

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

<Location D along the Mano River: Samples collected>

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

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

Locations	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°	2020/8/24	09:17	09:35	24.0	24.5	Sand with gravel	10YR4/2	None	0.30	>50

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

Locations	Latitude and longitude of the location		Survey date and time		pH	BOD (mg/L)	COD (mg/L)	DO (mg/L)	Electric conductivity (mS/m)	Salinity	TOC (mg/L)	SS (mg/L)	Turbidity (FNU)	Cs-134 (Bq/L)	Cs-137 (Bq/L)	Sr-90 (Bq/L)
	Latitude	Longitude	Date	Time (water)												
D-4 a	37.7308°	140.9081°	2020/8/24	09:17	7.4	<0.5	2.6	10.0	10.0	0.05	1.1	2	1.4	N.D.(0.0015)	0.039	0.00078

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>

Locations	Latitude and longitude of the location		Survey date and time		pH	Redox potential E _{NHE} (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)
											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)
D-4 a	37.7308°	140.9081°	2020/8/24	09:35	7.2	448	14.5	1.8	2.2	2.712	70.5	27.9	0.6	0.6	0.4	2.6	19	4.8	120	0.66	

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°	2020/8/6	Arthropoda	Malacostraca	Decapoda	Cambaridae	<i>Procambarus clarkii</i>	Red swamp crawfish	1	0.0042	Juvenile	-	-	3.2	N.D.(4.1)	3.2	-
					Vertebrata	Osteichthyes	Anguilliformes	Anguillidae	<i>Anguilla japonica</i>	Japanese eel	4	1.3	Immature fish,Mature fish	Fish	Viscera removed	20.3	1.3	19	0.097
					Vertebrata	Osteichthyes	Scorpaeniformes	Cottidae	<i>Cottus reinii</i>	Sculpin	2	0.064	Immature fish	Roe	Viscera removed	6.5	N.D.(2.9)	6.5	-
				2020/8/24	Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Tribolodon hakonensis</i>	Japanese dace	1	0.020	Immature fish	-	-	8.1	N.D.(7.0)	8.1	-
					Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Opsariichthys platypus</i>	Pale chub	4	0.037	Immature fish	-	-	5.0	N.D.(3.7)	5.0	-
					Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Gnathopogon elongatus elongatus</i>	Gnathopogon elongatus elongatus	2	0.018	Mature fish	-	-	4.3	N.D.(2.7)	4.3	-
					Vertebrata	Osteichthyes	Salmoniformes	Osmeridae	<i>Plecoglossus altivelis altivelis</i>	Sweetfish	91	1.5	Immature fish,Mature fish	-	-	10	N.D.(1.1)	10	0.16
					Vertebrata	Osteichthyes	Salmoniformes	Osmeridae	<i>Plecoglossus altivelis altivelis</i>	Sweetfish	53	0.94	Immature fish,Mature fish	-	-	19	N.D.(1.2)	19	0.20
					Vertebrata	Amphibia	Anura	Lithobates	<i>Lithobates catesbeianus</i>	American bullfrog	2	0.015	Larva(Tadpole)	-	-	78	N.D.(5.9)	78	-
					Algae/plant	-	-	-	-	Riverbed Deposits (Include algae)	-	0.0041	-	-	-	8.9	N.D.(7.3)	8.9	-
D-4 b	The main stream of the Mano River	37.7312°	140.9096°	2020/8/6	Arthropoda	Insecta	Odonata	Corduliidae	<i>Macromia amphigena amphigena</i>	Macromia amphigena	69	0.0092	Larva(Dragonfly larva)	-	-	8.7	N.D.(9.8)	8.7	-
					Arthropoda	Insecta	Odonata	Cordulegastriidae	<i>Anotogaster sieboldii</i>	Anotogaster sieboldii									
					Arthropoda	Insecta	Odonata	Gomphidae	<i>Sieboldius albardae</i>	Sieboldius albardae									
					Arthropoda	Insecta	Odonata	Gomphidae	<i>Davidius sp.</i>	Davidius									
					Arthropoda	Insecta	Odonata	Aeshnidae	<i>Boyeria maclachlani</i>	Boyeria maclachlani									
					Arthropoda	Insecta	Megaloptera	Corydalidae	<i>Protohermes grandis</i>	Protohermes grandis	14	0.0080	Larva	-	-	4.5	N.D.(4.6)	4.5	-
					Arthropoda	Malacostraca	Decapoda	Palaemonidae	<i>Palaemon paucidens</i>	Common prawn	27	0.032	Imago	-	-	7.9	N.D.(3.4)	7.9	-
					Arthropoda	Malacostraca	Decapoda	Atyidae	<i>Paratya improvisa</i>	Freshwater shrimp	45	0.0097	Juvenile,Imago	-	-	8.4	N.D.(7.2)	8.4	-
					Arthropoda	Malacostraca	Decapoda	Varunidae	<i>Eriocheir japonica</i>	Japanese mitten crab	1	0.050	Juvenile	-	-	14	N.D.(3.6)	14	-
					Vertebrata	Osteichthyes	Anguilliformes	Anguillidae	<i>Anguilla japonica</i>	Japanese eel	1	0.63	Mature fish	Obscure digesta	Viscera removed	35.8	1.8	34	-
					Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Phoxinus lagowskii steindachneri</i>	Amur minnow	6	0.0092	Immature fish,Mature fish	-	-	8.1	N.D.(4.7)	8.1	-
					Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Tribolodon hakonensis</i>	Japanese dace	2	0.031	Immature fish	-	-	12	N.D.(4.1)	12	-
					Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Opsariichthys platypus</i>	Pale chub	21	0.18	Immature fish,Mature fish	-	-	9.3	N.D.(1.4)	9.3	-
					Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Gnathopogon elongatus elongatus</i>	Gnathopogon elongatus elongatus	7	0.013	Immature fish	-	-	12	N.D.(8.3)	12	-
					Vertebrata	Osteichthyes	Cypriniformes	Cobitidae	<i>Misgurnus anguillicaudatus</i>	Oriental weatherfish	4	0.033	Immature fish,Mature fish	-	-	3.5	N.D.(3.1)	3.5	-
					Vertebrata	Osteichthyes	Salmoniformes	Osmeridae	<i>Plecoglossus altivelis altivelis</i>	Sweetfish	68	0.99	Immature fish,Mature fish	-	-	27	N.D.(2.0)	27	0.25
					Vertebrata	Osteichthyes	Perciformes	Centrarchidae	<i>Micropterus dolomieu</i>	Small mouth bass	1	0.60	Mature fish	Fish	Viscera removed	115.6	5.6	110	-
					Vertebrata	Osteichthyes	Perciformes	Centrarchidae	<i>Lepomis macrochirus</i>	Bluegill	1	0.018	Immature fish	-	-	25	N.D.(2.4)	25	-
					Vertebrata	Osteichthyes	Perciformes	Gobiidae	<i>Gymnogobius urotaenia</i>	Goby	3	0.021	Immature fish	-	-	6.5	N.D.(5.7)	6.5	-
					Vertebrata	Osteichthyes	Perciformes	Gobiidae	<i>Rhinogobius nagoyae</i>	<u>Rhinogobius nagoyae</u>	8	0.024	Immature fish,Mature fish	-	-	16	N.D.(4.0)	16	-
					Vertebrata	Osteichthyes	Perciformes	Gobiidae	<i>Rhinogobius kurodai</i>	Rhinogobius kurodai									
					Vertebrata	Osteichthyes	Siluriformes	Siluridae	<i>Silurus asotus</i>	Amur catfish	1	0.54	Mature fish	Obscure digesta	Viscera removed	71.5	3.5	68	-
					Vertebrata	Cephalaspidomorphi	Petromyzontiformes	Petromyzontidae	<i>Lethenteron reissneri</i>	Far eastern brook lamprey	8	0.023	Ammocoetes(larva)	-	-	4.0	N.D.(2.8)	4.0	-
Vertebrata	Amphibia	Anura	Ranidae	<i>Rana japonica</i>	Japanese brown frog	1	0.016	Imago	-	-	8.5	N.D.(5.6)	8.5	-					
Coarse Particulate Organic Matter	-	-	-	-	Bottom fallen leaves	-	0.20	-	-	-	3.9	N.D.(1.7)	3.9	-					
D-5	The main stream of the Mano River	37.7214°	140.8889°	2020/8/6	Arthropoda	Insecta	Trichoptera	Stenopsychidae	<i>Stenopsyche marmorata</i>	Stenopsyche marmorata	104	0.024	Larva	-	-	35	N.D.(6.2)	35	-
					Arthropoda	Insecta	Megaloptera	Corydalidae	<i>Protohermes grandis</i>	Protohermes grandis	47	0.026	Larva	-	-	4.8	N.D.(5.3)	4.8	-
					Vertebrata	Osteichthyes	Anguilliformes	Anguillidae	<i>Anguilla japonica</i>	Japanese eel	1	0.029	Immature fish	Ephemeroptera	Viscera removed	5.1	N.D.(5.3)	5.1	-
					Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Tribolodon hakonensis</i>	Japanese dace	90	0.13	Immature fish	-	-	8.2	N.D.(1.2)	8.2	-
					Vertebrata	Osteichthyes	Cypriniformes	Cyprinidae	<i>Opsariichthys platypus</i>	Pale chub	1	0.012	Immature fish	-	-	17	N.D.(4.4)	17	-
					Vertebrata	Osteichthyes	Perciformes	Centrarchidae	<i>Lepomis macrochirus</i>	Bluegill	1	0.0087	Immature fish	-	-	20	N.D.(8.0)	20	-
					Vertebrata	Osteichthyes	Siluriformes	Bagridae	<i>Tachysurus tokiensis</i>	Cut-tailed bullhead	1	0.018	Immature fish	-	-	7.9	N.D.(5.4)	7.9	-
					Vertebrata	Osteichthyes	Siluriformes	Siluridae	<i>Silurus asotus</i>	Amur catfish	3	0.86	Immature fish,Mature fish	Worm,Oriental weatherfish,Freshwater shrimp	Viscera removed	15	N.D.(1.0)	15	-
					Vertebrata	Amphibia	Anura	Lithobates	<i>Lithobates catesbeianus</i>	American bullfrog	1	0.49	Imago	-	-	35	N.D.(2.5)	35	-

*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.