

OResults of Radioactive Material Monitoring of Aquatic Organisms (Location D along the Mano River)

<Location D along the Mano River: Samples collected>

Items	General items		Radioactive materials			
Locations	Water	Sediment	Water (Cs)	Water (Sr)	Sediment (Cs)	Sediment (Sr)
D-4 a	○	○	○	○	○	○

<Location D along the Mano River: Site measurement item>

Items	Latitude and longitude of the location		Survey date and time			Water	Sediment				Other	
	Latitude	Longitude	Date	Time (water)	Time (sediment)	Water temperature (degrees C)	Sediment temperature (degrees C)	Property	Color	Contaminants	Water depth (m)	Transparency (cm)
D-4 a	37.7308°	140.9081°	2019/6/6	13:30	13:52	22.6	23.3	Sand	5Y4/2	None	0.31	>50

<Location D along the Mano River: General survey items/Analysis of radioactive materials Water>

Items	Latitude and longitude of the location		Survey date and time		pH	BOD	COD	DO	Electric conductivity	Salinity	TOC	SS	Turbidity	Cs-134	Cs-137	Sr-90
	Latitude	Longitude	Date	Time (water)		(mg/L)	(mg/L)	(mg/L)	(mS/m)		(mg/L)	(mg/L)	(FNU)	(Bq/L)	(Bq/L)	(Bq/L)
D-4 a	37.7308°	140.9081°	2019/6/6	13:30	8.6	0.8	3.2	14.5	13.3	0.07	1.1	1	1.5	N.D.(0.0011)	0.012	0.00091

Note) N.D. means to be below the detection limit and figures in parentheses show the detection limit.

<Location D along the Mano River: General survey items/Analysis of radioactive materials Sediment>

Items	Latitude and longitude of the location		Survey date and time		pH	Redox potential E _{NHIE} (mV)	Water content (%)	IL (%)	TOC (mg/g-dry)	Soil particle density (g/cm ³)	Grain size distribution								Cs-134 (Bq/kg-dry)	Cs-137 (Bq/kg-dry)	Sr-90 (Bq/kg-dry)	
	Latitude	Longitude	Date	Time (sediment)							Gravel (2-75mm) (%)	Coarse sand (0.85-2mm) (%)	Medium sand (0.25-0.85mm) (%)	Fine sand (0.075-0.25mm) (%)	Silt (0.005-0.075mm) (%)	Clay (Less than 0.005mm) (%)	Median grain diameter (mm)	Maximum grain diameter (mm)				
Locations																						
D-4 a	37.7308°	140.9081°	2019/6/6	13:52	7.4	368	18.4	1.7	2.2	2.708	30.2	48.0	17.5	2.3	2.0		1.4	9.5	22	300	0.65	

Note) N.D. means to be below the detection limit and figures in parentheses show the detection limit.

<Location D along the Mano River: Analysis items Aquatic organisms>

Locations	Sampling point	Latitude and longitude of the location		Sampling date	Division	Class	Order	Family	Scientific name	English name	Population	Sample weight (kg-wet)	Note			Radioactive cesium (Bq/kg-wet)			Sr-90 (Bq/kg-wet)				
		Latitude	Longitude										Growth stage	Stomach contents	Measurement site	Total	Cs-134	Cs-137					
D-3	The main stream of the Mano River	37.7051°	140.9623°	2019/6/4	Arthropoda	Malacostraca	Decapoda	Cambaridae	<i>Procambarus clarkii</i>	Red swamp crawfish	2	0.023	Imago	-	-	-	8.4	N.D.(2.4)	8.4	-			
					Vertebrata	Osteichthyes	Anguilliformes	Anguillidae	<i>Anguilla japonica</i>	Japanese eel	1	0.21	Immature fish	Japanese mitten Crab	Viscera removed	20.5	1.5	19	-				
					Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Pseudogobio esocinus esocinus</i>	Pseudogobio esocinus esocinus	1	0.031	Mature fish	-	-	5.0	N.D.(2.0)	5.0	-				
					Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Cyprinus carpio</i>	Common carp	1	4.5	Mature fish	Obscure digesta	Viscera removed	6.43	0.43	6.0	0.33				
					Vertebrata	Osteichthyes	Salmoniformes	Osmeridae	<i>Plecoglossus altivelis altivelis</i>	Sweetfish	3	0.0083	Immature fish	-	-	10	N.D.(4.7)	10	-				
					Vertebrata	Osteichthyes	Perciformes	Gobiidae	<i>Gymnogobius urotaenia</i>	Goby	2	0.029	Immature fish	-	-	17	N.D.(2.1)	17	-				
					Vertebrata	Osteichthyes	Siluriformes	Bagridae	<i>Tachysurus tokiensis</i>	Cut-tailed bullhead	2	0.0062	Immature fish	-	-	N.D.	N.D.(5.6)	N.D.(4.8)	-				
					Vertebrata	Amphibia	Anura	-	-	Frog	33	0.0066	Larva(Tadpole)	-	-	203	13	190	-				
Vertebrata	Amphibia	Anura	Lithobates	<i>Lithobates catesbeianus</i>	American bullfrog	129	2.6	Larva(Tadpole)	-	-	62.1	5.1	57	0.076									
D-4 b	The main stream of the Mano River	37.7312°	140.9096°	2019/6/5	Algae/plant	-	-	-	-	Riverbed Deposits (Include algae)	-	0.010	-	-	-	66.8	5.8	61	-				
					Algae/plant	-	-	-	<i>Bryophyta</i>	Bryophyte	-	0.23	-	-	-	55.9	3.9	52	-				
					Algae/plant	<i>Zygnematophyceae</i>	Zygnematales	Zygnemataceae	<i>Spirogyra sp.</i>	Spirogyra	-	0.31	-	-	-	6.39	0.49	5.9	-				
					Arthropoda	Insecta	Trichoptera	Stenopsychidae	<i>Stenopsyche marmorata</i>	Stenopsyche marmorata	34	0.0074	Larva	-	-	31	N.D.(5.2)	31	-				
					Arthropoda	Insecta	Odonata	Corduliidae	<i>Macromia amphigena amphigena</i>	Macromia amphigena	27	0.0076	Larva(Dragonfly larva)	-	-	18	N.D.(4.9)	18	-				
					Arthropoda	Insecta	Odonata	Cordulegastridae	<i>Anotogaster sieboldii</i>	Anotogester sieboldii													
					Arthropoda	Insecta	Odonata	Gomphidae	<i>Stylogomphus suzukii</i>	<i>Stylogomphus suzukii</i>													
					Arthropoda	Insecta	Odonata	Gomphidae	<i>Meligomphus viridicostus</i>	Meligomphus viridicostus													
					Arthropoda	Insecta	Odonata	Gomphidae	<i>Sieboldius albardae</i>	Sieboldius albardae													
					Arthropoda	Insecta	Odonata	Gomphidae	<i>Davidius sp.</i>	Davidius													
					Arthropoda	Insecta	Odonata	Libellulidae	<i>Orthetrum albistylum speciosum</i>	Common skimmer													
					Arthropoda	Insecta	Odonata	Aeshnidae	<i>Boyeria maclachlani</i>	Boyeria maclachlani													
					Arthropoda	Insecta	Megaloptera	Corydalidae	<i>Protohermes grandis</i>	Protohermes grandis	25	0.025	Larva	-	-	10	N.D.(2.1)	10	-				
					Arthropoda	Malacostraca	Decapoda	Cambaridae	<i>Procambarus clarkii</i>	Red swamp crawfish	2	0.033	Imago	-	-	61.2	4.2	57	-				
					Arthropoda	Malacostraca	Decapoda	Palaemonidae	<i>Palaemon paucidens</i>	Common prawn	50	0.087	Imago	-	-	16.3	1.3	15	-				
					Arthropoda	Malacostraca	Decapoda	Atyidae	<i>Paratya improvisa</i>	Freshwater shrimp	182	0.054	Juvenile	-	-	16.6	1.6	15	-				
					Mollusca	Bivalvia	Unionoida	Unionidae	<i>Inversunio jokohamensis</i>	Inversunio jokohamensis	8	0.025	Juvenile	-	Molluscous part	32	N.D.(2.4)	32	-				
					Mollusca	Gastropoda	Discopoda	Pleuroceridae	<i>Semisulcospira libertina</i>	Semisulcospira libertina	21	0.022	Imago	-	Molluscous part	24	N.D.(2.6)	24	-				
					Vertebrata	Osteichthyes	Anguilliformes	Anguillidae	<i>Anguilla japonica</i>	Japanese eel	2	0.19	Immature fish,Mature fish	Protohermes grandis	Viscera removed	24.6	1.6	23	-				
					Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Phoxinus lagowskii steindachneri</i>	Amur minnow	27	0.069	Immature fish,Mature fish	-	-	10.8	1.0	9.8	-				
					Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Tribolodon hakonensis</i>	Japanese dace	18	0.12	Immature fish	-	-	18.7	1.7	17	-				
					Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Opsariichthys platypus</i>	Pale chub	8	0.036	Immature fish	-	-	7.0	N.D.(2.2)	7.0	-				
					Vertebrata	Osteichthyes	Cypriniformes	Cobitidae	<i>Cobitis biwae</i>	Cobitis biwae	3	0.0063	Mature fish	-	-	16	N.D.(5.4)	16	-				
					Vertebrata	Osteichthyes	Cypriniformes	Cobitidae	<i>Misgurnus anguillicaudatus</i>	Oriental weatherfish	2	0.0087	Immature fish	-	-	24	N.D.(4.6)	24	-				
					Vertebrata	Osteichthyes	Salmoniformes	Salmonidae	<i>Oncorhynchus masou</i>	Yamame trout	5	0.045	Immature fish	-	-	11	N.D.(1.3)	11	-				
					Vertebrata	Osteichthyes	Perciformes	Centrarchidae	<i>Micropterus dolomieu</i>	Small mouth bass	4	0.16	Immature fish	Obscure digesta	Viscera removed	34.6	2.6	32	-				
					Vertebrata	Osteichthyes	Perciformes	Gobiidae	<i>Rhinogobius fluviatilis</i>	<i>Rhinogobius fluviatilis</i>	27	0.097	Immature fish,Mature fish	-	-	29.2	2.2	27	-				
					Vertebrata	Osteichthyes	Perciformes	Gobiidae	<i>Rhinogobius nagoyae</i>	Rhinogobius nagoyae													
					Vertebrata	Osteichthyes	Perciformes	Gobiidae	<i>Tridentiger brevispinis</i>	Dusky tripletooth goby	2	0.024	Mature fish	-	-	13	N.D.(1.6)	13	-				
					Vertebrata	Amphibia	Anura	-	-	Frog	72	0.034	Larva(Tadpole)	-	-	186	16	170	-				
					Vertebrata	Amphibia	Anura	Glandirana	<i>Glandirana rugosa</i>	Wrinkled frog	3	0.0083	Imago	-	-	8.1	N.D.(3.9)	8.1	-				
					Vertebrata	Amphibia	Caudata	Salamandridae	<i>Cynops pyrrhogaster</i>	Cynops pyrrhogaster	2	0.016	Imago	-	-	15	N.D.(3.5)	15	-				
					Coarse Particulate Organic Matter					-	-	-	-	Bottom fallen leaves	-	0.26	-	-	-	22.8	1.8	21	-
					D-5	The main stream of the Mano River	37.7214°	140.8889°	2019/6/4	Vertebrata	Osteichthyes	Anguilliformes	Anguillidae	<i>Anguilla japonica</i>	Japanese eel	1	0.20	Mature fish	Protohermes grandis,Oriental weatherfish	Viscera removed	30.1	2.1	28
Vertebrata	Osteichthyes	Salmoniformes	Salmonidae	<i>Oncorhynchus masou</i>						Yamame trout	31	0.27	Immature fish	-	-	17.1	1.1	16	-				
Vertebrata	Amphibia	Anura	Lithobates	<i>Lithobates catesbeianus</i>						American bullfrog	1	0.076	Imago	-	-	24.1	2.1	22	-				

*1: Organisms were collected in or around the targeted water areas.

*2: When multiple types of aquatic organisms were collected, a sample was prepared by mixing them.

*3: For a sample made of multiple types of aquatic organisms, the English name of the dominant one largest in number is underlined.

*4: Basically, measurement was conducted for all organism samples. Viscera (stomach and bowels) were removed for the measurement when possible so that undigested food and sediments, etc. in the digestive system would be excluded.

*5: Plankton (suspended algae) is the residue remaining after the filtration of lake water or seawater with a plankton net (40µm-mesh).

*6: River bottom materials (incl. algae) are algae, etc. that were scratched off stones with a brush, etc. and may include very fine particles such as inorganic silt and clay.

*7: N.D. means to be below the detection limit and figures in parentheses show the detection limit.

*8: Activity concentrations include counting errors, but the details are omitted here.