Crab	<i>Parasesarma pictum</i>																		
Crab	<i>Perisesarma bidens</i>																		
Crab	<i>Scopimera globosa</i>	1																	
Crab	<i>Uca borealis</i>																		
Crab	<i>Uca lactea</i>																		
Gastropod	<i>Batillaria multiformis</i>		10		15	40	52.0	2					1.6					1	0.8
Gastropod	<i>Batillaria zonalis</i>		1		19	15	28.0	4	7	4	6	7	22.4		2	7		3	9.6
Gastropod	<i>Cellana grata</i>										3		2.4						
Gastropod	<i>Cerithidea cingulata</i>									1	1	6	6.4	1					0.8
Gastropod	<i>Cerithidea diadjarimensis</i>			4	20	45	55.2	8	17	4	22	51	81.6	8	1	5	1	17	25.6
Gastropod	<i>Clithon</i> spp.																		
Gastropod	<i>Littoraria articulata</i>																		
Gastropod	<i>Lunella coronata</i>	3		1			3.2				2		1.6						
Gastropod	<i>Monodonta labio</i>	12	3	6			16.8				6		4.8						
Gastropod	<i>Nassarius festivus</i>																		
Gastropod	<i>Nerita polita</i>																		
Gastropod	<i>Patelloida pygmaea</i>																		
Gastropod	<i>Planaxis sulcatus</i>										1		0.8						
Gastropod	<i>Terebralia sulcata</i>																		
Gastropod	<i>Thais clavigera</i>																		
Hermit Crab	<i>Clibanarius</i> sp.																		
Horseshoe Crab	<i>Tachypleus tridentatus</i>																		
Worm	<i>Oligochaete</i> sp.							5			1		4.8		1	1	1		2.4
Worm	<i>Siphonosoma</i> sp.																		
Worm	<i>Sipunculus</i> sp.																		
Worm	Ribbon Worm sp.																		
Anemone	<i>Haliplanella lineata</i>																		

Group	Species	TCB3																		
		H1	H2	H3	H4	H5	Density (ind. / m ² or % cover)	M1	M2	M3	M4	M5	Density (ind. / m ² or % cover)	L1	L2	L3	L4	L5	Density (ind. / m ² or % cover)	
Algae	<i>Enteromorpha</i> spp.																			
Barnacle	<i>Balanus amphitrite</i>					<5%	<5%	<5%			10%		<5%	<5%						
Bivalve	<i>Anomalocardia squamosa</i>																			
Bivalve	<i>Coecella chinensis</i>																			
Bivalve	<i>Corbula erythrodon</i>																			
Bivalve	<i>Cyclina sinensis</i>																			
Bivalve	<i>Dosinia japonica</i>														1					0.8
Bivalve	<i>Ervilia</i> sp.																			
Bivalve	<i>Geloina erosa</i>			3	1		3.2													
Bivalve	<i>Saccostrea cucullata</i>													10%						<5%
Bivalve	<i>Septifer virgatus</i>								<5%				<5%							
Bivalve	<i>Tapes variegatus</i>																			
Crab	<i>Clistocoeloma</i> sp.																			
Crab	<i>Eriphia</i> sp.																			
Crab	<i>Hemigrapsus sanguineus</i>																			
Crab	<i>Macrophthalmus</i> sp.																			
Crab	<i>Metaplax longipes</i>																			
Crab	<i>Metapograpsus frontalis</i>																			
Crab	<i>Parasesarma pictum</i>																			
Crab	<i>Perisesarma bidens</i>																			
Crab	<i>Scopimera globosa</i>																			
Crab	<i>Uca borealis</i>																			
Crab	<i>Uca lactea</i>																			
Gastropod	<i>Batillaria multiformis</i>		128	125	42	26	256.8	9	15	4		10	30.4							
Gastropod	<i>Batillaria zonalis</i>				6	2	6.4	11	10	14	2	8	36.0					1		0.8
Gastropod	<i>Cellana grata</i>			1			0.8	1			1		1.6							
Gastropod	<i>Cerithidea cingulata</i>			5	3	8	12.8	4					3.2							
Gastropod	<i>Cerithidea diadjarimensis</i>		32	25	44	20	96.8	24	55	42	27	30	142.4		2					1.6
Gastropod	<i>Clithon</i> spp.		3	2	7	3	12.0	3		3		2	6.4							
Gastropod	<i>Littoraria articulata</i>																			
Gastropod	<i>Lunella coronata</i>							2	1	1	2	1	5.6	1						0.8
Gastropod	<i>Monodonta labio</i>			1				6	4		3	5	14.4	1						0.8
Gastropod	<i>Nassarius festivus</i>																		1	0.8
Gastropod	<i>Nerita polita</i>																			
Gastropod	<i>Patelloida pygmaea</i>																			
Gastropod	<i>Planaxis sulcatus</i>																			
Gastropod	<i>Terebralia sulcata</i>																			
Gastropod	<i>Thais clavigera</i>																			
Hermit Crab	<i>Clibanarius</i> sp.																			
Horseshoe Crab	<i>Tachypleus tridentatus</i>																			
Worm	<i>Oligochaete</i> sp.																			
Worm	<i>Siphonosoma</i> sp.							1		1										
Worm	<i>Sipunculus</i> sp.																			
Worm	Ribbon Worm sp.																			
Anemone	<i>Haliplanella lineata</i>																			

Group	Species	THW																		
		H1	H2	H3	H4	H5	Density (ind. / m ² or % cover)	M1	M2	M3	M4	M5	Density (ind. / m ² or % cover)	L1	L2	L3	L4	L5	Density (ind. / m ² or % cover)	
Algae	<i>Enteromorpha</i> spp.																			
Barnacle	<i>Balanus amphitrite</i>																			
Bivalve	<i>Anomalocardia squamosa</i>																			
Bivalve	<i>Coecella chinensis</i>																			
Bivalve	<i>Corbula erythrodon</i>																			
Bivalve	<i>Cyclina sinensis</i>																	1	2	2.4
Bivalve	<i>Dosinia japonica</i>																			
Bivalve	<i>Ervilia</i> sp.																1	2		2.4
Bivalve	<i>Geloina erosa</i>	11	6	4	2	8	24.8	2	5	1	8	3	15.2							
Bivalve	<i>Saccostrea cucullata</i>																			
Bivalve	<i>Septifer virgatus</i>																			
Bivalve	<i>Tapes variegatus</i>																			
Crab	<i>Clistocoeloma</i> sp.																			
Crab	<i>Eriphia</i> sp.																			
Crab	<i>Hemigrapsus sanguineus</i>											1	0.8							
Crab	<i>Macrophthalmus</i> sp.																			
Crab	<i>Metaplax longipes</i>				1		0.8									1				0.8
Crab	<i>Metapograpsus frontalis</i>				1		0.8													
Crab	<i>Parasesarma pictum</i>											1	0.8							
Crab	<i>Perisesarma bidens</i>																			
Crab	<i>Scopimera globosa</i>																			
Crab	<i>Uca borealis</i>																			
Crab	<i>Uca lactea</i>																			
Gastropod	<i>Batillaria multiformis</i>							1	2				2.4		8	8	5	40		48.8
Gastropod	<i>Batillaria zonalis</i>				22	22	35.2	43	17	7			53.6	39	38	41	48	18		147.2
Gastropod	<i>Cellana grata</i>																			
Gastropod	<i>Cerithidea cingulata</i>				1	1	21	2	1	9			9.6	6	20	18	34	14		73.6
Gastropod	<i>Cerithidea diadjarimensis</i>	12	18	39	99	84	201.6	81	73	110	84	57	324.0	107	61	79	96	46		311.2
Gastropod	<i>Clithon</i> spp.													3	1				6	8.0
Gastropod	<i>Littoraria articulata</i>																			
Gastropod	<i>Lunella coronata</i>																			
Gastropod	<i>Monodonta labio</i>																			
Gastropod	<i>Nassarius festivus</i>							2	8	2	1		10.4							
Gastropod	<i>Nerita polita</i>				1		0.8	1					0.8							
Gastropod	<i>Patelloida pygmaea</i>																			
Gastropod	<i>Planaxis sulcatus</i>																			
Gastropod	<i>Terebralia sulcata</i>				2		2.4				1		0.8							
Gastropod	<i>Thais clavigera</i>																			
Hermit Crab	<i>Clibanarius</i> sp.																			
Horseshoe Crab	<i>Tachypleus tridentatus</i>																			
Worm	<i>Oligochaete</i> sp.																			
Worm	<i>Siphonosoma</i> sp.																			
Worm	<i>Sipunculus</i> sp.																			
Worm	Ribbon Worm sp.																			
Anemone	<i>Haliplanella lineata</i>																			