Part 2: Radioactive Material Monitoring in the Water Environment in and around Fukushima Prefecture (FY2016)

1 Objective and Details

1.1 Objective

This monitoring was conducted in response to the Fukushima NPS Accident for the purpose of clarifying the distribution of the accident-derived radioactive materials in the water environment.

1.2 Details

(1) Locations

The survey was conducted mainly in the Tohoku and Kanto districts at around 600 locations for public water areas and at around 400 locations for groundwater. Specific locations are shown in Figure 1.2-1.

(2) Targets

For public water areas (rivers, lakes, and coastal areas), water and sediments were surveyed. Additionally, radioactivity in soil in the surrounding environment (river beds, etc.) near the sampling locations was also surveyed as reference.

Radioactivity in groundwater was also measured.

(3) Frequencies and periods

The monitoring for public water areas was conducted 2 to 10 times a year (varying by location).

The monitoring for groundwater was conducted 1 to 4 times a year (varying by location).

(4) Conducted analyses

Primarily, analyses of Cs-134 and Cs-137 were conducted for the subject samples.

Additionally, analyses on Sr-89, Sr-90 and other artificial radionuclides were also conducted for some of the samples.

(5) Compilation and evaluation of results

The results of the measurement are compiled and released sequentially as preliminary reports on the Ministry of the Environment website.

This report is the compilation of the overall monitoring results, and the details of individual monitoring surveys are available on the following website.

Public water area: http://www.env.go.jp/en/water/rmms/surveys.html

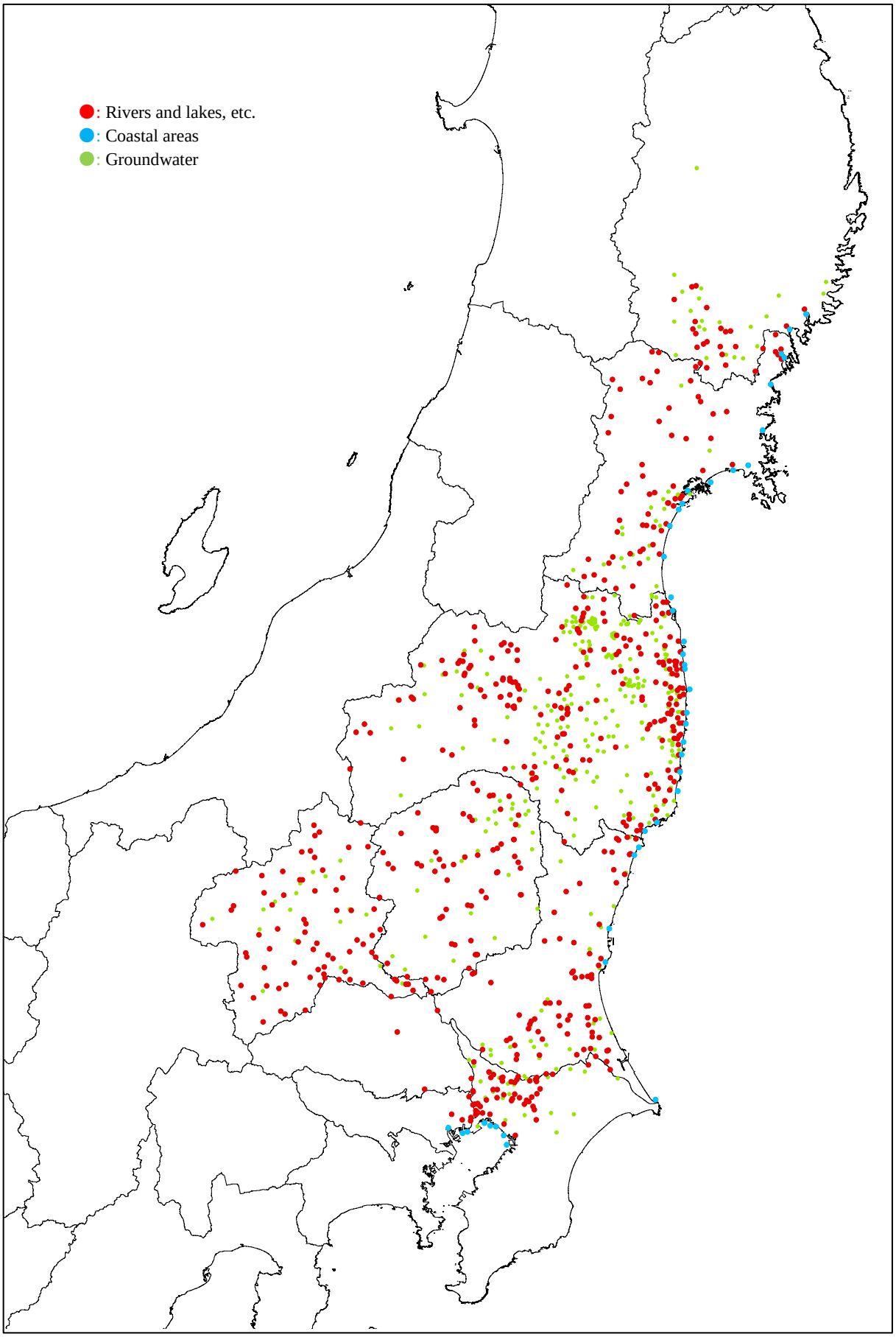


Figure 1.2-1 Map showing locations for the Post-Earthquake Monitoring

2 Survey Methods and Analysis Methods

2.1 Survey methods

Samples were collected at predetermined locations (for public water areas and groundwater) and the following analyses of radioactive materials were conducted.

Samples were collected based on the following guidelines in principle, as outlined below.

- Water Quality Survey Method (September 30, 1971; Notice Kansuikan No. 30 issued by the Director General of the Water Quality Preservation Bureau, Ministry of the Environment)
- Sediment Survey Method (August 8, 2012; Notice Kansuitaisuihatsu No. 120725002 issued by the Director General of the Environmental Management Bureau, Ministry of the Environment)
- Groundwater Quality Survey Method (September 14, 1989; Notice Kansuikan No. 189 issued by the Director General of the Water Quality Preservation Bureau, Ministry of the Environment)
- Environmental Sample Collection Method (1983, MEXT's Radioactivity Measurement Method Series)
- Sample Pretreatment for Instrumental Analysis Using Germanium Semiconductor Detectors (1982, MEXT's Radioactivity Measurement Method Series)

2.2 Analysis methods

γ-ray spectrometry measurements using a germanium semiconductor detector were conducted for water samples and sediment samples collected from public water areas and for groundwater samples, primarily targeting Cs-134 and Cs-137.

Additionally, analyses on Sr-89, Sr-90 and other artificial radionuclides were also conducted for some of the collected samples. Detected values were indicated with two significant digits in the unit of "Bq/L" in the case of water samples from public water areas and groundwater samples, and in the unit of "Bq/kg" in the case of sediment samples from public water areas. The measurement results were corrected for attenuation, and results were reported as activity concentrations at the time sampling was completed.

Adopted analysis methods were basically in line with the MEXT's Radioactivity Measurement Method Series. Detection limits are as shown in the table below.

Table 2.2-1 Target values of detection limits for radionuclides in Post-Earthquake Monitoring

Radionuclide		Public water areas (water)	Public water areas (sediments)	Groundwater
Radioactive cesium (Cs-134 and Cs-137)		Approx. 1 Bq/L	Approx. 10 Bq/kg	Approx. 1 Bq/L
Radioactive strontium	Sr-90	Approx. 1 Bq/L	Approx. 1 Bq/kg (0.16 to 2.9 Bq/kg)	Approx. 1 Bq/L
	Sr-89	-	-	Approx. 1 Bq/L
Other artificial radionuclides (*1)		-	Ag-110m: 7 to 180 Bq/kg Sb-125: 130 to 330 Bq/kg	-

*1: Varies by type of radionuclides; the above table shows detection limit targets for Ag-110m and Sb-125, which were detected during monitoring (see Chapter 5.2 of the main text).

3 Outlines of the Results

The results of the Post-Earthquake Monitoring conducted in Tokyo Metropolis and nine other prefectures in FY2016 are as outlined below.

3.1 Detection of radioactive cesium

Radioactive cesium (the total of Cs-134 and Cs-137) was detected as follows.

(1) Public water areas (water)

In FY2016, radioactive cesium activity concentrations ranged from not detectable to 1.7 Bq/L and had a detection rate of less than 0.1% in river water samples; from not detectable to 27 Bq/L and with a detection rate of 2.1% in lake water samples; and were not detectable in any coastal area water samples.

Since FY2011, all prefectures have shown decreasing trends in the detection rate for river water samples (11,000 or more total samples) and lake water samples (6,800 or more total samples). In prefectures other than Fukushima Prefecture, radioactive cesium has not been detected since FY2013 (see Figure 4.1-1 and Figure 4.1-2). In addition, no survey detected radioactive cesium in coastal area water samples (2,800 or more total samples).

(2) Groundwater

Radioactive cesium was not detected in any of the groundwater samples in FY2016.

Looking at the trend from FY2011 onward, radioactive cesium was detected in two samples from Fukushima Prefecture in FY2011 (detected values were 2 Bq/L and 1 Bq/L), and has not been detected in groundwater samples (5,600 or more total samples) since FY2012.

(3) Public water areas (sediments)

1) Overall trends

In FY2016, radioactive cesium activity concentrations ranged from not detectable to 8,600 Bq/kg and were detected with a detection rate of 86.3% in river sediment samples, from not detectable to 528,000 Bq/kg and with a detection rate of 99.3% in lake sediment samples, and from not detectable to 780 Bq/kg and at a detection rate of 78.7% in coastal area sediment samples.

2) Status by location

Because radioactive cesium was detected at many locations, its statuses in respective locations were compared. The status in respective locations were compared and detected concentration levels and their changes were statistically compiled as shown in "4.3 Detection of radioactive materials in sediments by location."

Detected concentration levels were compiled as shown in Table 3.1-1.

Locations of Categories A and B (top 10 percentile of the whole) were observed in Hamadori District, Fukushima Prefecture as well as in Nakadori and Aizu District, Fukushima Prefecture and in Ibaraki, Gunma, Chiba, and Miyagi Prefectures.

Table 3.1-1 Categorization of detected concentration levels for sediment samples from public water areas (FY2016) (rivers, lakes, and coastal areas)

<Rivers>

Category	Percentile (see Figure 4.3-1)	Range [coastal area sediments] [Bq/kg (dry)]	Number of locations												
			Iwate	Miyagi	Fukushima			Ibaraki	Tochigi	Gunma	Chiba	Saitama	Tokyo	Total	
					Hamadori	Nakadori	Aizu							Number of location	Percentage
A	Upper 5 percentile	839 or more	0	0	11	0	0	2	0	0	6	0	0	19	4.8
B	Upper 5 to 10 percentile	436 – 839	0	0	7	2	1	1	0	1	8	0	0	20	5.1
C	Upper 10 to 25 percentile	159 – 436	0	5	14	9	1	13	1	0	17	0	1	61	15.4
D	Upper 25 to 50 percentile	51 – 159	3	17	11	14	4	19	10	7	12	0	1	98	24.7
E	Lower 50 percentile	51 or less	19	21	10	19	20	18	45	40	4	2	0	198	50.0
Total			22	43	53	44	26	53	56	48	47	2	2	396	100.0

<Lakes>

Category	Percentile (see Figure 4.3-1)	Range [Lake sediments] [Bq/kg (dry)]	Number of locations									
			Miyagi	Fukushima			Ibaraki	Tochigi	Gunma	Chiba	Total	
				Hamadori	Nakadori	Aizu					Number of locations	Percentage
A	Upper 5 percentile	20,516 or more	0	8	0	0	0	0	0	0	8	4.9
B	Upper 5 to 10 percentile	9,265 ～ 20,516	0	8	0	0	0	0	0	0	8	4.9
C	Upper 10 to 25 percentile	2,085 ～ 9,265	1	11	4	7	1	0	0	1	25	15.2
D	Upper 25 to 50 percentile	530 ～ 2,085	3	9	5	2	5	3	13	1	41	25.0
E	Lower 50 percentile	530 or less	17	5	3	22	13	5	11	6	82	50.0
Total			21	41	12	31	19	8	24	8	164	100.0

<Coastal areas>

Category	Percentile (see Figure 4.3-1)	Range [coastal area sediments] [Bq/kg (dry)]	Number of locations							
			Iwate	Miyagi	Fukushima	Ibaraki	Chiba	Tokyo	Total	
									Number of location	Percentage
A	Upper 5 percentile	420 or more	0	1	1	0	0	0	2	4.8
B	Upper 5 to 10 percentile	347 ～ 420	0	1	1	0	0	0	2	4.8
C	Upper 10 to 25 percentile	197 ～ 347	0	2	3	0	0	1	6	14.3
D	Upper 25 to 50 percentile	36 ～ 197	0	3	5	0	1	2	11	26.2
E	Lower 50 percentile	36 or less	2	5	5	5	4	0	21	50.0
Total			2	12	15	5	5	3	42	100.0

Changes in detected concentration levels were compiled as shown in Figure 3.1-1, which shows Table 4.3-45 (described later) graphically.

At most monitoring locations for rivers, a decreasing trend was observed. For lakes, a decreasing or unchanged trend was generally observed with some locations showing fluctuations. For coastal areas, a decreasing or unchanged trend was observed at most locations with some locations showing fluctuations.

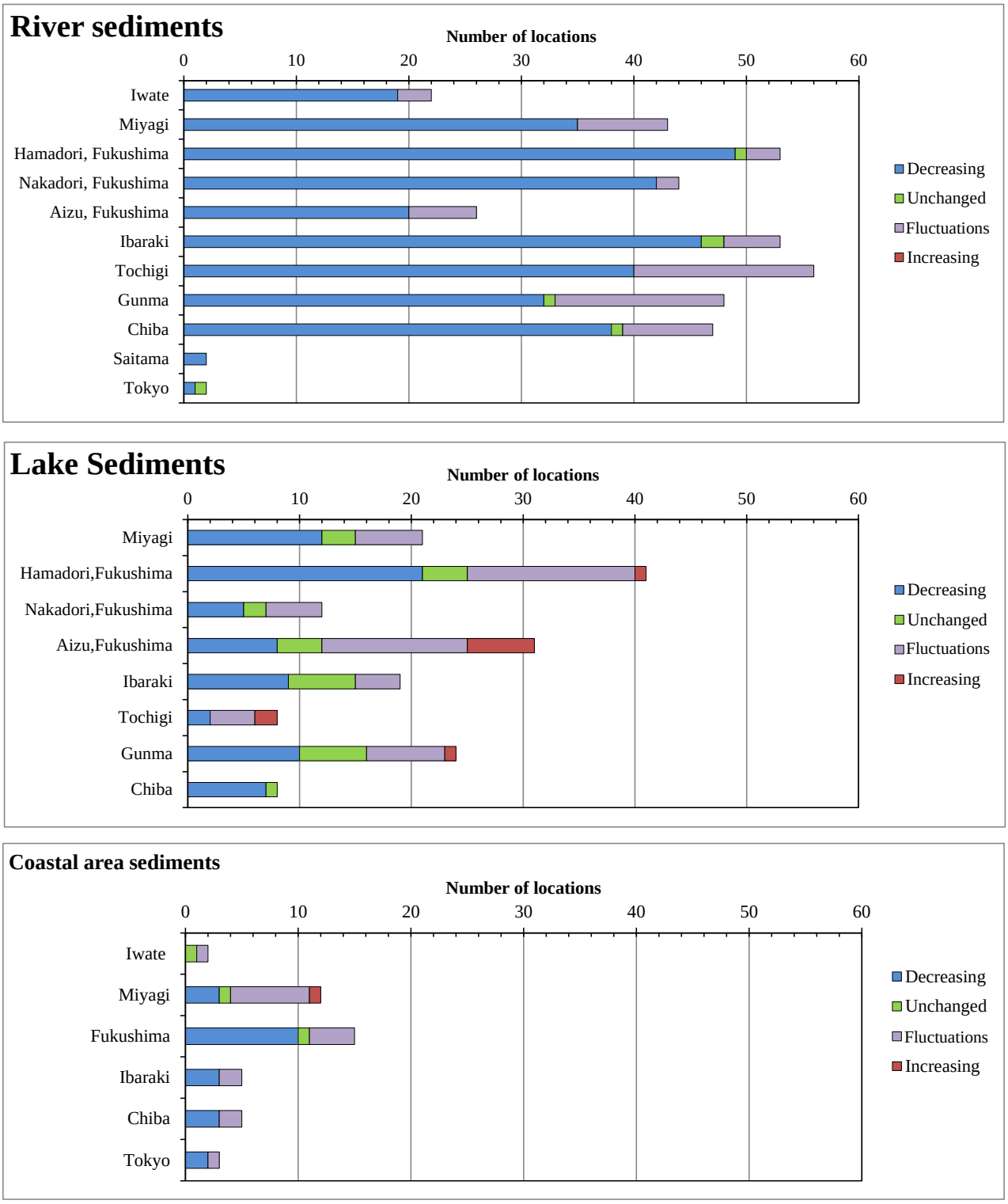


Figure 3.1-1 Changes in detected concentration levels of radioactive materials in sediment samples from public water areas (rivers, lakes, and coastal areas)

3.2 Detection of radionuclides other than radioactive cesium

(1) Sr-89 and Sr-90

Sr-90 was surveyed from FY2011 to FY2016 for sediment samples (approximately 640 samples in total) from public water areas (rivers, lakes, and coastal areas) and for groundwater samples (approximately 290 samples in total) (see Figure 5.1-1). Additionally, in FY2016, water samples (45 samples mainly targeting lakes) were also surveyed at those locations where relatively high concentrations were detected in sediment.

The results of the FY2016 survey were as follows: for public water area sediment samples, Sr-90 concentrations ranged from not detectable to 0.69 Bq/kg and had a detection rate of 52.2% in river sediments; from not detectable to 100 Bq/kg with a detection rate of 98.5% in lake sediments, and from not detectable to 0.38 with a detection rate of 6.3% in coastal area sediments. As for water samples, Sr-90 was not detected in any public water areas or ground water locations.

Sr-89 was not detectable in any of the monitoring surveys conducted for sediment samples from public water areas (a total of 22 samples collected from rivers and lakes in FY2011) or for groundwater samples (a total of approx. 290 samples surveyed from FY2011 to FY2016) (detection limit: 1 Bq/L for water and approximate 2 Bq/kg for sediments).

(2) Other artificial radionuclides

None have been detected since FY 2013.

4 Results (Radioactive cesium)

4.1 Water

(1) Public water areas

1) Rivers

Detection of radioactive cesium in river water samples is as shown in Table 4.1-1 and Figure 4.1-1.

According to the results, most prefectures have shown decreasing trends in the detection rate since FY2011. In FY2016, radioactive cesium was not detected in any locations other than Hamadori District, Fukushima Prefecture.

Detected values (the total of Cs-134 and Cs-137) have also shown decreasing trends since FY2011. The measured values in FY2016 ranged from not detectable to 1.7 Bq/L (detection limit: 1 Bq/L for both Cs-134 and Cs-137).

2) Lakes

Detection of radioactive cesium in lake water samples is as shown in Table 4.1-2 and Figure 4.1-2.

According to the results most prefectures have shown decreasing trends in the detection rate since FY2012. Radioactive cesium has not been detected in any locations other than Hamadori District, Fukushima Prefecture since FY2013.

Detected values (the total of Cs-134 and Cs-137) have shown decreasing trends since FY2012. The measured values in FY2016 ranged from not detectable to 27 Bq/L (detection limit: 1 Bq/L for both Cs-134 and Cs-137).

3) Coastal areas

Detection of radioactive cesium (Cs-134 and Cs-137) in coastal area water samples is as shown in Table 4.1-3.

According to the results, including the past fiscal years, radioactive cesium has not been detected in any locations (detection limit: 1 Bq/L for both Cs-134 and Cs-137).

(2) Groundwater

Detection of radioactive cesium in groundwater smples is as shown in Table 4.1-4.

According to the results, radioactive cesium has not been detected in any locations since FY2012 including FY2016.

<Reference>

・Specification and Standards for Food, Food Additives, etc. in Accordance with the Food Sanitation Act (Drinking Water) (Ministry of Health, Labor and Welfare Public Notice No.130, March 15, 2012)

Radioactive cesium (the total of Cs-134 and Cs-137): 10 Bq/kg

・Target Values for Radioactive Materials in Tap Water (Management Target for Water Supply Facilities) (March 5, 2012; 0305 Notice No.1 from the Director of the Water Supply Division, Health Service Bureau, Ministry of Health, Labor and Welfare)

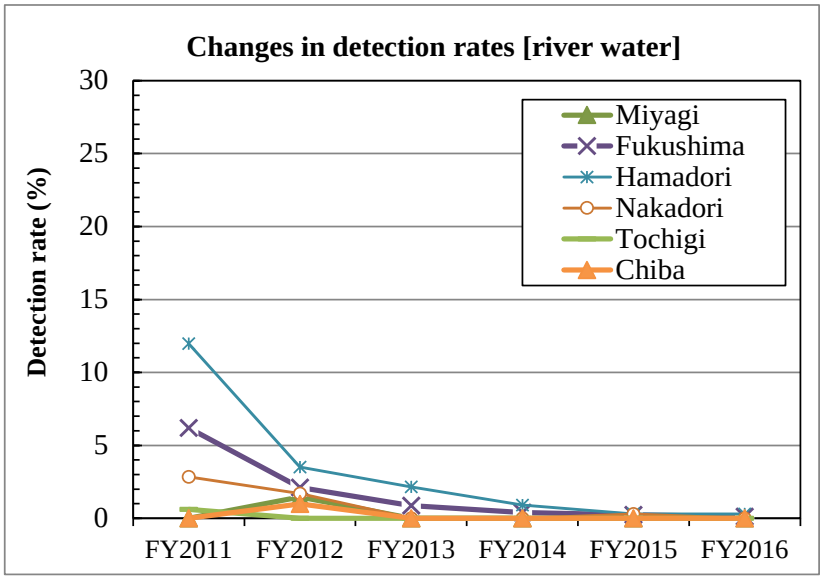
Radioactive cesium (the total of Cs-134 and Cs-137): 10 Bq/kg

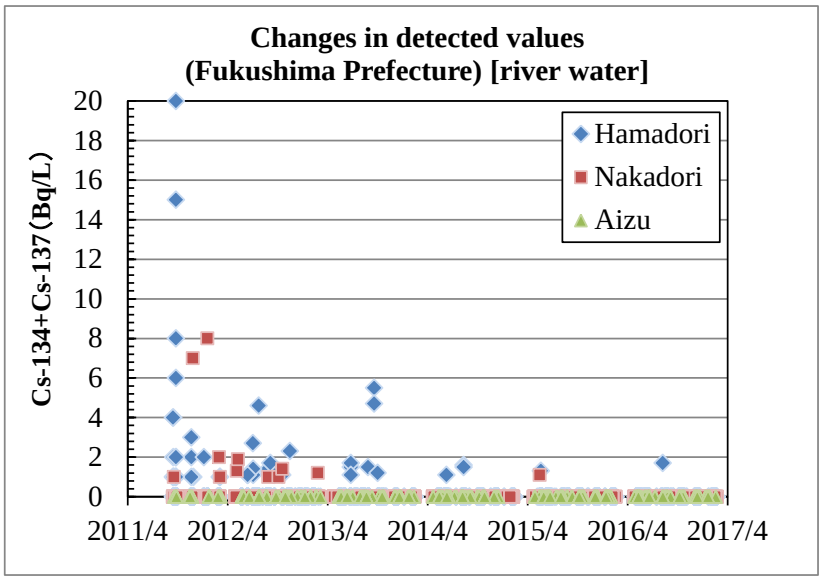
Table 4.1-1(1) Detection of radioactive cesium in river water samples (from FY2011 to FY2013)

Prefecture	FY2011				FY2012				FY2013			
	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)
Iwate	18	0	0.0	ND	64	0	0.0	ND	80	0	0.0	ND
Yamagata	10	0	0.0	ND	0	0	-	-	0	0	-	-
Miyagi	114	0	0.0	ND	204	3	1.5	ND - 6.3	193	0	0.0	ND
Fukushima	452	28	6.2	ND - 20	854	18	2.1	ND - 4.6	801	7	0.9	ND - 5.5
Hamadori	192	23	12.0	ND - 20	342	12	3.5	ND - 4.6	325	7	2.2	ND - 5.5
Nakadori	176	5	2.8	ND - 8.0	355	6	1.7	ND - 1.9	322	0	0.0	ND
Aizu	84	0	0.0	ND	157	0	0.0	ND	154	0	0.0	ND
Ibaraki	128	0	0.0	ND	214	0	0.0	ND	212	0	0.0	ND
Tochigi	161	1	0.6	ND - 1.0	277	0	0.0	ND	276	0	0.0	ND
Gunma	90	0	0.0	ND	216	0	0.0	ND	214	0	0.0	ND
Saitama	2	0	0.0	ND	8	0	0.0	ND	8	0	0.0	ND
Chiba	82	0	0.0	ND	202	2	1.0	ND - 1.3	200	0	0.0	ND
Tokyo	3	0	0.0	ND	12	0	0.0	ND	8	0	0.0	ND
Total	1,060	29	2.7	ND - 20	2,051	23	1.1	ND - 6.3	1,992	7	0.4	ND - 5.5

Table 4.1-1(2) Detection of radioactive cesium in river water samples (from FY2014 to FY2016)

Prefecture	FY2014				FY2015				FY2016				Total		
	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)	Number of samples	Detection times	Range of measured values (Bq/L)
Iwate	80	0	0.0	ND	80	0	0.0	ND	80	0	0.0	ND	402	0	ND
Yamagata	0	0	-	-	0	0	-	-	0	0	-	-	10	0	ND
Miyagi	196	0	0.0	ND	196	0	0.0	ND	196	0	0.0	ND	1099	3	ND - 6.3
Fukushima	770	3	0.4	ND - 1.6	819	2	0.2	ND - 1.3	809	1	0.1	ND - 1.7	4,505	59	ND - 20
Hamadori	326	3	0.9	ND - 1.6	330	1	0.3	ND - 1.3	326	1	0.3	ND - 1.7	1,841	47	ND - 20
Nakadori	324	0	0.0	ND	324	1	0.3	ND - 1.1	324	0	0.0	ND	1,825	12	ND - 8.0
Aizu	120	0	0.0	ND	165	0	0.0	ND	159	0	0.0	ND	839	0	ND
Ibaraki	212	0	0.0	ND	212	0	0.0	ND	212	0	0.0	ND	1190	0	ND
Tochigi	274	0	0.0	ND	278	0	0.0	ND	278	0	0.0	ND	1,544	1	ND - 1.0
Gunma	210	0	0.0	ND	214	0	0.0	ND	213	0	0.0	ND	1157	0	ND
Saitama	8	0	0.0	ND	8	0	0.0	ND	8	0	0.0	ND	42	0	ND
Chiba	200	0	0.0	ND	200	0	0.0	ND	200	0	0.0	ND	1084	2	ND - 1.3
Tokyo	8	0	0.0	ND	8	0	0.0	ND	8	0	0.0	ND	47	0	ND
Total	1,958	3	0.2	ND - 1.6	2,015	2	0.1	ND - 1.3	2,004	1	0.0	ND - 1.7	11,080	65	ND - 20





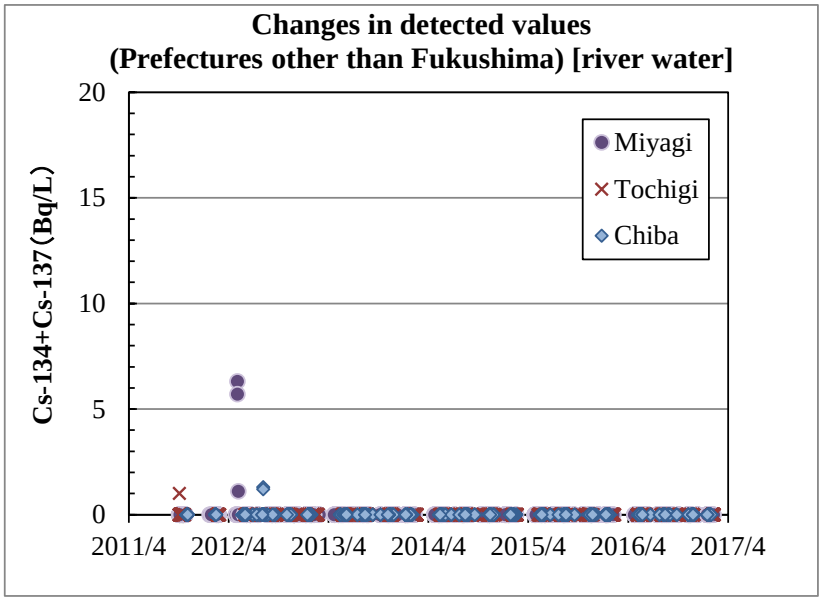


Figure 4.1-1 Detection rates of radioactive cesium in river water samples (top) and changes in detected values (middle and bottom)

Table 4.1-2(1) Detection of radioactive cesium in lake water samples (from FY2011 to FY2013)

Prefecture	FY2011				FY2012				FY2013			
	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)
Yamagata	4	0	0.0	ND	0	0	-	-	0	0	-	-
Miyagi	34	1	2.9	ND - 3.0	90	0	0.0	ND	118	0	0.0	ND
Fukushima	211	11	5.2	ND - 27	581	72	12.4	ND - 100	761	36	4.7	ND - 47
Hamadori	76	9	11.8	ND - 27	272	65	23.9	ND - 100	321	36	11.2	ND - 47
Nakadori	56	2	3.6	ND - 5.0	83	3	3.6	ND - 1.2	109	0	0.0	ND
Aizu	79	0	0.0	ND	226	4	1.8	ND - 5.1	331	0	0.0	ND
Ibaraki	48	0	0.0	ND	93	0	0.0	ND	152	0	0.0	ND
Tochigi	24	0	0.0	ND	54	0	0.0	ND	62	0	0.0	ND
Gunma	51	0	0.0	ND	144	1	0.7	ND - 1.0	188	0	0.0	ND
Chiba	32	0	0.0	ND	50	0	0.0	ND	53	0	0.0	ND
Total	404	12	3.0	ND - 27	1,012	73	7.2	ND - 100	1,334	36	2.7	ND - 47

Table 4.1-2(2) Detection of radioactive cesium in lake water samples (from FY2014 to FY2016)

Prefecture	FY2014				FY2015				FY2016				Total		
	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)	Number of samples	Detection times	Range of measured values (Bq/L)
Yamagata	0	0	-	-	0	0	-	-	0	0	-	-	4	0	ND
Miyagi	114	0	0.0	ND	118	0	0.0	ND	117	0	0.0	ND	591	1	ND - 3.0
Fukushima	799	29	3.6	ND - 34	807	29	3.6	ND - 52	797	28	3.5	ND - 27	3,956	205	ND - 100
Hamadori	342	29	8.5	ND - 34	350	29	8.3	ND - 52	357	28	7.8	ND - 27	1,718	196	ND - 100
Nakadori	113	0	0.0	ND	115	0	0.0	ND	105	0	0.0	ND	581	5	ND - 5.0
Aizu	344	0	0.0	ND	342	0	0.0	ND	335	0	0.0	ND	1,657	4	ND - 5.1
Ibaraki	152	0	0.0	ND	149	0	0.0	ND	147	0	0.0	ND	741	0	ND
Tochigi	64	0	0.0	ND	64	0	0.0	ND	64	0	0.0	ND	332	0	ND
Gunma	187	0	0.0	ND	192	0	0.0	ND	190	0	0.0	ND	952	1	ND - 1.0
Chiba	50	0	0.0	ND	37	0	0.0	ND	37	0	0.0	ND	259	0	ND
Total	1,366	29	2.1	ND - 34	1,367	29	2.1	ND - 52	1,352	28	2.1	ND - 27	6,835	207	ND - 100

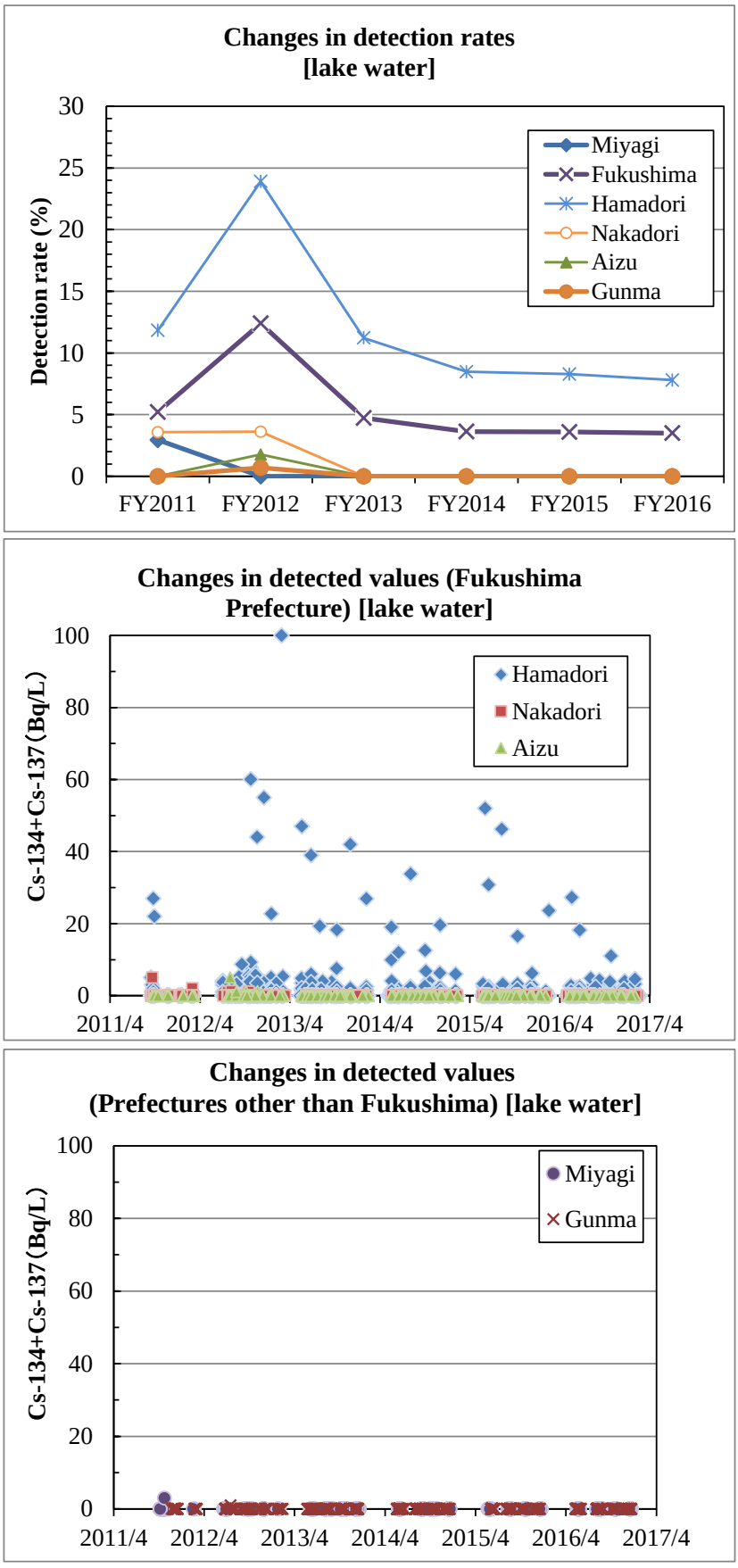


Figure 4.1-2 Detection rates of radioactive cesium in lake water samples (top) and changes in detected values (middle and bottom)

Table 4.1-3(1) Detection of radioactive cesium in coastal area water samples (from FY2011 to FY2013)

Prefecture	FY2011				FY2012				FY2013			
	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)
Iwate	5	0	0.0	ND	8	0	0.0	ND	8	0	0.0	ND
Miyagi	94	0	0.0	ND	96	0	0.0	ND	102	0	0.0	ND
Fukushima	116	0	0.0	ND	189	0	0.0	ND	300	0	0.0	ND
Ibaraki	45	0	0.0	ND	62	0	0.0	ND	40	0	0.0	ND
Chiba	0	0	-	-	62	0	0.0	ND	46	0	0.0	ND
Tokyo	0	0	-	-	38	0	0.0	ND	36	0	0.0	ND
Total	260	0	0.0	ND	455	0	0.0	ND	532	0	0.0	ND

Table 4.1-3(2) Detection of radioactive cesium in coastal area water samples (from FY2014 to FY2016)

Prefecture	FY2014				FY2015				FY2016				Total		
	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)	Number of samples	Detection times	Range of measured values (Bq/L)
Iwate	8	0	0.0	ND	8	0	0.0	ND	8	0	0.0	ND	45	0	ND
Miyagi	104	0	0.0	ND	104	0	0.0	ND	104	0	0.0	ND	604	0	ND
Fukushima	300	0	0.0	ND	300	0	0.0	ND	300	0	0.0	ND	1,505	0	ND
Ibaraki	40	0	0.0	ND	40	0	0.0	ND	40	0	0.0	ND	267	0	ND
Chiba	46	0	0.0	ND	46	0	0.0	ND	46	0	0.0	ND	246	0	ND
Tokyo	36	0	0.0	ND	36	0	0.0	ND	36	0	0.0	ND	182	0	ND
Total	534	0	0.0	ND	534	0	0.0	ND	534	0	0.0	ND	2,849	0	ND

Table 4.1-4(1) Detection of radioactive cesium in groundwater samples (from FY2011 to FY2013)

Prefecture	FY2011				FY2012				FY2013			
	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)
Iwate	42	0	0.0	ND	44	0	0.0	ND	44	0	0.0	ND
Miyagi	79	0	0.0	ND	44	0	0.0	ND	48	0	0.0	ND
Yamagata	79	0	0.0	ND	0	0	-	-	0	0	-	-
Fukushima	540	2	0.4	ND - 2.0	543	0	0.0	ND	766	0	0.0	ND
Ibaraki	89	0	0.0	ND	54	0	0.0	ND	54	0	0.0	ND
Tochigi	76	0	0.0	ND	54	0	0.0	ND	54	0	0.0	ND
Gunma	40	0	0.0	ND	40	0	0.0	ND	42	0	0.0	ND
Chiba	54	0	0.0	ND	46	0	0.0	ND	46	0	0.0	ND
Total	999	2	0.2	ND - 2.0	825	0	0.0	ND	1,054	0	0.0	ND

Table 4.1-4(2) Detection of radioactive cesium in groundwater samples (from FY2014 to FY2016)

Prefecture	FY2014				FY2015				FY2016				Total		
	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L)	Number of samples	Detection times	Range of measured values (Bq/L)
Iwate	22	0	0.0	ND	22	0	0.0	ND	22	0	0.0	ND	196	0	ND
Miyagi	24	0	0.0	ND	24	0	0.0	ND	24	0	0.0	ND	243	0	ND
Yamagata	0	0	-	-	0	0	-	-	0	0	-	-	79	0	ND
Fukushima	771	0	0.0	ND	775	0	0.0	ND	773	0	0.0	ND	4,168	2	ND - 2.0
Ibaraki	27	0	0.0	ND	27	0	0.0	ND	27	0	0.0	ND	278	0	ND
Tochigi	27	0	0.0	ND	27	0	0.0	ND	27	0	0.0	ND	265	0	ND
Gunma	21	0	0.0	ND	21	0	0.0	ND	21	0	0.0	ND	185	0	ND
Chiba	23	0	0.0	ND	23	0	0.0	ND	23	0	0.0	ND	215	0	ND
Total	915	0	0.0	ND	919	0	0.0	ND	917	0	0.0	ND	5,629	2	ND - 2.0

(*) Detected in FY2011. Both Cs-134 and Cs-137 were detected at one site, and only Cs-137 was detected at another site, at a level of 1 Bq/L (detection limit: 1 Bq/L) (see the main text).

4.2 Sediments

Detection of radioactive cesium in sediment samples from public water areas (rivers, lakes, and coastal areas) is as outlined below.

(1) Public water areas (rivers)

Radioactive cesium detected in river sediment samples is as shown in Table 4.2-1 and Figure 4.2-1.

According to the results, including the past fiscal years, the detection rate has ranged between 50 and 100% and has been slightly decreasing over time in many prefectures.

On the other hand, as for detected values (the total of Cs-134 and Cs-137) shown in Figure 4.2-1, the number of locations with high concentration levels has decreased while number of locations with low concentration levels has increased.

(2) Public water areas (lakes)

Detection of radioactive cesium in lake sediment samples is as shown in Table 4.2-2 and Figure 4.2-2.

According to the results, including the past fiscal years, the detection rate has ranged between 83 and 100%. In FY2016, detection rates of 90% or more were observed in all prefectures.

Detected values (the total of Cs-134 and Cs-137) have generally decreased or unchanged with some locations showing fluctuations. In Hamadori District, Fukushima Prefecture, however, radioactive cesium was still detected at concentrations of 100,000 Bq/kg or more in FY2016.

(3) Public water areas (coastal areas)

Detection of radioactive cesium in coastal area sediment samples is as shown in Table 4.2-3 and Figure 4.2-3.

According to the results, including the past fiscal years, the detection rate ranged between 30 and 100% and slightly decreased in FY2016, except for a small number of samples from Iwate Prefecture.

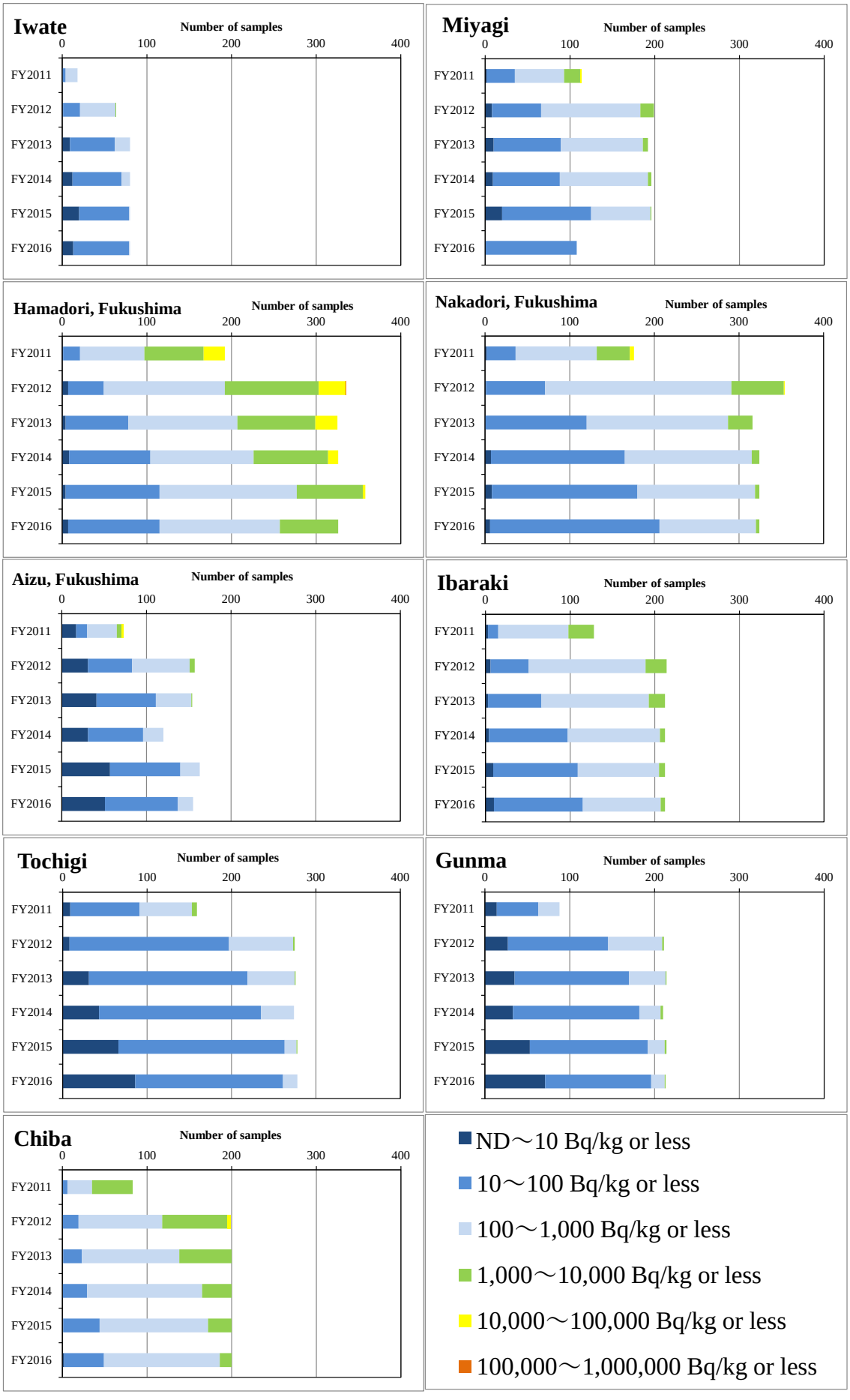
Coastal area locations showed lower detected values (the total of Cs-134 and Cs-137) than those in rivers or lakes. Radioactive cesium was not detected with a value of 1,000 Bq/kg or more in any prefectures in FY2016.

Table 4.2-1(1) Detection of radioactive cesium in river sediment samples (from FY2011 to FY2013)

	FY2011				FY2012				FY2013			
	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)
Iwate	18	18	100.0	62 - 990	64	63	98.4	ND - 1,040	80	71	88.8	ND - 340
Yamagata	10	6	60.0	ND - 132	0	0	-	-	0	0	-	-
Miyagi	113	111	98.2	ND - 11,100	199	191	96.0	ND - 3,700	192	182	94.8	ND - 2,450
Fukushima	441	421	95.5	ND - 92,000	847	808	95.4	ND - 165,000	795	750	94.3	ND - 45,000
Hamadori	192	191	99.5	ND - 92,000	336	329	97.9	ND - 165,000	325	321	98.8	ND - 45,000
Nakadori	176	174	98.9	ND - 30,000	354	353	99.7	ND - 20,000	316	316	100.0	10 - 8,300
Aizu	73	56	76.7	ND - 25,000	157	126	80.3	ND - 2,590	154	113	73.4	ND - 1,410
Ibaraki	128	125	97.7	ND - 5,800	214	208	97.2	ND - 4,800	212	209	98.6	ND - 4,200
Tochigi	159	150	94.3	ND - 4,900	275	267	97.1	ND - 1,780	276	245	88.8	ND - 1,540
Gunma	88	74	84.1	ND - 410	211	184	87.2	ND - 1,560	214	179	83.6	ND - 1,560
Saitama	2	2	100.0	35 - 530	8	8	100.0	12 - 540	8	8	100.0	10 - 67
Chiba	83	83	100.0	50 - 9,700	199	199	100.0	17 - 20,200	200	199	99.5	ND - 7,900
Tokyo	2	2	100.0	580 - 700	12	12	100.0	131 - 670	8	8	100.0	75 - 460
Total	1,044	992	95.0	ND - 92,000	2,029	1,940	95.6	ND - 165,000	1,985	1,851	93.2	ND - 45,000

Table 4.2-1(2) Detection of radioactive cesium in river sediment samples (from FY2014 to FY2016)

	FY2014				FY2015				FY2016				Total		
	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)	Number of samples	Detection times	Range of measured values (Bq/kg)
Iwate	80	68	85.0	ND - 301	80	60	75	ND - 121	80	67	83.8	ND - 161	402	347	ND - 1,040
Yamagata	0	0	-	-	0	0	-	-	0	0	-	-	10	6	ND - 132
Miyagi	196	187	95.4	ND - 1,620	196	176	90	ND - 1,860	196	172	87.8	ND - 1,070	1,092	1,019	ND - 11,100
Fukushima	770	724	94.0	ND - 24,700	845	776	92	ND - 20,100	805	741	92.0	ND - 8,600	4,503	4,220	ND - 165,000
Hamadori	326	318	97.5	ND - 24,700	358	354	99	ND - 20,100	326	319	97.9	ND - 8,600	1,863	1,832	ND - 165,000
Nakadori	324	317	97.8	ND - 3,060	324	316	98	ND - 3,270	324	318	98.1	ND - 1,510	1,818	1,794	ND - 30,000
Aizu	120	89	74.2	ND - 720	163	106	65	ND - 810	155	104	67.1	ND - 810	822	594	ND - 25,000
Ibaraki	212	208	98.1	ND - 1,640	212	203	96	ND - 2,160	212	202	95.3	ND - 1,900	1,190	1,155	ND - 5,800
Tochigi	274	231	84.3	ND - 820	278	212	76	ND - 1,010	278	192	69.1	ND - 245	1,540	1,297	ND - 4,900
Gunma	210	177	84.3	ND - 2,160	214	161	75	ND - 1,510	213	142	66.7	ND - 1,100	1,150	917	ND - 2,160
Saitama	8	7	87.5	ND - 68	8	4	50	ND - 291	8	4	50.0	ND - 43	42	33	ND - 540
Chiba	200	200	100.0	11 - 5,200	200	199	100	ND - 4,100	200	198	99.0	ND - 4,130	1,082	1,078	ND - 20,200
Tokyo	8	8	100.0	96 - 430	8	8	100	86 - 404	8	8	100.0	27 - 253	46	46	27 - 700
Total	1,958	1,810	92.4	ND - 24,700	2,041	1,799	88.1	ND - 20,100	2,000	1,726	86.3	ND - 8,600	11,057	10,118	ND - 165,000



Prefectures where only a small number of samples were collected are omitted.

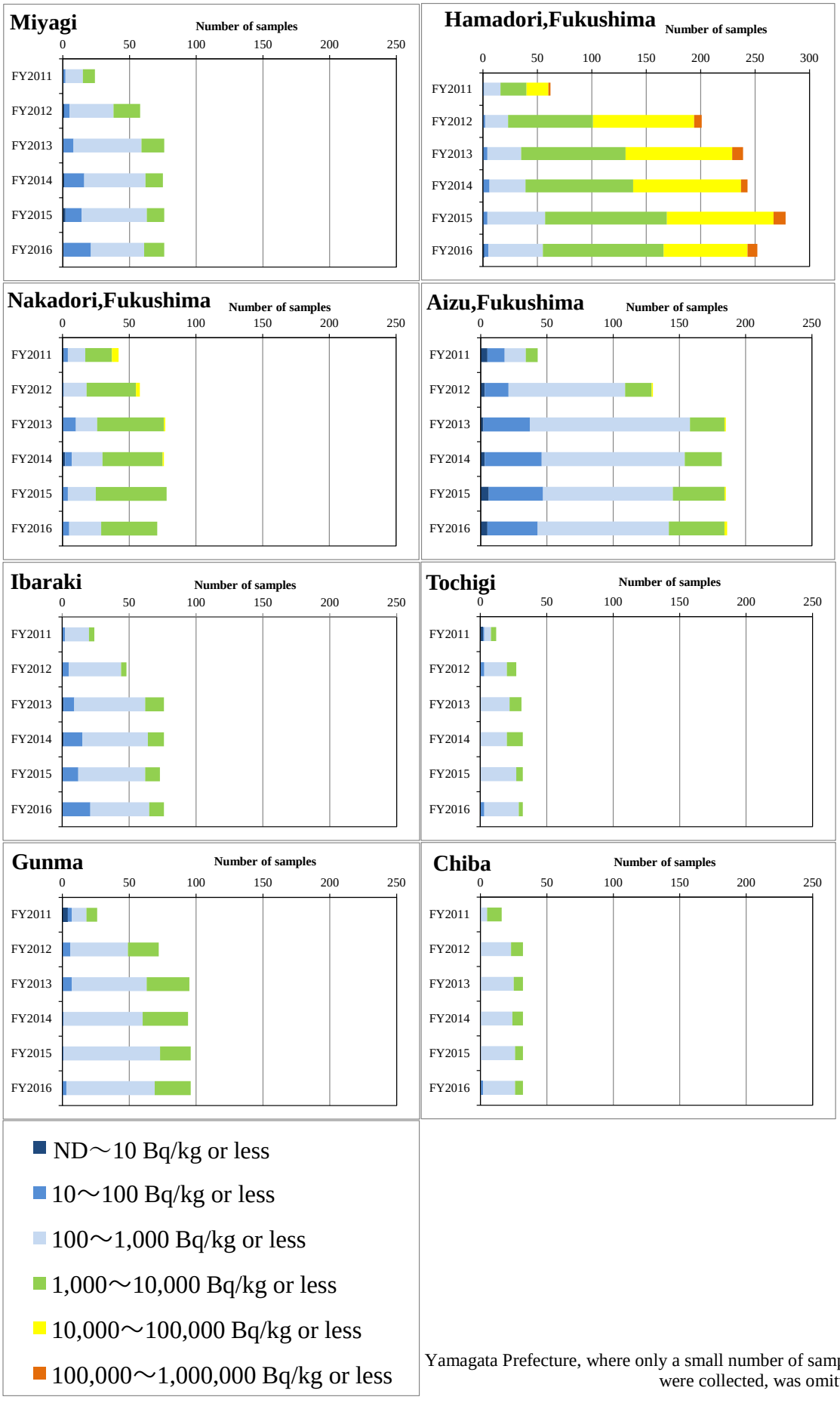
Figure 4.2-1 Detection of radioactive cesium in river sediment samples (changes)

Table 4.2-2(1) Detection of radioactive cesium in lake sediment samples (from FY2011 to FY2013)

Prefecture	FY2011				FY2012				FY2013			
	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)
Yamagata	2	2	100.0	34 - 470	0	0	-	-	0	0	-	-
Miyagi	24	24	100.0	31 - 3,000	58	57	98.3	ND - 9,700	76	76	100.0	18 - 4,200
Fukushima	147	141	95.9	ND - 260,000	389	386	99.2	ND - 780,000	501	499	99.6	ND - 460,000
Hamadori	62	62	100.0	45 - 260,000	201	201	100.0	42 - 780,000	239	239	100.0	68 - 460,000
Nakadori	42	41	97.6	ND - 35,000	58	58	100.0	63 - 24,900	77	77	100.0	68 - 11,100
Aizu	43	38	88.4	ND - 2,020	130	127	97.7	ND - 10,200	185	183	98.9	ND - 13,400
Ibaraki	24	24	100.0	37 - 1,840	48	48	100.0	93 - 1,300	76	75	98.7	ND - 5,400
Tochigi	12	10	83.3	ND - 6,700	27	27	100.0	11 - 4,100	31	31	100.0	106 - 5,100
Gunma	26	22	84.6	ND - 4,600	72	72	100.0	16 - 4,100	95	95	100.0	21 - 4,300
Chiba	16	16	100.0	440 - 7,400	32	32	100.0	460 - 8,200	32	32	100.0	151 - 5,700
Total	251	239	95.2	ND - 260,000	626	622	99.4	ND - 780,000	811	808	99.6	ND - 460,000

Table 4.2-2(2) Detection of radioactive cesium in lake sediment samples (from FY2014 to FY2016)

Prefecture	FY2014				FY2015				FY2016				Total		
	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)	Number of samples	Detection times	Range of measured values (Bq/kg)
Yamagata	0	0	-	-	0	0	-	-	0	0	-	-	2	2	34 - 470
Miyagi	75	74	98.7	ND - 2,220	76	74	97.4	ND - 4,490	76	76	100.0	12 - 3,680	385	381	ND - 9,700
Fukushima	501	496	99.0	ND - 297,000	541	535	98.9	ND - 920,000	509	503	98.8	ND - 528,000	2,588	2,560	ND - 920,000
Hamadori	243	243	100.0	18 - 297,000	278	278	100.0	16 - 920,000	252	251	99.6	ND - 528,000	1,275	1,274	16 - 920,000
Nakadori	76	74	97.4	ND - 10,900	78	78	100.0	44 - 6,200	71	71	100.0	23 - 7,700	402	399	ND - 35,000
Aizu	182	179	98.4	ND - 7,800	185	179	96.8	ND - 12,300	186	181	97.3	ND - 15,400	911	887	ND - 15,400
Ibaraki	76	75	98.7	ND - 3,170	73	73	100.0	61 - 3,070	76	76	100.0	23 - 2,750	373	371	ND - 5,400
Tochigi	32	32	100.0	134 - 8,700	32	32	100.0	103 - 1,760	32	32	100.0	44 - 1,790	166	164	ND - 8,700
Gunma	94	94	100.0	38 - 5,100	96	96	100.0	47 - 4,570	96	96	100.0	26 - 2,510	479	475	ND - 5,100
Chiba	32	32	100.0	121 - 5,700	32	32	100.0	187 - 4,240	32	32	100.0	66 - 2,520	176	176	121 - 8,200
Total	810	803	99.1	ND - 297,000	850	842	99.1	ND - 920,000	821	815	99.3	ND - 528,000	4,169	4,129	ND - 920,000



Yamagata Prefecture, where only a small number of samples were collected, was omitted.

Figure 4.2-2 Detection of radioactive cesium in lake sediment samples (changes)

Table 4.2-3(1) Detection of radioactive cesium in coastal area sediment samples (from FY2011 to FY2013)

Prefecture	FY2011				FY2012				FY2013			
	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)
Iwate	3	0	0.0	ND	4	2	50.0	ND - 39	4	2	50.0	ND - 46
Miyagi	52	34	65.4	ND - 830	48	38	79.2	ND - 1,530	51	47	92.2	ND - 2,040
Fukushima	80	77	96.3	ND - 1,240	97	93	95.9	ND - 1,110	150	145	96.7	ND - 1,600
Ibaraki	28	27	96.4	ND - 230	31	17	54.8	ND - 69	20	11	55.0	ND - 67
Chiba	0	0	-	-	31	20	64.5	ND - 134	23	14	60.9	ND - 54
Tokyo	0	0	-	-	19	17	89.5	ND - 780	18	18	100.0	12 - 780
Total	163	138	84.7	ND - 1,240	230	187	81.3	ND - 1,530	266	237	89.1	ND - 2,040

Table 4.2-3(2) Detection of radioactive cesium in coastal area sediment samples (from FY2014 to FY2016)

Prefecture	FY2014				FY2015				FY2016				Total		
	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)	Number of samples	Detection times	Range of measured values (Bq/kg)
Iwate	4	2	50.0	ND - 16	4	1	25.0	ND - 10	4	1	25.0	ND - 12	23	8	ND - 46
Miyagi	52	42	80.8	ND - 1,090	52	41	78.8	ND - 910	52	38	73.1	ND - 710	307	240	ND - 2,040
Fukushima	150	139	92.7	ND - 830	150	140	93.3	ND - 2,950	150	136	90.7	ND - 780	777	730	ND - 2,950
Ibaraki	20	11	55.0	ND - 67	20	8	40.0	ND - 178	20	6	30.0	ND - 49	139	80	ND - 230
Chiba	23	14	60.9	ND - 21	23	11	47.8	ND - 315	23	11	47.8	ND - 71	123	70	ND - 315
Tokyo	18	17	94.4	ND - 630	18	18	100.0	83 - 410	18	18	100.0	81 - 304	91	88	ND - 780
Total	267	225	84.3	ND - 1,090	267	219	82.0	ND - 2,950	267	210	78.7	ND - 780	1,460	1,216	ND - 2,950

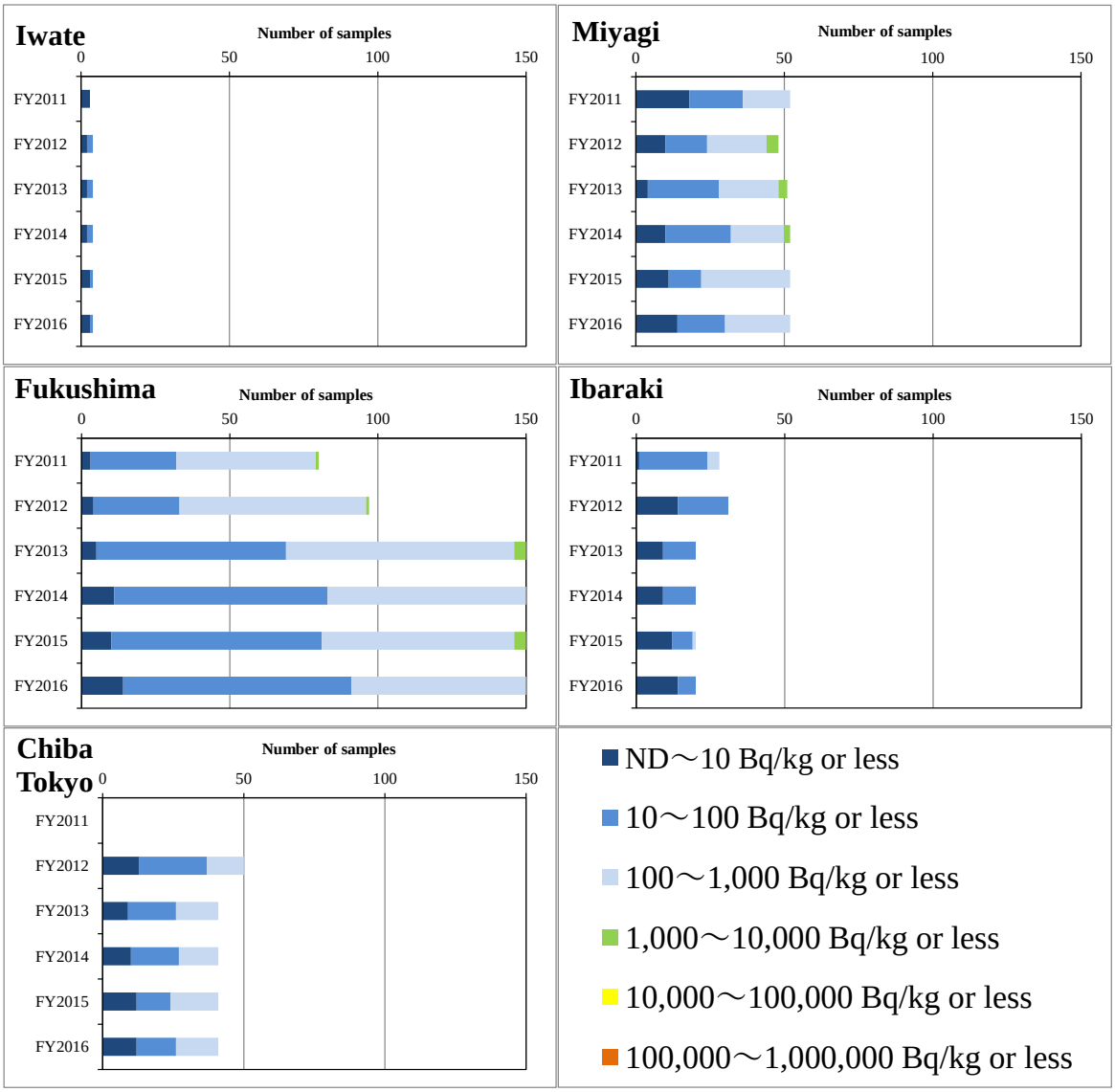


Figure 4.2-3 Detection of radioactive cesium in coastal area sediment samples (Changes)

4.3 Detection of radioactive materials in sediments by location

(1) Evaluation policy

Circumstances where radioactive materials were detected were compiled in further detail by sampling location, while separately considering the property such as rivers, lakes and coastal areas.

Circumstances for each location were statistically analyzed from the following two perspectives by using all available data for each location. Locations where the survey was completed in a single fiscal year and Yamagata Prefecture, where the survey has not been conducted since 2012, were excluded from the evaluation.

1) Relative detected concentration levels

i. Obtain the average value for each location in FY2016 by using all survey results concerning concentrations of radioactive cesium (the total of Cs-134 and Cs-137) (arithmetic average calculated by assuming ND (not detectable) to be zero; hereinafter referred to as the "average for each location").

ii. Arrange all such averages for each location (separately for samples from rivers, lakes, and coastal areas) in descending order and set the following five categories depending on upper percentile ranges (see Figure 4.3-1).

- Category A: Upper 5 percentile of the entirety
- Category B: Upper 5 to 10 percentile of the entirety
- Category C: Upper 10 to 25 percentile of the entirety
- Category D: Upper 25 to 50 percentile of the entirety
- Category E: Upper 50 to 100 percentile of the entirety (lower 50 percentile)

(Incidentally, a comparison between the average and the maximum value for each location for FY2016 revealed a good correlation (see right below of Figure 4.3-1). Therefore, considering that the evaluation of the average for each location covers that of large detected values (maximum values) that emerge occasionally, the evaluation was conducted by using only the average for each location.)

2) Changes in detected values

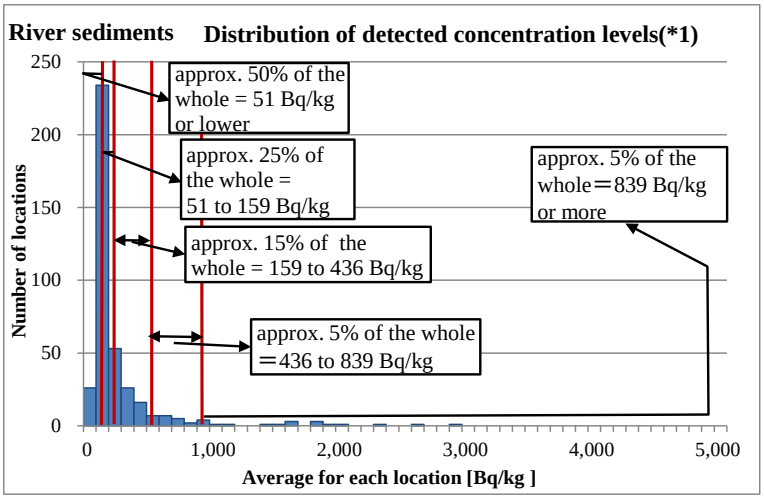
i. Changes in detected values were categorized based on the following policy in order to evaluate their changes over the years.

(i) Based on graphs showing changes in detected values of each location over the years, those negatively sloped are set as "decreasing" and those positively sloped are set as "increasing" respectively by eye measurement.

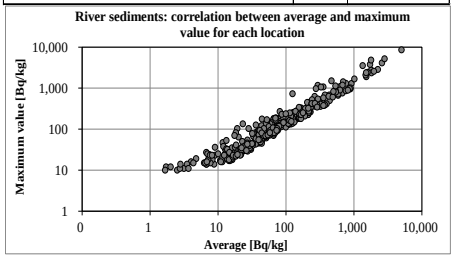
(ii) When eye measurement is difficult, a regression analysis is conducted to check the trend. Specifically, when the lower and upper 95% of the slope are both negative, it is judged as "decreasing," and when the lower and upper 95% of the slope are both positive, it is judged as "increasing."

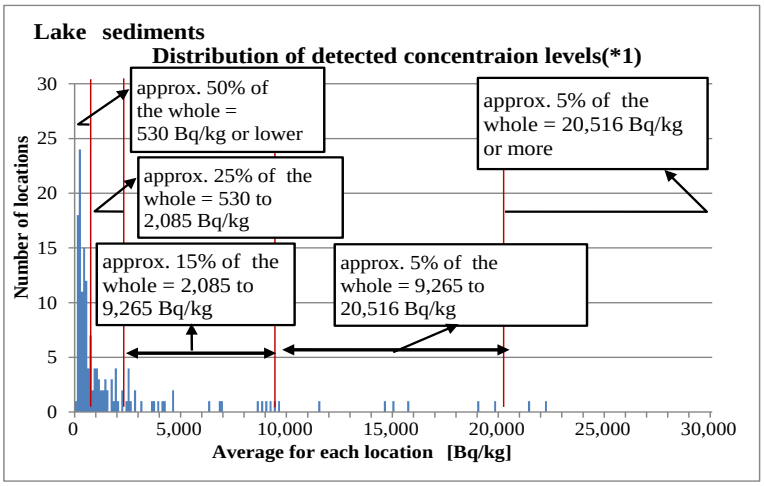
(iii) When increasing or decreasing tendencies are unclear (either the lower or upper limit of 95% of the slope is negative or the other is positive), a coefficient of variation of 0.5 was used as a reference. When the coefficient of variation is less than 0.5, it is judged as "unchanged," and when the coefficient of variation is 0.5 or higher, it is judged as "fluctuations."

ii. However, data may show fluctuations, depending on minor differences in sampling locations or properties of the samples, and it is considered to be too early to make judgments on changes in detected values at this point in time. Even if a certain location is categorized as an “increasing trend” based on the abovementioned policy, whether or not the trend is increasing in a particular location requires further continuous collection of data in order to make an informed judgment.

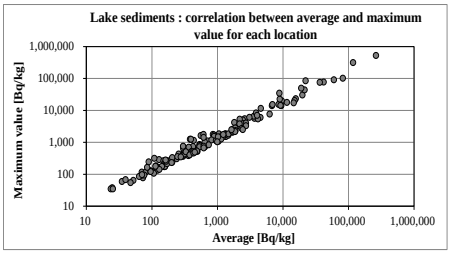


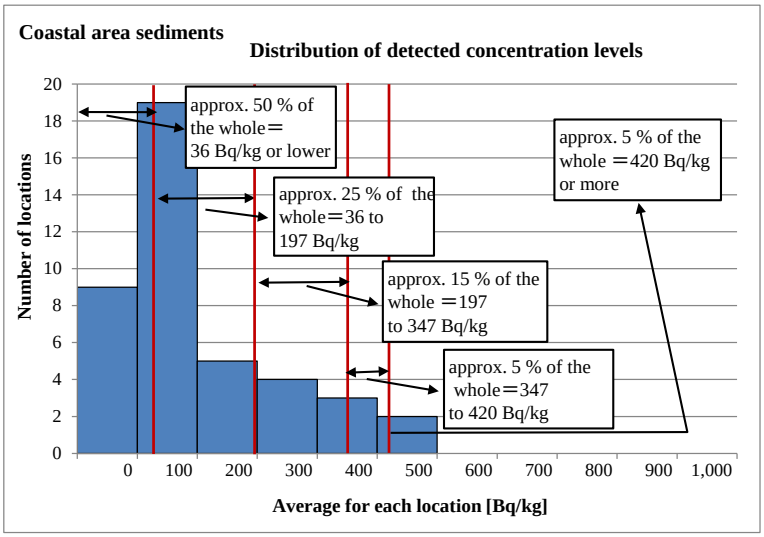
Category	Percentile	Range [River sediments] [Bq/kg (dry)]	Number of locations	Same as on the left. [%]
A	Upper 5 percentile	839 or more	19	4.8
B	Upper 5 to 10 percentile	436 ~ 839	20	5.1
C	Upper 10 to 25 percentile	159 ~ 436	61	15.4
D	Upper 25 to 50 percentile	51 ~ 159	98	24.7
E	Lower 50 percentile	51 or less	198	50.0
Total			396	100.0





Category	Percentile	Range [Lake sediments] [Bq/kg (dry)]	Number of locations	Same as on the left. [%]
A	Upper 5 percentile	20,516 or more	8	4.9
B	Upper 5 to 10 percentile	9,265 ~ 20,516	8	4.9
C	Upper 10 to 25 percentile	2,085 ~ 9,265	25	15.2
D	Upper 25 to 50 percentile	530 ~ 2,085	41	25.0
E	Lower 50 percentile	530 or less	82	50.0
Total			164	100.0





Category	Percentile	Range [Coastal area sediments] [Bq/kg (dry)]	Number of locations	Same as on the left. [%]
A	Upper 5 percentile	420 or more	2	4.8
B	Upper 5 to 10 percentile	347 ~ 420	2	4.8
C	Upper 10 to 25 percentile	197 ~ 347	6	14.3
D	Upper 25 to 50 percentile	36 ~ 197	11	26.2
E	Lower 50 percentile	36 or less	21	50.0
Total			42	100.0

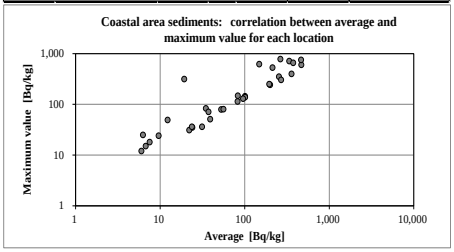


Figure 4.3-1 Categories based on the average for each location
(left: picture showing means of categorization; upper right: results of categorization[9]; lower right: correlation between average and maximum value for each location)

*1: locations where the maximum value on the horizontal axis is exceeded are not shown.

[9]Method of setting categorization boundary value: The boundary value of adjacent categories is the average value of the minimum value of the upper categorization and the maximum value of the lower categorization.

(2) Concentration levels in sediment samples from rivers, lakes, and coastal areas and their changes by prefecture

(2)-1 Rivers

1) Iwate Prefecture

In Iwate Prefecture, surveys were conducted 11 to 21 times from December 2011 to February 2017 for river sediment samples collected at 22 locations (this analysis excludes the survey results from one location where the survey was conducted only in 2011).

Regarding the concentration levels of detected values, three locations were categorized into Category D and 19 locations were categorized into Category E (see Table 4.3-1 and Table 4.3-2).

Concentration levels were generally decreasing at 19 locations and were fluctuating at three locations.

Table 4.3-1 Categorization of detected values at respective locations (Iwate Prefecture: river sediments)

Category	Percentile (percentile in all detected values)	Number of locations	Locations
A	Upper 5 percentile	0	(None)
B	Upper 5 to 10 percentile	0	(None)
C	Upper 10 to 25 percentile	0	(None)
D	Upper 25 to 50 percentile	3	No. 4, No. 16, No. 22
E	Lower than upper 25 to 50 percentile (lower 50%)	19	No. 1, No. 2, No. 3, No. 5, No. 6, No. 7, No. 8, No. 9, No. 10, No. 11, No. 12, No. 13, No. 14, No. 15, No. 17, No. 18, No. 19, No. 20, No. 21

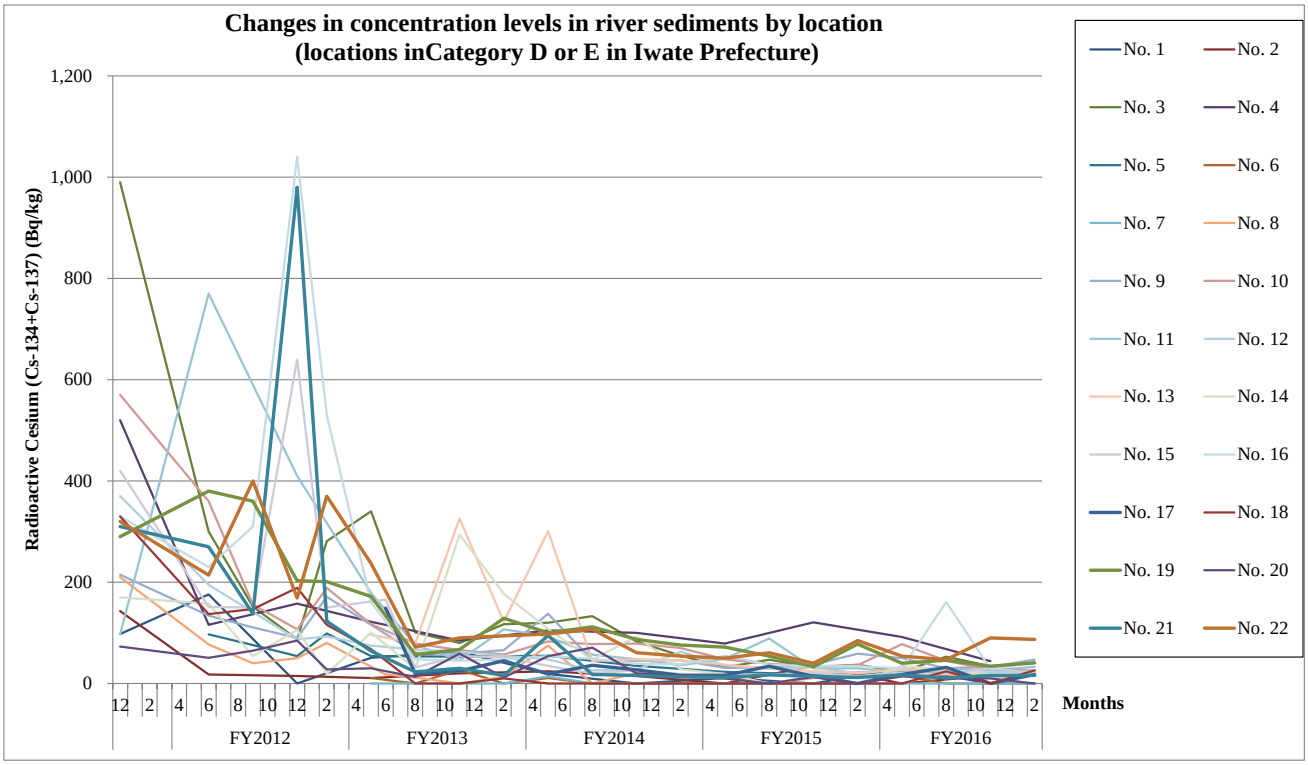


Figure 4.3-2 Changes in concentration levels over the years at respective locations (Iwate Prefecture: river sediments)

Table 4.3-2 Detection of radioactive cesium at respective locations (Iwate Prefecture: river sediments) (1)

No.		Water area	Location	Municipality	River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																			
					FY2011								FY2012											
					8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1		Sakari River Lower Reaches	Sano Bridge	Ofunato City					98						176						0			
2		Kesen River	Aneha Bridge	Rikuzentakada City					143						18						15			
3		Okawa River	Prefectural border with Miyagi	Ichinoseki City					990						300			152			87		281	
4		Tsuyagawa River	Chiyogahara Bridge	Ichinoseki City					520						116						158			
5	Kitakami River System	Kurosawa River	Kawarada Bridge	Kanegasaki Town											97			76			54		99	
6		Isawa River	Oago Bridge	Oshu City																				
7			Saijin Bridge	Oshu City																				
8		Kitakami River	Fuji Bridge	Oshu City					210						77			40			50		80	
9		Shiratori River	Shiratori Bridge	Oshu City					215						134			111			90		171	
10		Koromo River	Koromogawa Bridge	Hiraizumi Town					570						360			156			107		189	
11		Ota River	Hitosuji Bridge	Hiraizumi Town					97						770						410			
12		Iwai River Middle Reaches	Kamino Bridge	Ichinoseki City					370						195			141			87		93	
13		Iwai River Lower Reaches	Kozenji Bridge	Ichinoseki City																				
14		Kitakami River	Chitose Bridge(Kozenji)	Ichinoseki City					170						158			54			106		19	
15		Sokei River	Unada Bridge	Ichinoseki City					420						151			150			640		150	
16		Sarusawa River	Kannon Bridge	Ichinoseki City					330						230			310			1,040		530	
17		Satetsu River	Oide Bridge	Ichinoseki City																				
18			Kanzaki Bridge	Ichinoseki City					330						137			147			189		116	
19		Senmaya River Upper Reaches	Miyata Bridge	Ichinoseki City					290						380			360			203		201	
20		Kitakami River	Kitakamigawa Bridge	Ichinoseki City					73						51			65			85		28	
21		Kinomi River	Higuchi Bridge	Ichinoseki City					310						270			138			980		123	
22		Kinryu River	Tenjin Bridge	Ichinoseki City					320						214			400			169		370	
					Total number of samples		401		Detection times		346													

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

No.		Water area	Location	Municipality	River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																					
					FY2013												FY2014											
					4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1		Sakari River Lower Reaches	Sano Bridge	Ofunato City		51						63						19						0				
2		Kesen River	Aneha Bridge	Rikuzentakada City		11						20						24						15				
3		Okawa River	Prefectural border with Miyagi	Ichinoseki City		340			101			80			117			120			133			83			55	
4		Tsuyagawa River	Chiyogahara Bridge	Ichinoseki City		122						85						105						100				
5	Kitakami River System	Kurosawa River	Kawarada Bridge	Kanegasaki Town		54						53						55						35				
6		Isawa River	Oago Bridge	Oshu City		11			0			27			0			11			0			0			0	
7			Saijin Bridge	Oshu City		0			0			0			0			14			0			0			0	
8		Kitakami River	Fuji Bridge	Oshu City			18		12			0			13			75			0			21			13	
9		Shiratori River	Shiratori Bridge	Oshu City			98		61			59			66			138			46			45			46	
10		Koromo River	Koromogawa Bridge	Hiraizumi Town		117			79			66			57			83			78			79			70	
11		Ota River	Hitosuji Bridge	Hiraizumi Town		179			76			46			107			93			57			48			36	
12		Iwai River Middle Reaches	Kamino Bridge	Ichinoseki City		75			67			63			55			48			26			27			63	
13		Iwai River Lower Reaches	Kozenji Bridge	Ichinoseki City		96			80			326			122			301			45			48			46	
14		Kitakami River	Chitose Bridge(Kozenji)	Ichinoseki City		101			29			294			177			108			47			93			28	
15		Sokei River	Unada Bridge	Ichinoseki City			166		32			54			52			35			20			26			19	
16		Sarusawa River	Kannon Bridge	Ichinoseki City		160			48			45			48			54			49			39			38	
17		Satetsu River	Oide Bridge	Ichinoseki City			149		19			25			45			19			36			27			16	
18			Kanzaki Bridge	Ichinoseki City		68			0			0			10			0			0			0			0	
19		Senmaya River Upper Reaches	Miyata Bridge	Ichinoseki City		172			57			67			129			100			112			87			76	
20		Kitakami River	Kitakamigawa Bridge	Ichinoseki City		30			13			59			12			54			71			20			16	
21		Kinomi River	Higuchi Bridge	Ichinoseki City		64			23			30			16			95			18			16			13	
22		Kinryu River	Tenjin Bridge	Ichinoseki City		237			72			90			94			98			107			61			54	

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

Table 4.3-2 Detection of radioactive cesium at respective locations

(Iwate Prefecture: river sediments) (2)

Location				River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																								Average of FY2016 (*2)	No.	Coefficient of variation	Trends (*3)
No.	Water area	Location	Municipality	FY2015												FY2016												Changes				
				4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3					
1	Sakari River Lower Reaches	Sano Bridge	Ofunato City		11						0						30						0						15	1	1.35	
2	Kesen River	Aneha Bridge	Rikuzentakada City		0						35						0						16						8.0	2	1.47	
3	Okawa River	Prefectural border with Miyagi	Ichinoseki City		32			47			32			37			23			53			34			41			38	3	1.43	
4	Tsuyagawa River	Chiyogahara Bridge	Ichinoseki City		79						121						92						44						68	4	0.92	
5	Kurosawa River	Kawarada Bridge	Kanegasaki Town		23						18						25						17						21	5	0.57	
6	Isawa River	Oago Bridge	Oshu City		0			0			0			0			16			0			0			0			4.0	6	1.97	
7		Saijin Bridge	Oshu City		0			0			0			0			0			0			0			0			0	7	4.00	
8	Kitakami River	Fuji Bridge	Oshu City		10			0			11			13			18			18			13			16			16	8	1.41	
9	Shiratori River	Shiratori Bridge	Oshu City		31			32			37			59			50			30			33			47			40	9	0.67	
10	Koromo River	Koromogawa Bridge	Hiraizumi Town		48			39			34			36			78			45			27			26			44	10	1.15	
11	Ota River	Hitosuji Bridge	Hiraizumi Town		49			89			30			30			21			29			26			33			27	11	1.55	
12	Iwai River Middle Reaches	Kamino Bridge	Ichinoseki City		36			29			32			20			30			22			22			24			25	12	1.11	
13	Iwai River Lower Reaches	Kozenji Bridge	Ichinoseki City		37			30			24			21			27			28			12			23			23	13	1.22	
14	Kitakami River	Chitose Bridge(Kozenji)	Ichinoseki City		19			0			14			0			35			27			18			18			25	14	1.05	
15	Sokei River	Unada Bridge	Ichinoseki City		18			18			21			15			22			19			30			21			23	15	1.58	
16	Sarusawa River	Kannon Bridge	Ichinoseki City		55			37			34			34			30			161			29			42			66	16	1.52	
17	Satetsu River	Oide Bridge	Ichinoseki City		16			34			14			0			18			32			0			18			17	17	1.17	
18		Kanzaki Bridge	Ichinoseki City		0			0			0			0			0			24			0			26			13	18	1.75	
19	Senmaya River Upper Reaches	Miyata Bridge	Ichinoseki City		72			54			33			78			40			46			34			41			40	19	0.84	
20	Kitakami River	Kitakamigawa Bridge	Ichinoseki City		10			0			13			0			14			11			10			0			8.8	20	0.90	
21	Kinomi River	Higuchi Bridge	Ichinoseki City		12			17			14			12			17			11			16			16			15	21	2.07	
22	Kinryu River	Tenjin Bridge	Ichinoseki City		50			61			40			85			54			47			90			87			70	22	0.83	

Kitakami River System

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

A	B	C	D	E

27 Average

*2: Arithmetic Average; calculated by assuming ND=0; Color codes show categories (see the right).

*3: Results of the analysis of trends at respective locations using the method explained on 4.3(1) 2) Decreasing Increasing Unchanged Fluctuations

2) Miyagi Prefecture

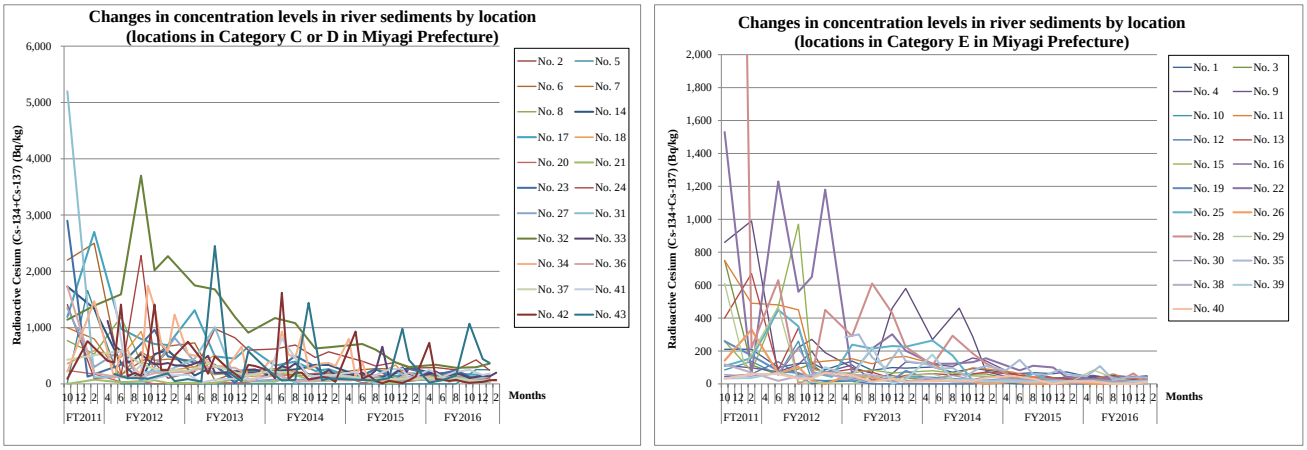
In Miyagi Prefecture, surveys were conducted 20 to 53 times from October 2011 to February 2017 for river sediment samples collected at 43 locations (this analysis excludes the survey results from 37 locations where the survey was conducted only in 2011).

Regarding the concentration levels of detected values, five locations were categorized into Category C, 17 locations into Category D, and 21 locations into Category E (see Table 4.3-3 and Table 4.3-4).

Concentration levels were generally decreasing at 35 locations and were fluctuating at eight locations.

Table 4.3-3 Categorization of detected values at respective locations (Miyagi Prefecture: river sediments)

Category	Percentile (percentile in all detected values)	Number of locations	Locations
A	Upper 5 percentile	0	(None)
B	Upper 5 to 10 percentile	0	(None)
C	Upper 10 to 25 percentile	5	No. 24, No. 32, No. 33, No. 41, No. 43
D	Upper 25 to 50 percentile	17	No. 2, No. 5, No. 6, No. 7, No. 8, No. 14, No. 17, No. 18, No. 20, No. 21, No. 23, No. 27, No. 31, No. 34, No. 36, No. 37, No. 42
E	Lower than upper 25 to 50 percentile (lower 50%)	21	No. 1, No. 3, No. 4, No. 9, No. 10, No. 11, No. 12, No. 13, No. 15, No. 16, No. 19, No. 22, No. 25, No. 26, No. 28, No. 29, No. 30, No. 35, No. 38, No. 39, No. 40



Notes: 1) For locations where surveys were conducted multiple times in one month, their average value is used in the figures.

2) Scales of the vertical axes differ in the left and right figures.

Figure 4.3-3 Changes in concentration levels over the years at respective locations (Miyagi Prefecture: river sediments)

Table 4.3-4 Detection of radioactive cesium at respective locations (Miyagi Prefecture: river sediments) (No.1)

Location					River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																						
No.	Water area		Location	Municipality	FY2011							FY2012															
					8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Shishiori River		Kinzan Bridge	Kesennuma City			210				211				100			124		128		86		
2			Namiita Bridge				1,220				810				189			165		370		262		
3	Okawa River		Tateyama-ohashi Bridge				750				115				56			91		121		56		
4			Kamiyama Bridge				860				990				59			222		271		190		
5			Okawa River Estuary				23			1,660					0			0		0		0		
6	Omose River		Ozaki Bridge				2,200				2,500				159			400		510		670		
7	Kitakami River System	Arima River	Unanda Bridge	Kurihara City			1,000				800				146			570		420		440		
8		Kinryu River	Obata Bridge				770				530				1,190			380		340		570		
9		Kitakami River	Tome-ohashi Bridge (Tome)				113				98				74			118		199		71		
10		Hasama River Area	Sanhasama River				85				137				55			260		24		20		
11			Nihasama River				750				490				480			450		131				
12			Hasama River				44				60				135			56		0		14		
13							400				670				84			340		104		65		
14			Yamayoshida Bridge	Tome City			1,730				1,340				370			69		530		600		
15		Eai River Area	Eai River	Osaki City			260				77				470			970		89			66	
16							141				330				63			104		18		0		
17			In Furukawa District,Osaki City				1,190				2,700				980			800		710		690		
18			Dekigawa River	Misato Town			360				590				470			930		195		233		
19			Eai River	Wakuya Town /Ishinomaki Town			260				172				79			66		37		73		
20		Kyu-Kitakami River		Ishinomaki City			240				175				36			49		0		10		
21	Naruse River		Onobashi Bridge (Ono)	Higashi-Matsushima City			0				74				28			41		65		17		
22	Sunaoshi River		Tagajozeki Weir	Tagajo City			1,530				62				1,230			560		650		1,180		
23			Nenbutsu Bridge				2,900			129					340			710		960		490		
24	Teizan-unga Canal (Kyu-sunaoshi River)		Teizan Bridge	Shiogama City/Shichigahama Town/Tagajo City			1,410				95				141			2,280		380		101		
25	Nanakita River System	Nanakita River	Nanakita Bridge	Sendai City			109				157				450			350		71			43	
26			Fukuda-ohashi Bridge				10				60				14			60		17			17	
27		Umeda River	Fukuda Bridge				1,350				300				600			53		300			820	
28		Nanakita River	Takasago Bridge				11,100				220				630			0		42		450		
29	Natori River System	Natori River	Yuriage-ohashi Bridge	Sendai City /Natori City			610			108					470			14						
30		Masuda River	Yakushi Bridge	Natori City			56				47				68			220		73				
31			Koyama Bridge				5,200				116				124			202		221		236		
32			Bishamon Bridge				1,140				1,390				1,590			3,700		2,020		2,270		
33	Abukuma River System	Abukuma River	Hadeniwa Bridge	Marumori Town									1,120	690	580	380	430	530	520 330	350	350	370	330	
34			Marumori Bridge	Marumori Town			220				1,470		570	101	560	610	280	162	3,400 90	1,360	710	580	1,230	
35			Higashine Bridge	Kakuda City																				
36		Shiroishi River Aarea	Shiroishi River	Shiroishi City			1,730				191				116			123		190				
37			Saikawa River	Shiroishi City			430								590			350		270				
38			Matsukawa River	Zao Town			119								19			47		54		66		
39			Arakawa River	Murata Town/Ogawara Town			33				36				68			38		32		101		
40			Shiroishi River	Shibata Town			32				61				60			32		31		68		
41		Abukuma River	Tsukinoki-ohashi Bridge	Kakuda City/Shibata Town										2,470 540		88		340	63			154	152	
42			Abukuma-ohashi Bridge (Iwanuma)	Iwanuma City/Watari Town			91			760			410	380	1,410	136	196	143	730 300	1,410	243	247	500	
43			Abukuma River Estuary (Watariohashi Bridge)	Iwanuma City/Watari Town										103 249		104		102	91			187	49	
					Total number of samples		1,048	Detection times		976														

*1: Blank cells are locations where samples were not collected. The resuk "Not detectable" is indicated as "0."

Table 4.3-4 Detection of radioactive cesium at respective locations (Miyagi Prefecture: river sediments) (No.2)

Location					River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																								
No.	Water area		Location	Municipality	FY2013												FY2014												
					4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Shishiori River		Kinzan Bridge	Kesennuma City		139			83			99		96				103			71			93		85		
2			Namiita Bridge			245			28			186		268				300			150			231		265		
3	Okawa River		Tateyama-ohashi Bridge			39			43			51		35				33			54			60		61		
4			Kamiyama Bridge			99			65			460		580				269				460		288		76		
5			Okawa River Estuary			0			0			0		0				0			0			0		0		
6	Omose River		Ozaki Bridge			730			64			194		63				158			158			185		182		
7	Kitakami River System	Arima River	Unanda Bridge	Kurihara City		420			173			229		210				225			152			145		131		
8		Kinryu River	Obata Bridge			289			165			196		221				271			250			304		184		
9		Kitakami River	Tome-ohashi Bridge (Tome)			115			22			63		133				119			106			158		139		
10		Hasama River Area / Sanhasama River	Doman Bridge (Kurikoma Dam)			25			13			38		45				40			33			26		22		
11		Nihasama River	Kajiya Bridge			153			123			161		167				124			54			98		91		
12		Hasama River	Hanayama Dam, inflow area			17			0			0		0				0			0			0		10		
13			Wakayanagi			90			71			33		52				62			55			61		72		
14			Yamayoshida Bridge	Tome City		150			327			68		197				225			258			339		337		
15		Eai River Area / Eai River	Todoroki Bridge (Todoroki)	Osaki City		67			85			66						80			67			49		46		
16			Shimizu Komon Lock			59			37			17		17				16			18			11		0		
17		In Furukawa District,Osaki City	Shinborisaihon, entrance			1,310			490			450		660				324			398			229		265		
18		Dekigawa River	Kogota Bridge	Misato Town		305			510			134		133				153			232			95		101		
19		Eai River	Oikawa Bridge (Tandai)	Wakuya Town /Ishinomaki Town		56			41			21		79				20			19			13		18		
20		Kyu-Kitakami River	Kadonowaki	Ishinomaki City		0			27			18		26				221			171			184		212		
21	Naruse River		Onobashi Bridge (Ono)	Higashi-Matsushima City		19			19			82		44				40			153			53		54		
22	Sunaoshi River		Tagajozeki Weir	Tagajo City		61			215			302		202				122			123			132		156		
23			Nenbutsu Bridge			380			340			17		255				225			500			307		87		
24	Teizan-unga Canal (Kyu-sunaoshi River)		Teizan Bridge	Shiogama City/Shichigahama Town/Tagajo City		218			980			820		600				620			690			470		570		
25	Nanakita River System	Nanakita River	Nanakita Bridge	Sendai City		238			215			230		226				264			173			20		18		
26			Fukuda-ohashi Bridge			13			12			16		13				18			22			16		0		
27		Umeda River	Fukuda Bridge			390			186			233		47				76			71			84		124		
28		Nanakita River	Takasago Bridge			291			610			430		225				114			293			185		124		
29	Natori River System	Natori River	Yuriage-ohashi Bridge	Sendai City /Natori City		0			52			11		47				61			26			23		18		
30		Masuda River	Yakushi Bridge	Natori City		35		23				17		20				28			52			27		43		
31			Koyama Bridge			450			1,010			81		168				208			21			112		74		
32			Bishamon Bridge			1,750			1,680			1,190		910				1,170			1,080			630		650		
33	Abukuma River System	Abukuma River	Hadeniwa Bridge	Marumori Town	320		310	500	196		203		236	247	259		153	236	312	280	363	272	157		165	251	155	
34			Marumori Bridge	Marumori Town	530		700	253	390	320		312		660	59	75		380	420	930	520	470	890	262		364	373	318	
35			Higashine Bridge	Kakuda City	283		301			161		96		212	138			122		91		98		46		98	108		
36		Shiroishi River Aarea / Shiroishi River	Before the confluence with Kawaragosawa River (Sunaoshi Bridge)	Shiroishi City	218			302				286		165				212				45			46		71		
37		Saikawa River	Etsubo Bridge	Shiroishi City	234			360				206		146				225				188			137		153		
38		Matsukawa River	Miya-ohashi Bridge	Zao Town	31			58				39		10				39				13			15		14		
39		Arakawa River	Niragami Bridge	Murata Town/Ogawara Town		47			222			0		27					178			26			26		14		
40		Shiroishi River	Shirahata Bridge	Shibata Town		52			12			31		12					19			20			16		37		
41		Abukuma River	Tsukinoki-ohashi Bridge	Kakuda City/Shibata Town	166		24		74		88		94	84			123		810		463		137		145	143		
42			Abukuma-ohashi Bridge (Iwanuma)	Iwanuma City/Watari Town	750		231	650	181	490		270		91	338	318		240	101	1,620	82	197	200	77		123	111	37	
43			Abukuma River Estuary (Watariohashi Bridge)	Iwanuma City/Watari Town	85		41		2,450		209		45	580			237		60		70		1,440		65	98		

Table 4.3-4 Detection of radioactive cesium at respective locations
(Miyagi Prefecture: river sediments) (No.3)

Location					River sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																													Average of FY2016 (*2)	No.	Coefficient of variation	Trends(*3)
					FY2015												FY2016																					
No.	Water area		Location	Municipality	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	Changes										
1	Shishiori River		Kinzan Bridge	Kesennuma City		61			68			62		73				36			52			41		48				44	1	0.49	
2			Namiita Bridge			164			178			138		127				132			114			112		74				108	2	1.02	
3	Okawa River		Tateyama-ohashi Bridge			27			30			22		46				24			29			46		31				33	3	1.83	
4			Kamiyama Bridge			34			62			38		35				44			43			44		45				44	4	1.16	
5			Okawa River Estuary			0			0			0		0				0			0			255		252				127	5	3.58	
6	Omose River		Ozaki Bridge			242			273			266		111				178			127			44		179				132	6	1.48	
7	Kitakami River System	Arima River	Unanda Bridge	Kurihara City		156			146			149		45				103			139			134		125				125	7	0.88	
8		Kinryu River	Obata Bridge			188			119			125		103				129			87			114		103				108	8	0.88	
9		Kitakami River	Tome-ohashi Bridge (Tome)			60			27			31		33				52			31			28		30				35	9	0.61	
10		Hasama River Area: Sanhasama River	Doman Bridge (Kurikoma Dam)			20			27			19		22				16			16			19		13				16	10	1.26	
11		Nihasama River	Kajiya Bridge			71			44			38		26				29			61			18		43				38	11	1.15	
12		Hasama River	Hanayama Dam, inflow area				0		0			15		0				0			0			0		0				0.0	12	2.03	
13			Wakayanagi			59			36			36		26				30			24			33		34				30	13	1.42	
14			Yamayoshida Bridge	Tome City		165			89			191		288				179			217			38		34				117	14	1.18	
15		Eai River Area: Eai River	Todoroki Bridge (Todoroki)	Osaki City		37			21			26		0				15			18			12		27				18	15	1.82	
16			Shimizu Komon Lock			13			0			0		12				0			0			0		0				0	16	1.92	
17		In Furukawa District,Osaki City	Shinboriaihon, entrance			88			271			138		191				157			185			164		113				155	17	1.04	
18		Dekigawa River	Kogota Bridge	Misato Town		153			157			336		78				149			194			95		159				149	18	0.79	
19		Eai River	Oikawa Bridge (Tandai)	Wakuya Town /Ishinomaki Town		33			17			16		13				19			0			13		18				13	19	1.23	
20		Kyu-Kitakami River	Kadonowaki	Ishinomaki City			21		50			70		92				112			90			106		89				99	20	0.85	
21	Naruse River		Onohashi Bridge (Ono)	Higashi-Matsushima City		122			17			13		74				78			54			49		38				55	21	0.71	
22	Sunaoshi River		Tagajozeki Weir	Tagajo City			82		110			100		42				27			40			39		46				38	22	1.38	
23			Nonbutsu Bridge				145		264			71		267				151			246			68		51				129	23	1.49	
24	Teizan-unga Canal (Kyu-sunaoshi River)		Teizan Bridge	Shiogama City/Shichigahama Town/Tagajo City			403		319			384		283				291			251			428		241				303	24	0.91	
25	Nanakita River System	Nanakita River	Nanakita Bridge	Sendai City			26		63			13		14				0			13			0		23				9.0	25	1.04	
26			Fukuda-ohashi Bridge				0		0			0		0				0			0			0		0				0	26	1.30	
27		Umeda River	Fukuda Bridge				69		113			64		76				65			96			46		44				63	27	1.34	
28		Nanakita River	Takasago Bridge				21		30			0		0				16			0			64		0				20	28	3.46	
29	Natori River System	Natori River	Yuriage-ohashi Bridge	Sendai City /Natori City			17		14			11		0				84			37			16		10				37	29	1.98	
30		Masuda River	Yakushi Bridge	Natori City			26		35			29		21				25			22			18		19				21	30	1.02	
31			Koyama Bridge				123		0			215		125				110			118			83		135				112	31	2.62	
32			Bishamon Bridge				710		608			381		300				341			286			297		360				321	32	0.75	
33	Abukuma River System	Abukuma River	Hadeniwa Bridge	Marumori Town	176	144	199	137	238	660	113		294	177	143		177	219	140	152	184	162	103		147	134	200			162	33	0.63	
34			Marumori Bridge		800	130	384	27	84	42	69		87	113	73		130	65	109	35	91	41	39		52	75	53			69	34	1.31	
35			Higashine Bridge	Kakuda City	83		146		60		55		87	58			47		108		23		40		40	37				49	35	0.69	
36		Shiroishi River Aarea: Shiroishi River	Before the confluence with Kawaragosawa River (Sunaoshi Bridge)	Shiroishi City	61			97				67		198			48			71				67		43				57	36	1.73	
37		Saikawa River	Etsubo Bridge	Shiroishi City	136			80				89		102			92			116				51		45				76	37	0.70	
38		Matsukawa River	Miya-ohashi Bridge	Zao Town	28			19				15		11			15			10				0		0				6.3	38	0.94	
39		Arakawa River	Niragami Bridge	Murata Town/Ogawara Town		16			12			15		17				18			0			14		16				12	39	1.28	
40		Shiroishi River	Shirahata Bridge	Shibata Town		48			31			0		14				13			0			0		14				6.8	40	0.74	
41		Abukuma River	Tsukinoki-ohashi Bridge	Kakuda City/Shibata Town		214	105		149		261		273	76			252		128		220		248		157	184				198	41	1.61	
42			Abukuma-ohashi Bridge (Iwanuma)	Iwanuma City/Watari Town		0 1,860	85	151	53	10	54		17	64	134		730	85	75	52	73	41	19		36	64	71			125	42	1.33	
43			Abukuma River Estuary (Watariohashi Bridge)	Iwanuma City/Watari Town		75	71		60		103		980	424			23		68		150		1,070		441	373				354	43	1.59	

A	B	C	D	E

84 Average

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

*2: Arithmetic Average; calculated by assuming ND=0; Color codes show categories (see the right).

*3: Results of the analysis of trends at respective locations using the method explained on 4.3(1) 2) Decreasing Increasing Unchanged Fluctuations

3) Fukushima Prefecture

(i) Hamadori

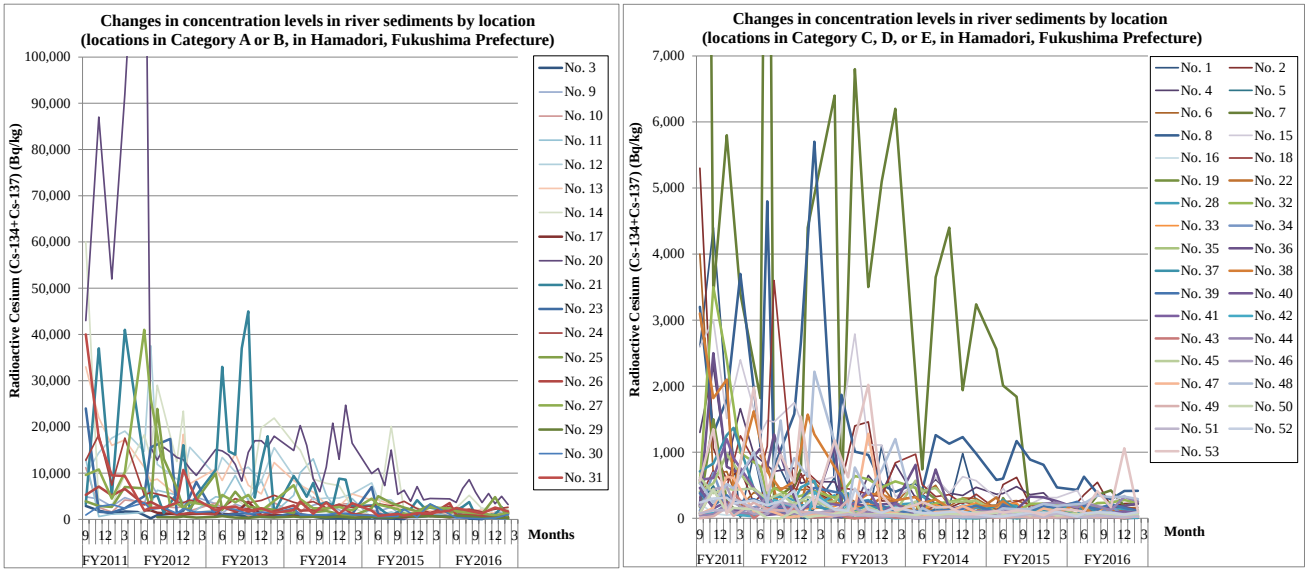
In Hamadori, Fukushima Prefecture, surveys were conducted 29 to 55 times from September 2011 to February 2017 for river sediment samples collected at 53 locations.

Regarding the concentration levels of detected values, 11 locations were categorized into Category A, seven locations into Category B, 14 locations into Category C, 11 locations into Category D, and 10 locations into Category E (see Table 4.3-5 and Table 4.3-6).

Concentration levels were generally decreasing at 49 locations, were unchanged at one location, and were fluctuating at three locations.

Table 4.3-5 Categorizations of detected values at respective locations
(Hamadori, Fukushima Prefecture: river sediments)

Category	Percentile (percentile in all detected values)	Number of locations	Locations
A	Upper 5 percentile	11	No. 3, No. 12, No. 13, No. 14, No. 20, No. 21, No. 24, No. 25, No. 26, No. 27, No. 31
B	Upper 5 to 10 percentile	7	No. 9, No. 10, No. 11, No. 17, No. 23, No. 29, No. 30
C	Upper 10 to 25 percentile	14	No. 2, No. 4, No. 6, No. 7, No. 8, No. 15, No. 18, No. 28, No. 32, No. 36, No. 39, No. 44, No. 48, No. 53
D	Upper 25 to 50 percentile	11	No. 5, No. 22, No. 33, No. 34, No. 35, No. 37, No. 38, No. 41, No. 45, No. 50, No. 52
E	Lower than upper 25 to 50 percentile (lower 50%)	10	No. 1, No. 16, No. 19, No. 40, No. 42, No. 43, No. 46, No. 47, No. 49, No. 51



Notes: 1) For locations where surveys were conducted multiple times in one month, their average value is used in the figures.

2) Scales of the vertical axes differ in the left and right figures.

Figure 4.3-4 Changes in concentration levels over the years at respective locations
(Hamadori, Fukushima Prefecture: river sediments)

Table 4.3-6 Detection of radioactive cesium at respective locations (Hamadori, Fukushima Prefecture: river sediments) (No.1)

Location				River sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																					
No.	Water area	Location	Municipality	FY2011								FY2012													
				8	9	10	11	12	1	2	3	4	5	6	7		8	9	10	11	12		1	2	3
1	Jizogawa River	Hamahata Bridge	Shinchi Town		2,600		4,400		1,790		18		980		54		940			320	0		0		
2	Koizumi River	Koizumi Bridge	Soma City		5,300		1,060		580		740		231		460		142			470	680		480		
3		Hyakken Bridge			2,900		1,880		1,280		1,700		1,570		240		920			1,350	1,070		1,330		
4	Udagawa River	Horisaka Bridge			1,300		2,300		820		1,660		970		800		710			760	530		560		
5		Hyakken Bridge			240		490		155	155			109		55		143			84	23		290	0	
6	Manogawa River	Ochiai Bridge	Minamisoma City		4,000		660		710		180		390		310		460			450	430		440		
7		Majima Bridge			28,000		3,400		5,800		3,400			1,820	15,900		280			500	750		4,400		
8	Niida River	Kusano	Iitate Village		3,200		1,290		1,800		3,700			1,090	4,800		770			1,580	2,670			5,700	
9		Komiya			4,900		4,400		2,800		4,700			3,300	7,900		5,400			4,300	2,900			4,800	
10		Kidouchi Bridge	Minamisoma City		11,200		2,600		1,570		4,200			3,800	2,250	2,600	2,800			2,520	2,800		1,850		
11		Sakekawa Bridge			13,000		610		1,140		1,230			1,530	3,300	3,400	6,300			5,300	3,700		1,070		
12	Ota River	Ishiwatado Bridge			9,700		14,400		17,600		19,100			14,700	61,000	14,100	11,900			8,700	9,300		15,600		
13		Kaminouchi Bridge			33,000		22,000		16,000		17,200			11,300	8,000	8,600	8,700			5,200	18,400		7,700		
14		Masuda Bridge			60,000		2,900		2,900		9,700			18,300	3,800	22,800	29,000			12,500	23,400		1,270		
15		JR Tetsudo Bridge			2,600		3,000		1,510		2,400			1,280	1,750	1,210	1,460			1,750	1,470		510		
16		Maruyama Bridge			230		71		48		72			121	180	123	92			48	53		45		
17	Odaka River	Shimokawara Bridge												1,940	1,950		1,430			1,080	1,020		1,140		
18		Zencho Bridge			310		720		470		1,250			700	1,090		3,600			360	620		690		
19		Hatsukara Bridge			173		1,500		260		44			108	410	54	78			18	42		17		
20	Ukedo River	Murohara Bridge	Namie Town		43,000		87,000		52,000		92,000			165,000	13,400	17,800	12,800	15,600	14,600	13,400	11,600	14,200	11,000	9,500	
21		Ukedo Bridge			3,300		37,000		5,000		41,000			12,400	5,600	3,700	5,200	1,370		5,600	23,700	8,400	1,870	5,200	
22	Furumichi River	Before the confluence with Takasegawa River(Kodoshimohira,Miyakoji Town)	Tamura City											950	162	1,410		80		165	176		640		
23	Takase River	Keio Bridge	Namie Town		24,000		1,650		1,460		2,400			5,000	15,800	15,400			17,400	1,370	1,830			8,100	
24	Maeda River	National Route 6, west	Futaba Town		12,800		18,300		7,400		17,600			5,300	5,800				4,800	3,700	3,600		4,200		
25		Nakahama Bridge	Namie Town		3,900		2,900		2,700		7,000			6,700	2,900	1,310	23,900	13,100		6,800	2,260		2,310		
26	Kumagawa River	National Route 6, west	Okuma Town		5,300		7,100		5,200		6,600			3,200	3,800				1,610	1,070	1,200		1,380		
27		Mikuma Bridge			9,600		10,800		4,500		10,200			41,000	26,000				2,900	3,500	2,460		3,700		
28	Tomioka River	Nabekura Bridge	Kawauchi Village														330		310	270	470			570	242
29		Sakaigawa Bridge															490			440	710	560		400	
30		National Route 6, west	Tomioka Town		930		2,800		3,200		2,400			3,600	2,150			2,530		1,300	2,330			1,540	
31		Kobama Bridge			40,000		17,600		9,500		9,400			1,940	2,470			2,530		3,600	10,700			4,300	
32	Idegawa River	Motogama Bridge	Naraha Town		530		3,500		2,400		990			780	320		460			310	340			410	
33	Kawauchi River	Before the confluence with Kidogawa River(Futamata Bridge)	Kawauchi Village														181	290	83	194	142			149	
34	Kidogawa River	Nishiyama Bridge	Naraha Town		111		690		139		99			198	81			86		137	130			271	
35		Nagatoro Bridge			400		530		970		670			320	121		178			236	280			217	
36		Kidokawa Bridge			200		2,500		780		680			1,060	780		1,270			320	154			192	
37	Asami River	Boda Bridge	Hirono Town		710		830		1,260	1,370			450		240		230			153	200			183	
38	Ohisa River	Kageiso Bridge	Iwaki City		3,100		1,820		2,100	450			1,620		710			430		560			1,570	1,270	
39	Kohisa River	Rengo Bridge			380		184		350	240			290		202			149		127			400	460	
40	Niida River	Kasumida Bridge			460		148		250	123			156		52			68		75	92			85	
41		Matsuba Bridge			580		610		1,200	910			460		161			181		151	122			250	
42	Natsui River	Kitanouchi Bridge	Ono Town		66		76		206	61			29		155		280			172			0	400	
43		Kyudayu Bridge	Iwaki City		80		440		117	400			0		159			116		149			22	14	
44		Rokujumai Bridge			43		58		210	96			66		350			47		72			63	72	
45	Yoshima River	Iwaanatsuri Bridge			620		380		450	430			450		290			370		206			330	276	
46		Before the confluence with Natsui River			182		440		480	237			69		63			246		191	34		48		
47	Fujiwara River	Shima Bridge			64		157		630	610			102		126			55	13				46		
48		Minato-ohashi Bridge			530		239		520	450			1,000		214			1,480	580	910			630	2,220	
49	Samegawa River	Idosawa Bridge			0		30		161	36			238		134										
50		Samegawa Bridge			78		440		91	157			136		0			0		106			16	33	
51	Shitoki River	Komuro Bridge			74		121		122	300			149		103			265	78	208	48			96	
52	Binda River	Kobana Bridge			237		300		310	226			270		198			259		420	137			330	
53		Binda Bridge			570		1,350		66	260			1,980		420			960		540	1,540			156	

Total number of samples	1,863	Detection times	1,832

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

Table 4.3-6 Detection of radioactive cesium at respective locations

(Hamadori, Fukushima Prefecture: river sediments) (No.2)

Location				River sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																									
No.	Water area	Location	Municipality	FY2013												FY2014													
				4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Jizogawa River	Hamahata Bridge	Shinchi Town		620	95		151		0		1,100		24			13	361		224		170		980		245	
2	Koizumi River	Koizumi Bridge	Soma City		235	540		1,400		1,460		261		273			333	114		181		158		247		214	
3		Hyakken Bridge			1,490	1,200		1,040		510		750		840			970	500		560		209		206		194	
4	Udagawa River	Horisaka Bridge			550	370		165		650		390		820			308	390		590		382		344		470	
5		Hyakken Bridge			100	70		84		60		64		65			83	46		149		24		28		60	
6	Manogawa River	Ochiai Bridge	Minamisoma City		224	380		250		236		490		225			560	360		500		183		309		300	
7		Majima Bridge			6,400	161		6,800		3,500		5,100		6,200			2,140	740		3,650		4,400		1,940		3,240	
8	Niida River	Kusano	Iitate Village		630	1,870		1,010		960		510		400			530	420		1,260		1,130		1,230		980	
9		Komiya			3,400	1,370		3,300		2,280		1,810		2,050			1,270	1,620		3,070		3,680		2,050		990	
10		Kidouchi Bridge	Minamisoma City		3,500	2,500		3,040		760		1,560		3,600			1,320	1,270		4,800		2,240		3,360		3,350	
11		Sakekawa Bridge			4,900	4,700		9,500		4,100		8,400		1,420			5,200	10,100		13,100		5,300		1,080		4,480	
12	Ota River	Ishiwatado Bridge			9,500	13,400		10,300		11,300		8,300		15,500			9,300	7,700		4,300		4,600		4,600		5,500	
13		Kaminouchi Bridge			10,900	8,400		14,300		7,400		5,500		12,300			8,400	7,400		5,900		3,150		2,860		5,500	
14		Masuda Bridge			2,090	2,520		4,500		2,400		19,800		21,900			16,500	15,000		8,700		7,800		7,300		2,590	
15		JR Tetsudo Bridge			630	1,460		2,790		1,110		1,110		327			480	368		620		381		630		570	
16		Maruyama Bridge			53	60		84		50		16		36			27	68		46		53		21		16	
17	Odaka River	Shimokawara Bridge			1,270	890		1,310		3,800		940		860			900	1,020		760		830		790		970	
18		Zencho Bridge			307	460		430		359		325		840			970	510		329		358		220		365	
19		Hatsukara Bridge			48	19		0		71		52		20			65	443		289		133		21		0	
20	Ukedo River	Murohara Bridge	Namie Town		15,100	14,800	13,900	11,900	8,300	14,500	17,000	17,000	15,700	18,000			14,900	20,300	16,000	8,800	6,000	11,300	20,800	13,000	24,700	16,500	
21		Ukedo Bridge			10,700	33,000	14,700	14,000	37,000	45,000	4,700	12,100	18,000	1,510			9,400	7,300	4,900	7,900	3,190	3,690	3,020	8,800	8,600	2,810	
22	Furumichi River	Before the confluence with Takasegawa River(Kodoshimohira,Miyakoji Town)	Tamura City		231	220		182		171		316					111	175		95		54		80		103	
23	Takase River	Keio Bridge	Namie Town		770	860		1,140		1,370		510		520			1,370	1,100		800		660		1,110		1,140	
24	Maeda River	National Route 6, west	Futaba Town		2,500	2,510		4,500		3,600		4,100		5,200			3,690	3,350		3,860		2,510		3,210		2,560	
25		Nakahama Bridge	Namie Town		9,900	2,040		6,000		2,740		2,380		2,060			1,360	3,770		1,560		1,830		1,110		690	
26	Kumagawa River	National Route 6, west	Okuma Town		1,070	2,640		1,740		2,280		830		1,780			3,010	1,880		1,970		2,360		3,120		1,230	
27		Mikuma Bridge			2,850	5,300		3,700		5,300		1,870		4,000			7,400	4,400		2,400		2,340		2,690		1,960	
28	Tomioka River	Nabekura Bridge	Kawauchi Village		350	235		239		276		144		205			230	339		172		100		196		156	
29		Sakaigawa Bridge			550	690		400		340		580		430			600	500		570		430		610		366	
30		National Route 6, west	Tomioka Town		1,780	2,580		2,170		1,150		1,540		1,400			2,450	970		990		1,020		1,430		980	
31		Kobama Bridge			1,970	2,460		2,730		1,720		2,390		1,390			2,020	3,870		1,220		3,660		1,180		3,520	
32	Idegawa River	Motogama Bridge	Naraha Town		310	370		640		590		470		560			460	168		228		244		297		197	
33	Kawauchi River	Before the confluence with Kidogawa River(Futamata Bridge)	Kawauchi Village		177	224		154		217		170		148			182	137		208		126		171		235	
34	Kidogawa River	Nishiyama Bridge			16	38		108		111		67		49			113	78		82		100		64		62	
35		Nagatoro Bridge	Naraha Town		259	390		110		58		117		94			570	410		460		249		252		267	
36		Kidokawa Bridge			1,100	218		226		174		210		230			810	74		740		150		167		83	
37	Asami River	Boda Bridge	Hirono Town			93	380	128		187		138		169			77	124		87		95		93		93	
38	Ohisa River	Kageiso Bridge	Iwaki City			610	260	235		370		360		273			321	229		286		159		92		182	
39	Kohisa River	Rengo Bridge				380	204	243		262		191		96			112	98		113		130		144		191	
40	Niida River	Kasumida Bridge				14	57	41		100		17		47			0	0		12		29		71		56	
41		Matsuba Bridge				195	228	211		430		80		224			61	54		71		58		41		66	
42	Natsui River	Kitanouchi Bridge	Ono Town			31	219	12		42		21		0			10	0		15		29		0		0	
43		Kyudayu Bridge	Iwaki City			42	13	0		14		36		10			12	11		23		12		42		20	
44		Rokujumai Bridge				99	94	65		91		59		45			21	26		17		56		182		109	
45	Yoshima River	Iwaanatsuri Bridge				79	164	47		175		80		85			254	53		63		59		34		49	
46		Before the confluence with Natsui River				157	63	163		37		17		38			0	50		15		20		16		18	
47	Fujiwara River	Shima Bridge			38		96	144		1,280		100		78			37	22		97		102		187		92	
48		Minato-ohashi Bridge				790	139	770		369		730		1,200			41	159		54		83		20		53	
49	Samegawa River	Idosawa Bridge			68		278	41		148		48		45			19	0		26		18		70		36	
50		Samegawa Bridge			64		109	46		59		58		65			48	71		48		68		55		91	
51	Shitoki River	Komuro Bridge			40		59	52		41		48		41			14	11		12		25		21		20	
52	Binda River	Kobana Bridge			134		113	450		132		83		161			98	81		77		99		100		60	
53		Binda Bridge			1,180		620	1,210		2,020		349		117			201	246		162		174		63		64	

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

Table 4.3-6 Detection of radioactive cesium at respective locations

(Hamadori, Fukushima Prefecture: river sediments) (No.3)

Location				River sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																													Changes	Average of FY2016 (*2)	No.	Coefficient of variation	Trends(*3)
				FY2015														FY2016																				
No.	Water area	Location	Municipality	4	5	6	7	8	9	10		11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3										
1	Jizogawa River	Hamahata Bridge	Shinchi Town		75	70		181		26			20		0			0	15		0		11		0		0										
2	Koizumi River	Koizumi Bridge	Soma City		184	509		620		212			221		202			235	355		544		184		222		230										
3		Hyakken Bridge			237	301		189		77			1,840		684			1,430	1,670		170		46		1,410		1,370										
4	Udagawa River	Horisaka Bridge			364	374		480		357			385		185			178	197		187		175		191		209										
5		Hyakken Bridge			77	116		64		47			72		141			72	59		47		42		56		48										
6	Manogawa River	Ochiai Bridge	Minamisoma City		123	251		268		227	223	155	197	143	113	138		181	145			170	179		157		163										
7		Majima Bridge			2,560	2,010		1,840		86	63	67	103	169	67	84		140	85		352		422		186		250										
8	Niida River	Kusano	Iitate Village		580	600		1,170		940	1,010	720		810		467		428	630		375		288		414		415										
9		Komiya			2,010	1,760		2,610		430	266	368		362		750		417	215		1,190		730		442		1,080										
10		Kidouchi Bridge	Minamisoma City		1,900	1,530		580		440	299	297		585		1,100		780	900			485	710		372		496										
11		Sakekawa Bridge			296	820		1,610		790	800	640		790		1,320		740	860		740		585		195		103										
12	Ota River	Ishiwatado Bridge			7,900	4,280		4,230		1,080	890	1,360		1,450		1,450		1,540	1,530			1,300	2,440		1,250		1,480										
13		Kaminouchi Bridge			4,200	4,170		3,220		1,280	2,590	1,850		1,830		1,830		1,210	1,540		1,780		2,090		1,270		1,030										
14		Masuda Bridge			760	1,190		20,100		1,630	2,950	620		2,560		980		2,240	2,480		5,200		2,320		2,450		2,190										
15		JR Tetsudo Bridge			307	455		167		254	170	218		314		312		423	244			185	229		348		169										
16		Maruyama Bridge			29	23		0		75	107	63		39		12		33	31		28		45		33		25										
17	Odaka River	Shimokawara Bridge			580	990			503	540	436	511		740		750		444	605		382		473		528		493										
18		Zencho Bridge			135	185			286	167	166	158		138		169		166	236		124		187		163		136										
19		Hatsukara Bridge			31	307		0		23	36	31		13		33		20	23		44		46		0		28										
20	Ukedo River	Murohara Bridge	Namie Town		9,900	11,000	7,300	15,000	5,400	6,300			3,910	7,100	4,220	4,530		4,420	3,670	6,700	8,600	5,870	3,640	5,590	3,380	4,990	3,220										
21		Ukedo Bridge			3,030	2,660	1,520	730	1,570	2,230			2,210	4,160	2,660	2,530		1,790	1,990	2,730	3,760	810	631	830	1,060	2,640	1,040										
22	Furumichi River	Before the confluence with Takasegawa River(Kodoshimohira,Miyakoji Town)	Tamura City		317	169		199		123				32		69		142	101		154		130		110		82										
23	Takase River	Keio Bridge	Namie Town		7,000	1,100		790		1,260				550		800		600	800		740		590		281		242										
24	Maeda River	National Route 6, west	Futaba Town		2,880	3,380		2,890		3,900				2,320		1,460		2,860	1,890		2,240		1,640		2,190		2,630										
25		Nakahama Bridge	Namie Town		2,430	5,000		3,540		2,550				1,750		3,140		1,450	1,650		1,530		1,150		4,830		132										
26	Kumagawa River	National Route 6, west	Okuma Town		780	580		1,000		740				960		910		3,540	960		1,040		685		442		1,390										
27		Mikuma Bridge			4,480	3,200			2,230	1,150				1,470		2,600		2,370	1,780		1,420		1,270		880		1,370										
28	Tomioka River	Nabekura Bridge	Kawauchi Village		198	217		184		102				117		107		232	168		137		173		138		103										
29		Sakaigawa Bridge			499	462		393		700				618		690		504	830		657		303		351		341										
30		National Route 6, west	Tomioka Town		870	600			660	2,200				471		3,370		1,130	366		231		142		295		1,040										
31		Kohama Bridge			1,880	760			1,190	830				1,330		1,350		1,900	2,480		1,860		1,280		2,570		1,730										
32	Idegawa River	Motogama Bridge	Naraha Town		169	188		94		218				222		204		191	129		232		238		276		233										
33	Kawauchi River	Before the confluence with Kidogawa River(Futamata Bridge)	Kawauchi Village		162	212		231		39				68		59		77	116		144		95		47		71										
34		Nishiyama Bridge			25	42		60		50				24		57		27	90		51		185		39		28										
35	Kidogawa River	Nagatoro Bridge	Naraha Town		96	84		57		109				150		155		59	117			40	61		86		112										
36		Kidokawa Bridge			68	190		132		327				317		259		154	91			172	172		186		225										
37	Asami River	Boda Bridge	Hirono Town		191	279		139		119				134		109		50	229		75		101		23		42										
38	Ohira River	Kageiso Bridge	Iwaki City		194	257		84		93				62		58		236	142		50		75		48		45										
39	Kohisa River	Rengo Bridge			92	210		112		126				183		158		251	191		137		215		157		115										
40	Niida River	Kasumida Bridge			16	20		26		28				24		19		19	23		18		20		23		24										
41		Matsuba Bridge			61	117		72		56				82		46		52	51		74		82		103		82										
42		Kitanouchi Bridge	Ono Town		21	12		0		22				17		17		13	13		15		23		0		10										
43	Natsui River	Kyudayu Bridge	Iwaki City		15	14		17		21				14		20		16	32		29		21		0		35										
44		Rokujumai Bridge			108	154		63		152				223		235		166	231		182		122		323		255										
45	Yoshima River	Iwaanatsuri Bridge			84	66		28		69				75		78		58	77		61		82		42		79										
46		Before the confluence with Natsui River			27	26		21		25				26		113		28	22		44		38		31		27										
47	Fujiwara River	Shima Bridge			22	47		24		46				148		106		30	30		18		24		22		33										
48		Minato-ohashi Bridge			96	151		137		142				219		188		214	225		345		320		328		291										
49	Samegawa River	Idosawa Bridge			12	11		24		13				11		12		24	12		16		20		21		23										
50		Samegawa Bridge			78	58		97		42				87		40		68	35		82		60		42		61										
51	Shitoki River	Komuro Bridge			25	106		36		65				22		75		23	23		43		29		13		31										
52	Binda River	Kohana Bridge			29	29		57		85				79		98		31	76		93		85		59		93										
53		Binda Bridge			112	85		120		105				45		145		117	99		411		170		1,060		103										
																									A	B	C	D	E		581	Average			

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

*2: Arithmetic Average; calculated by assuming ND=0; Color codes show categories (see the right).

*3: Results of the analysis of trends at respective locations using the method explained on 4.3(1)2) ↘ Decreasing ↗ Increasing → Unchanged ∿ Fluctuations

(ii) Nakadori

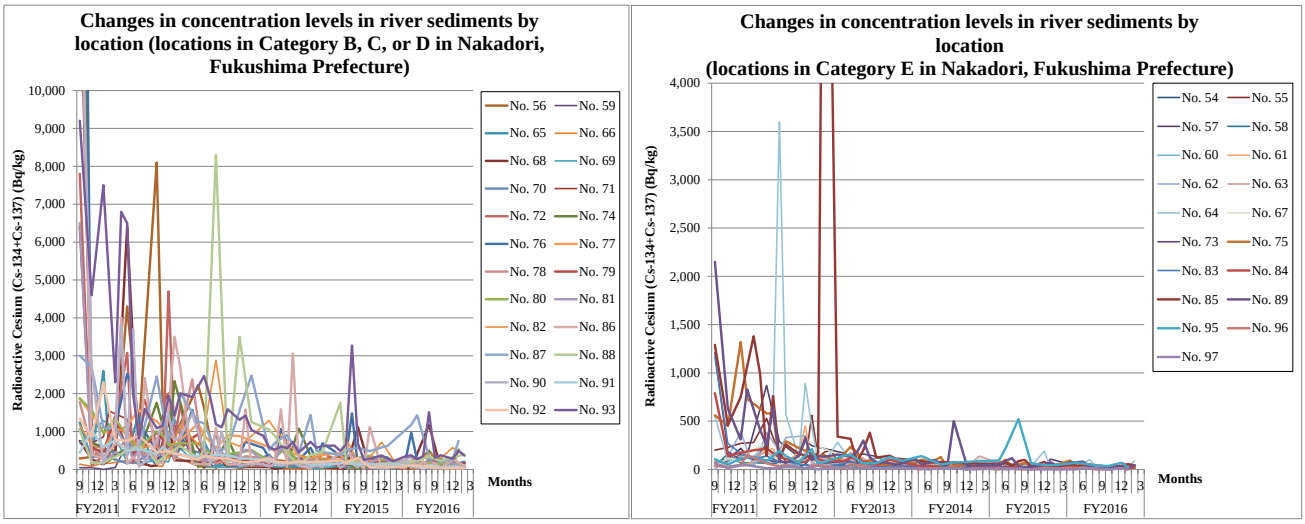
In Nakadori, Fukushima Prefecture, surveys were conducted 33 to 57 times from September 2011 to February 2017 for river sediment samples collected at 44 locations.

Regarding the concentration levels of detected values, two locations were categorized into Category B, nine locations into Category C, 14 locations into Category D, and 19 locations into Category E (see Table 4.3-7 and Table 4.3-8).

Concentration levels were generally decreasing at 42 locations and were fluctuating at two locations.

Table 4.3-7 Categorizations of detected values at respective locations
(Nakadori, Fukushima Prefecture: river sediments)

Category	Percentile (percentile in all detected values)	Number of locations	Locations
A	Upper 5 percentile	0	(None)
B	Upper 5 to 10 percentile	2	No. 87, No. 93
C	Upper 10 to 25 percentile	9	No. 59, No. 68, No. 71, No. 74, No. 76, No. 79, No. 80. , No. 82, No. 88
D	Upper 25 to 50 percentile	14	No. 56, No. 65, No. 66, No. 69, No. 70, No. 72, No. 77, No. 78, No. 81, No. 86, No. 90, No. 91, No. 92, No. 94
E	Lower than upper 25 to 50 percentile (lower 50%)	19	No. 54, No. 55, No. 57, No. 58, No. 60, No. 61, No. 62, No. 63, No. 64, No. 67, No. 73, No. 75, No. 83, No. 84, No. 85, No. 89, No. 95, No. 96, No. 97



Notes: 1) For locations where surveys were conducted multiple times in one month, their average value is used in the figures.

2) Scales of the vertical axes differ in the left and right figures.

Figure 4.3-5 Changes in concentration levels over the years at respective locations
(Nakadori, Fukushima Prefecture: river sediments)

Table 4.3-8 Detection of radioactive cesium at respective locations (Nakadori, Fukushima Prefecture: river sediments) (No.1)

Location				River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																				
No.	Water area	Location	Municipality	FY2011								FY2012												
				8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
54	Abukuma River	Habuto Bridge	Nishigo Village		66		81		155		96		262		44			31	49	144	89			
55		Tamachi-ohashi Bridge	Shirakawa City		200		228		270		280		1,010 46	330	184	56 107		60	85	560	125	180	203	
56	Yanta River	Before the confluence with Abukuma River			290		330		530		490		4,300		1,050			8,100	1,720	2,010	860			
57	Yashiro River	Yashirogawa Bridge	Tanagura Town		77		108		218	150			870		290			129	300	246				
58	Kitasu River	Yanagi Bridge	Hirata Village		27		165		66		70		64		65			14	57	19	72			
59	Imade River	Nekonaki Bridge	Ishikawa Town		45		47		0		55		680		610			105	1,450	1,150	1,180			
60	Yashiro River	Oji Bridge			35		36		51		52		145		50			55	98	100	98			
61	Abukuma River	Kawanome Bridge	Tamakawa Village		71		34		37		77		330 105	213	84	53 73		180	450	49	120 130	138		
62		Emochi Bridge	Sukagawa City		0		124		390		24		380		193	330			350	72	48			
63	Shakado River	Sukagawa City water intake point			72		97		138		126		182		77			83	168	94	108			
64		Before the confluence with Abukuma River			550		89		124		129		540 41	600	3,600	93 1,050		117	890	440	96 85	75		
65	Sasahara River	Shinbashi Bridge	Koriyama City		1,240		260		2,600	480			380		1,470		237		200	1,540	1,300			
66	Yatagawa River	Yatagawa Bridge			137		79		184	160			236		140		99		81	400	340			
67	Otakine River	Funehiki Bridge	Tamura City		27		119		87	173			270		52		96		133	120	239			
68		Before the confluence with Abukuma River	Koriyama City		750		270		134		360		6,400		215		89	108		1,340	242			
69	Ouse River	Before the confluence with Babagawa River			700		960		1,290	1,190			183		164			110 370		199	700			
70		Makunouchi Bridge			1,060		330		360	310			163		240		440	209		420	610			
71		Before the confluence with Abukuma River			13,500		690		860	1,540			2,020 640	690	610	290 189		820 330		360	290 420	550		
72	Abukuma River	Akutsu Bridge			7,800		116		350	350			6,000 148	169	1,410	269 3,400		610	400	4,700	740	2,880 520		
73	Gohyaku River	After the confluence with Ishimuro River			1,210		184		99	122			96		74			50 116		158	63			
74		Kamisekishita Bridge	Motomiya City		22,000		700		590	230			590		450			1,780 1,730		590	2,330			
75		Before the confluence with Abukuma River			560		450		1,320	730			960 201	580	89	111 470		330 114		167	137	150	99	
76	Abukuma River	Takada Bridge	Nihonmatsu City		30,000		610		600	440			3,200 1,840	2,160	1,280	720 1,260		490	268	770	250	268 970		
77	Kuchibuto River	Kuchibutogawa Bridge			1,880		1,440		990		950		1,160		1,570			1,620 920			790	780		
78	Utsushi River	Osegawa Bridge			1,780		550		330		670	610	860	640	580	234 530		610	1,260	750	250	1,130 720		
79	Mizuhara River	Getouchi Bridge	Fukushima City		6,400		570		460		1,410		520		410			980	800	450		620		
80	Megami River	Tsurumaki Bridge			1,870		1,570		950		1,340		880		550			1,010	900	650		690		
81	Abukuma River	Horai Bridge			6,500		176		171		460	370	660	290	500	242 255		340	440	530	370	330 440		
82	Nigori River	Before the confluence with Omori River			1,160		650		530		1,090		980		590			610	410	300		1,180		
83	Arakawa River	Hinokura Bridge			1,160		270		167		114		139		77	79			45	42		22		
84	Sukawa River	Sukawa Bridge			790		137		173		199		216		125			82	74	132		84		
85	Arakawa River	Before the confluence with Abukuma River			1,290		460		750		1,380	990	142	760	119	280 237		161	145	117	119 220	9,500		
86	Matsukawa River				15,200		400		280		690	4,000	144	330	175	920 3,900		145	173	1,560	3,500	1,070 4,300		
87	Hattanda River	Hattanda Bridge			3,000		2,700		1,100		1,090		620		520			4,300 610		750		2,010		
88	Surikami River	Totsuna Bridge			1,040		186		167	260					630		400	170		430		620		
89		Before the confluence with Abukuma River			2,150		630		310	830		410	250	640	92	50 86		140	330	96	110 163	131		
90	Abukuma River	Taisho Bridge	Date City		14,200		2,700		153		1,160	3,800	410	3,700	73	172 219		770	1,280	1,740 1,130	780	850		
91	Hirose River	Tatenokoshi Bridge	Kawamata Town		440		1,030		590		770		490		530			410	590	480		390		
92		Jizogawara Bridge	Date City		1,340		870		2,300		780		760		890			330 580		480	410	390		
93	Oguni River	Before the confluence with Hirose River			9,200		4,600		7,500		2,300	6,800	6,500	2,000	820	1,390 1,800		890 1,290	1,150	3,000 880	1,430	2,010		
94	Hirose River	Before the confluence with Abukuma River			740		1,280		980		710	2,700	20,000	650	650	430 640		720	890	300 590	610	440		
95	Kurokawa River	Tochigisakai	Shirakawa City		105		50		114		133		82		194	138		73		213	56			
96	Kujigawa River	Matsuoka Bridge	Tanagura Town		39		23		48	150			63		31	42			12	39	43			
97		Takachihara Bridge	Yamatsuri Town		63		14		41	44			13		14	24			16	18	0			
				Total number of samples		1,818	Detection times		1,794															

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

Table 4.3-8 Detection of radioactive cesium at respective locations (Nakadori, Fukushima Prefecture: river sediments) (No.2)

Location				River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																								
No.	Water area	Location	Municipality	FY2013													FY2014											
				4	5	6		7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
54	Abukuma River	Habuto Bridge	Nishigo Village		51	135			80		14		53		25			36	28		17		23		33	52		
55		Tamachi-ohashi Bridge	Shirakawa City	77		113	57	51	46	59	39		33	53	22		40	47	17	54	30	53	24		22	12	36		
56	Yanta River	Before the confluence with Abukuma River			2,230	1,630			43		380		212		234			243	244		215		279		240	241		
57	Yashiro River	Yashirogawa Bridge	Tanagura Town		170	132			159		135		66		71			81	52		71		51		45	51		
58	Kitasu River	Yanagi Bridge	Hirata Village		37	40			29		40		11		21			21	17		19		16		0	17		
59	Imade River	Nekonaki Bridge	Ishikawa Town		116	248			42		179		15		120			78	0		139		14		63	203		
60	Yashiro River	Oji Bridge			71	80			46		127		64		54			16	24		24		22		23	78		
61	Abukuma River	Kawanome Bridge	Tamakawa Village	108		57	63	40	31	38	50		72	69	69		15	57	78	18	49	24	58		33	64	58	
62		Emochi Bridge	Sukagawa City		68	19			13		35		13		17			39	12		10		11		12		27	
63	Shakado River	Sukagawa City water intake point			109	175			113		47		63		51			37	58		28		11		27		138	
64		Before the confluence with Abukuma River		282		107	80	88	51	59	58		18	73	67		80	66	57	42	18	31	51		26	52	80	
65	Sasahara River	Shinbashi Bridge	Koriyama City		240	730			102		106		114		199			75	148		99		114		85	131		
66	Yatagawa River	Yatagawa Bridge			85	57			49		66		39		61			49	61		25		17		25	19		
67	Otakine River	Funehiki Bridge	Tamura City		132	98			35		69		110		75			38	65		53		42		25		112	
68		Before the confluence with Abukuma River	Koriyama City		213	49			370		73		66		64			69	21		64		60		51	60		
69	Ouse River	Before the confluence with Babagawa River			106	96			60		50		56		87			90	71		64		66		49	18		
70		Makunouchi Bridge			450	660			241		298		174		178			390	206		139		237		202	264		
71		Before the confluence with Abukuma River		800		241	390	232	224	295	129		194	233	187		165	263	194	208	186	272	126		180	154	199	
72	Abukuma River	Akutsu Bridge		220		197	280	400	233	251	113		114	90	103		101	145	177	146		344	136	114		179	107	444	
73	Gohyaku River	After the confluence with Ishimuro River			83	85			42		21		40		39			24	38		24		32		33	28		
74		Kamisekishita Bridge	Motomiya City		67	130			222		810		134		116			181	134		124		1,080		362	174		
75		Before the confluence with Abukuma River		88		157	310	179	59	101	49		51	18	97		58	102	86	91	129	19	48		25	36	30	
76	Abukuma River	Takada Bridge	Nihonmatsu City	1,570		540	285	360	1,020	256	380		400	730			570	305	229	1,070		387	305	250		570	264	690	
77	Kuchibuto River	Kuchibutogawa Bridge			1,210	900			570		900		880					590	470		490		365		283	363		
78	Utsushi River	Osegawa Bridge		2,380		191	144	360	154	212	229		244	350			300	118	179	134		132	149	246		130	162	122	
79	Mizuhara River	Getouchi Bridge	Fukushima City		930	430			229		302		321					169	141		171		268		165		187	
80	Megami River	Tsurumaki Bridge			680	540			330		410		440		510			233	317		600		169		200		238	
81	Abukuma River	Horai Bridge		320		235	250	259	242	440	318		390	520	490		198	341	219	600	310	185	220		278	166	216	
82	Nigori River	Before the confluence with Omori River			650	1,030			2,880		740		610					1,290	1,050		720		370		299	322		
83	Arakawa River	Hinokura Bridge			61	77			72		22		29		38			24	15		16		17		23	18		
84	Sukawa River	Sukawa Bridge			87	119			87		44		99					33	38		31		75		60	40		
85	Arakawa River	Before the confluence with Abukuma River		340		500	135	85	200	380	122		143	112			96	85	70	71	79	76	66		67	67	61	
86	Matsukawa River			149		119	152	137	1,100	277	129		137	1,580	105		257	167	305	1,590	71	3,060	98		25	287	75	
87	Hattanda River	Hattanda Bridge			1,260	1,220			470		570		1,560		2,480			510	700		910		420		1,440	490		
88	Surikami River	Totsuna Bridge			300	510			8,300		176		3,500		1,250			1,050	880		440		94		381		450	
89		Before the confluence with Abukuma River		154		108	157	179	300	124	76		66	50	63		112	52	68	99	58	33	500		44	33	44	
90	Abukuma River	Taisho Bridge	Date City	1,460		750	285	193	297	1,000	280		98	123	152		135	78	132	100		95	287	110		77	85	71	
91	Hirose River	Tatenokoshi Bridge	Kawamata Town		350	319			390		370		300					241	165		168		213		125	130		
92		Jizogawara Bridge	Date City		257	370			296		289		197		193			297	211		177		207		196		200	
93	Oguni River	Before the confluence with Hirose River		1,910		2,860	2,070	1,930	1,190	1,110	1,590		1,310	1,420	1,040		890	580	520	610	560	730	450		730	570	620	
94	Hirose River	Before the confluence with Abukuma River		790		520	540	910	278	470	360		490	510	550		560	530	530	710		1,140	246	254		344	153	152	
95	Kurokawa River	Tochigisakai	Shirakawa City		143	153			65		64		127		89			138	109		52		71		78	82		
96	Kujigawa River	Matsuoka Bridge	Tanagura Town		11	55			40		12		12		18			0	13		12		22		0	14		
97		Takachihara Bridge	Yamatsuri Town		27	13			14		10		15		11			11	0		13		11		0	0		

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

Table 4.3-8 Detection of radioactive cesium at respective locations

(Nakadori, Fukushima Prefecture: river sediments) (No.3)

Location No.	Water area	Location	Municipality	River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																									Changes	Average of FY2016 (*2)	No.	Coefficient of variation	Trends(*3)
				FY2015														FY2016																	
				4	5		6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3					
54	Abukuma River	Habuto Bridge	Nishigo Village		29		73		14		22		25	19				27	23		34		28		10	15				23	54	0.95	
55		Tamachi-ohashi Bridge	Shirakawa City	91	62		79	35	34	61	55		19	18	56		13	29	28	40	32	19	24		16	19	34			25	55	1.59	
56	Yanta River	Before the confluence with Abukuma River			339		269		219		271		171	197				166	188		154		159		117	147				155	56	1.86	
57	Yashiro River	Yashirogawa Bridge	Tanagura Town		73		42		36		33		39	107				37	56		49		29		39	39				42	57	1.25	
58	Kitasu River	Yanagi Bridge	Hirata Village		17		16		21		0		18	17				21	15		18		14		17	14				17	58	0.98	
59	Imade River	Nekonaki Bridge	Ishikawa Town		167		21		11		17		22	154				156	77		61		163		325	171				159	59	1.55	
60	Yashiro River	Oji Bridge			94		31		31		22		33	13				31	20		29		12		17	11				20	60	0.70	
61	Abukuma River	Kawanome Bridge	Tamakawa Village	44	17		24	36	25	22	19		34	19	20		27	18	24	25	11	20	31		23	12	18			21	61	1.16	
62		Emochi Bridge	Sukagawa City		14		12		15		16		32		12			16	18		12		23		21		10			17	62	1.63	
63	Shakado River	Sukagawa City water intake point			59		52		24		72		33		40			43	43		50		33		70		41			47	63	0.61	
64		Before the confluence with Abukuma River		62	21		21	65	20	42	35		189	15	15		60	26	53	103	34	14	27		37	31	88			47	64	2.62	
65	Sasahara River	Shinbashi Bridge	Koriyama City		135		116		88		66		77	74				118	88		78		51		51	81				78	65	1.53	
66	Yatagawa River	Yatagawa Bridge			19		25		31		25		27	14				22	21		170		42		27	32				52	66	1.09	
67	Otakine River	Funehiki Bridge	Tamura City		33		22		25		28		29		27			28	35		27		25		25		36			29	67	0.83	
68		Before the confluence with Abukuma River	Koriyama City		24		20		1,120		27		40		40			28	413		1,170		32		57		59			293	68	2.68	
69	Ouse River	Before the confluence with Babagawa River			93		36		71		24		30		22			80	43		94		49		47		42			59	69	1.57	
70		Makunouchi Bridge			210		183		203		270		224		151			163	180		160		119		117		204			157	70	0.66	
71		Before the confluence with Abukuma River		191	274		229	430	259	117	194		241	106	102		191	129	163	177	236	200	200		60	57	183			160	71	3.09	
72	Abukuma River	Akutsu Bridge			116	228	78	195	97	150	25		169	138	105		162	151	102	100	139	112	163		49	91	58			113	72	2.29	
73	Gohyaku River	After the confluence with Ishimuro River			22		29		18		21		20	42				40	22		33		20		24	36				29	73	2.31	
74		Kamisekishita Bridge	Motomiya City		186		146		18		107		79	73				50	195		492		79		115	522				242	74	3.47	
75		Before the confluence with Abukuma River		22	59		101	36	55	67	36		18	29	51		93	30	47	56	32	32	27		34	31	29			41	75	1.52	
76	Abukuma River	Takada Bridge	Nihonmatsu City	480	355		364	1,480	99	332	230		337	315	211		216	970	241	143	233	180	274		164	166	170			276	76	3.54	
77	Kuchibuto River	Kuchibutogawa Bridge			431		158		209		236		199	143				162	79		159		106		309	135				158	77	0.77	
78	Utsushi River	Osegawa Bridge		268	164		228	207	142	156	102		105	144	76		167	144	39	71	64	62	65		42	25	24			70	78	1.22	
79	Mizuhara River	Getouchi Bridge	Fukushima City		106		224		246		167		187		165			152	292		318		94		139		158			192	79	1.98	
80	Megami River	Tsurumaki Bridge			222		204		307		360		259		249			183	175		189		141		151		112			159	80	0.83	
81	Abukuma River	Horai Bridge			256	176	305	442	73	221	146		365	232	173		266	339	152	63	317	102	39		173	74	28			155	81	2.12	
82	Nigori River	Before the confluence with Omori River			228		810		208		322		720		251			212	241		427		299		578		381			356	82	0.76	
83	Arakawa River	Hinokura Bridge			23		16		15		19		13		13			19	12		22		22		22		13			18	83	2.47	
84	Sukawa River	Sukawa Bridge			40		74		14		22		25		25			18	31		22		27		15		19			22	84	1.47	
85	Arakawa River	Before the confluence with Abukuma River			62	51	67	38	87	99	30		79	35	34		52	40	35	38	36	27	34		36	55	42			40	85	3.47	
86	Matsukawa River				850	34	720	259	183	16	1,120		39	31	84		27	252	68	214	75	173	28		271	174	96			138	86	2.42	
87	Hattanda River	Hattanda Bridge			378		510		569		483		580	620				1,180	1,430		327		194		269	750				692	87	0.85	
88	Surikami River	Totsuna Bridge			1,760		229		206		125		158		169			212	224		341		230		321		396			287	88	1.93	
89		Before the confluence with Abukuma River			64	35	88	117	35	21	29		39	74	38		71	74	81	37	35	24	25		29	18	45			44	89	1.83	
90	Abukuma River	Taisho Bridge	Date City	276	39		148	148	55	380	49		26	39	112		269	45	113	68	34	28	41		85	67	60			81	90	2.74	
91	Hirose River	Tatenokoshi Bridge	Kawamata Town		152		200		129		143		137	135				128	59		109		68		68	80				85	91	0.75	
92		Jizogawara Bridge	Date City		237		175		304		59		81		61			108	100		71		37		33		37			64	92	1.17	
93	Oguni River	Before the confluence with Hirose River		630	490		650	3,270	680	251	285		368	288	216		346	374	269	348	1,510	309	373		280	496	363			467	93	1.22	
94	Hirose River	Before the confluence with Abukuma River		590	394		272	186	258	193	158		210	164	67		248	121	77	189	114	123	94		43	67	63			114	94	3.22	
95	Kurokawa River	Tochigisakai	Shirakawa City		92		217		522		63		46	42				69	63		40		36		69	23				50	95	0.83	
96	Kujigawa River	Matsuoka Bridge	Tanagura Town		0		16		0		0		19	12				15	23		0		0		11	0				8.2	96	1.21	
97		Takachihara Bridge	Yamatsuri Town		11		0		10		0		0	0				0	16		13		0		12	0				6.8	97	1.10	

	A	B	C	D	E		121	Average	

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

*2: Arithmetic Average; calculated by assuming ND=0; Color codes show categories (see the right).

*3: Results of the analysis of trends at respective locations using the method explained on 4.3(1)2) ↘ Decreasing ↗ Increasing → Unchanged ∿ Fluctuations

(iii) Aizu

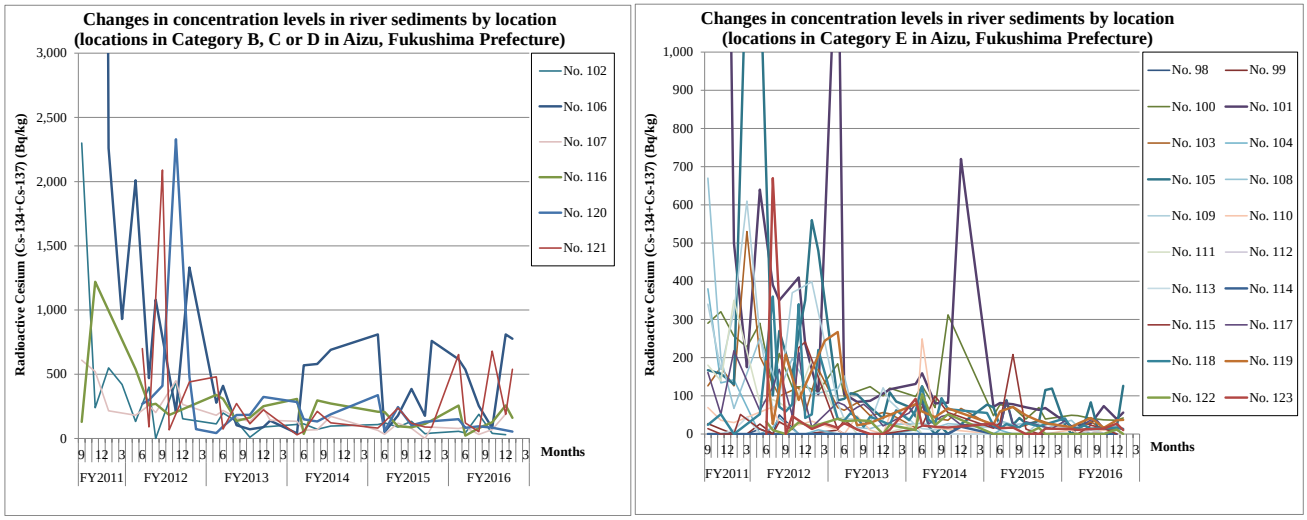
In Aizu, Fukushima Prefecture, surveys were conducted 25 to 50 times from September 2011 to January 2017 for river sediment samples collected at 26 locations.

Regarding the concentration levels of detected values, one location was categorized into Category B, one location into Category C, four locations into Category D, and 20 locations into Category E (see Table 4.3-9 and Table 4.3-10).

Concentration levels were generally decreasing at 20 locations and fluctuating at six locations.

Table 4.3-9 Categorizations of detected values at respective locations
(Aizu, Fukushima Prefecture: river sediments)

Category	Percentile (percentile in all detected values)	Number of locations	Locations
A	Upper 5 percentile	0	(None)
B	Upper 5 to 10 percentile	1	No. 106
C	Upper 10 to 25 percentile	1	No. 121
D	Upper 25 to 50 percentile	4	No. 102, No. 107, No. 116, No. 120
E	Lower than upper 25 to 50 percentile (lower 50%)	20	No. 98, No. 99, No. 100, No. 101, No. 103, No. 104, No. 105, No. 108, No. 109, No. 110, No. 111, No. 112, No. 113, No. 114, No. 115, No. 117, No. 118, No. 119, No. 122, No. 123



Notes: 1) For locations where surveys were conducted multiple times in one month, their average value is used in the figures.

2) Scales of the vertical axes differ in the left and right figures.

Figure 4.3-6 Changes in concentration levels over the years at respective locations
(Aizu, Fukushima Prefecture: river sediments)

Table 4.3-10 Detection of radioactive cesium at respective locations

(Aizu, Fukushima Prefecture: river sediments) (No.1)

Location				River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																						
No.	Water area	Location	Municipality	FY2011								FY2012														
				8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1		2	3		
98	Agano River	Tajima Bridge	Minamiaizu Town		0		0		0		0		13		0	50			0							
99		Okawa Bridge	Aizuwakamatsu City		27		13		0		0		26		0	0			0	0						
100	Yukawa River	Takimi Bridge			290		320		256		228		290		120	211		123		124			111			
101		Shinyukawa Bridge			8,700		3,000		500		175		640		390	350			410	236			104			
102		Before the confluence with Agano River			2,300		240		550		420		132		400	0			440	153						
103	Miyakawa River	Saikuna Bridge	Aizubange Town		126		175		126		530		203		133	99			122	55			170			
104	Agano River	Miyako Bridge			380		134		142				0		17	42			0	0			11			
105	Nippashi River	Minami-ohashi Bridge	Kitakata City		167		158		130		1,300		1,240		101	270		173	132	263	350	530	590	480		
106	Kyu-yukawa River	Awanomiya Bridge	Yugawa Village		13,000		25,000		2,260		930		2,010		470	1,080				207		72	2,590			
107	Kyu-miyakawa River	Josuke Bridge	Aizubange Town		610		520		216				181		257	202				450	265					
108	Tatsuki River	Ohashi	Kitakata City		670		199		67				250		157	112		198				86	121			
109		Shimokawara Bridge			340		169		320		610		260		66	87		370				67	730			
110	Nigori River	Nigorigawa Bridge			69		36		30				57		71	28			24			16	51			
111		Yamazaki Bridge			180		139		350				82		90	82		61				40	350			
112	Inagawa River	Aoyagi Bridge	Minamiaizu Town		0		0		0		0		0		0	0			0	0				0		
113		Kurosawa Bridge	Tadami Town		0		0		10		44		0		0	0			0			0				
114	Tadami River	Nishitani Bridge	Kaneyama Town		0		0						0		0	0		0				0	0			
115		Fuji Bridge	Aizubange Town		14		0		0	51			13		0	32		12		226	241					
116	Agano River	Shingo Dam	Kitakata City		129		1,220						540		260	270		183								
117	Sukawa River	Sukawano	Inawashiro Town		161		52		218				61		123	169		58	39	213	86	18				
118	Nagase River	Kogane Bridge			24		52		0				52		360	71	59	78		340	42	47	55	220		
119	Takahashi River	Shinbashi Bridge												190	26		208			89					244	
120	Koguro River	Umeno Bridge												270	300		410			2,330		480		73		
121	Hishinuma River	Sekido District												700	90		2,090	67				520	360			
122	Funatsu River	Funatsu Bridge	Koriyama City											32	10		0			31		17	21			
123	Haragawa River	Estuary, front	Aizuwakamatsu City											0	670		0	47				13			27	
				Total number of samples		822	Detection times		594																		

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

Table 4.3-10 Detection of radioactive cesium at respective locations

(Aizu, Fukushima Prefecture: river sediments) (No.2)

Location				River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																							
No.	Water area	Location	Municipality	FY2013												FY2014											
				4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
98	Agano River	Tajima Bridge	Minamiaizu Town		0	0		0		0		0					0	0		0		0		0			
99		Okawa Bridge	Aizuwakamatsu City		10	0		0		0		0					0	0		0		0		0			
100	Yukawa River	Takimi Bridge			184	98		112		124		100	120				98	126		69		312					
101		Shinyukawa Bridge			1,410	105		84		87		106	117				131	159		80		82		720			
102		Before the confluence with Agano River			114	199		132		10		89					109	114		72		97					
103	Miyakawa River	Saikuna Bridge	Aizubange Town		69	62		82		48		56	53				16	72		41		36		67			
104	Agano River	Miyako Bridge			0	0		0		0		0	0				11	0		0		0		0			
105	Nippashi River	Minami-ohashi Bridge	Kitakata City		88	92	108 105	103	87	70		41	109	85		71	46	92	20	0	18	0					
106	Kyu-yukawa River	Awanomiya Bridge	Yugawa Village		279	410		103		72		88	139				40	570		580		690					
107	Kyu-miyakawa River	Josuke Bridge	Aizubange Town		181	219		161		131		236	142				134	64		68		172					
108	Tatsuki River	Ohashi	Kitakata City		118	152		17		14		25	26				26	29		16		27					
109		Shimokawara Bridge			80	40		39		28		121	87				23	14		11		21					
110	Nigori River	Nigorigawa Bridge			11	0		47		10		0	48				10	249		16		12					
111		Yamazaki Bridge			41	43		0		0		0					25	0		0		0					
112	Inagawa River	Aoyagi Bridge	Minamiaizu Town		0	0		0		0		0					0	0		0		0					
113		Kurosawa Bridge	Tadami Town		0	0		0		0		0					0	0		0		0					
114	Tadami River	Nishitani Bridge	Kaneyama Town		0	0		0		0		0	0				0	0		0		0		19			
115		Fuji Bridge	Aizubange Town		12	36		11		0		0					13	21		99		56					
116	Agano River	Shingo Dam	Kitakata City		340	309		137		163		251					308	36		296		272					
117	Sukawa River	Sukawano	Inawashiro Town		83	76	44 73	70	78	63		21				55	79	78	27	34	46	50		24			
118	Nagase River	Kogane Bridge			40	35	87 23	42	19	45		32	24	62		36	61	125	37	26	94	65					
119	Takahashi River	Shinbashi Bridge			267	122		23		29							78	59		44		67					
120	Koguro River	Umeno Bridge			42	94		183		184		324					284	149		133		188					
121	Hishinuma River	Sekido District			480	74		272		115		223					28	56		211		122					
122	Funatsu River	Funatsu Bridge	Koriyama City		40	33		36		34		0	24				10	104		23		52					
123	Haragawa River	Estuary, front	Aizuwakamatsu City		16	28		12		0		0	11				92	22		19		17					

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

Table 4.3-10 Detection of radioactive cesium at respective locations

(Aizu, Fukushima Prefecture: river sediments) (No.3)

Location				River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																								Average of FY2016 (*2)	No.	Coefficient of variation	Trends(*3)
				Fy2015												FY2016															
No.	Water area	Location	Municipality	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	Changes				
98	Agano River	Tajima Bridge	Minamiaizu Town		0	0		0		0		0	0				0	0		0		0		0					0	98	4.38	
99		Okawa Bridge	Aizuwakamatsu City		0	0		0		0		0	0				0	0		0		0		0					0	99	2.82	
100	Yukawa River	Takimi Bridge			48	77		70		39		69	39				49	48		41		37		36	42				42	100	0.71	
101		Shinyukawa Bridge			71	81		78		70		63	68				20	24		27		73		39	56				40	101	2.83	
102		Before the confluence with Agano River			108	122		89		134		37	42				56	43		188		40		29					71	102	1.90	
103	Miyakawa River	Saikuna Bridge	Aizubange Town		19	15		15		23		37	31				15	13		32		11		11	0				14	103	1.25	
104	Agano River	Miyako Bridge			0	10		0		0		0	0				0	0		0		0		0	0				0	104	3.15	
105	Nippashi River	Minami-ohashi Bridge	Kitakata City	77	70	19	89	24	42	27		31	115	119		24	0	16	27	83	18	14		17	126				36	105	1.65	
106	Kyu-yukawa River	Awanomiya Bridge	Yugawa Village		810	51		179		386		177	760				617	537		253		81		810	777				513	106	2.75	
107	Kyu-miyakawa River	Josuke Bridge	Aizubange Town		63	33		119		79		0	88				78	88		32		69		190					91	107	0.82	
108	Tatsuki River	Ohashi	Kitakata City		18	35		24		28		24	14				36	19		0		14		20					18	108	1.53	
109		Shimokawara Bridge			17	32		19		0		31	26				14	12		16		0		10	14				11	109	1.56	
110	Nigori River	Nigorigawa Bridge			0	0		0		0		0	0				11	0		0		11		0	0				3.7	110	1.80	
111		Yamazaki Bridge			0	0		0		0		0	0				0	0		14		0		0					2.8	111	1.83	
112	Inagawa River	Aoyagi Bridge	Minamiaizu Town		0	0		0		0		0	0				0	0		10		0		0	0				1.7	112	-	
113		Kurosawa Bridge	Tadami Town		0	0		0		0		0					0	0		0		0		0					0	113	4.39	
114	Tadami River	Nishitani Bridge	Kaneyama Town		0	0		0		0		0	0				0	0		0		0		0					0	114	5.48	
115		Fuji Bridge	Aizubange Town		15	29		208		13		0	0				0	0		23		15		0					7.6	115	1.76	
116	Agano River	Shingo Dam	Kitakata City		208	206		95		87		114	141				256	22		81		126		257	161				151	116	0.94	
117	Sukawa River	Sukawano	Inawashiro Town	26	18	12	87	27	17	32			18	14		34	18	15	26	37	35	14		17	14				23	117	0.88	
118	Nagase River	Kogane Bridge		55	22	14	26	20	18	29		20				41	15	14	23	13	16	15		16	13				18	118	1.30	
119	Takahashi River	Shinbashi Bridge			25	59		71		49		34	28				18	27		42		16		36	37				29	119	0.97	
120	Koguro River	Umeno Bridge			337	58		245		103		130					150	83		95		84			54				93	120	1.64	
121	Hishinuma River	Sekido District			81	130		238		119		89	87				654	121		53		680		188	539				373	121	1.33	
122	Funatsu River	Funatsu Bridge	Koriyama City		0	0		0		0		16	0				0	0		0		0		12	0				2.0	122	1.30	
123	Haragawa River	Estuary, front	Aizuwakamatsu City		27	15		17		0		0	14				13	11		13		14		27	10				15	123	3.08	

A	B	C	D	E

60 Average

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

*2: Arithmetic Average; calculated by assuming ND=0; Color codes show categories (see the right).

*3: Results of the analysis of trends at respective locations using the method explained on 4.3(1)2) Decreasing Increasing Unchanged Fluctuations

4) Ibaraki Prefecture

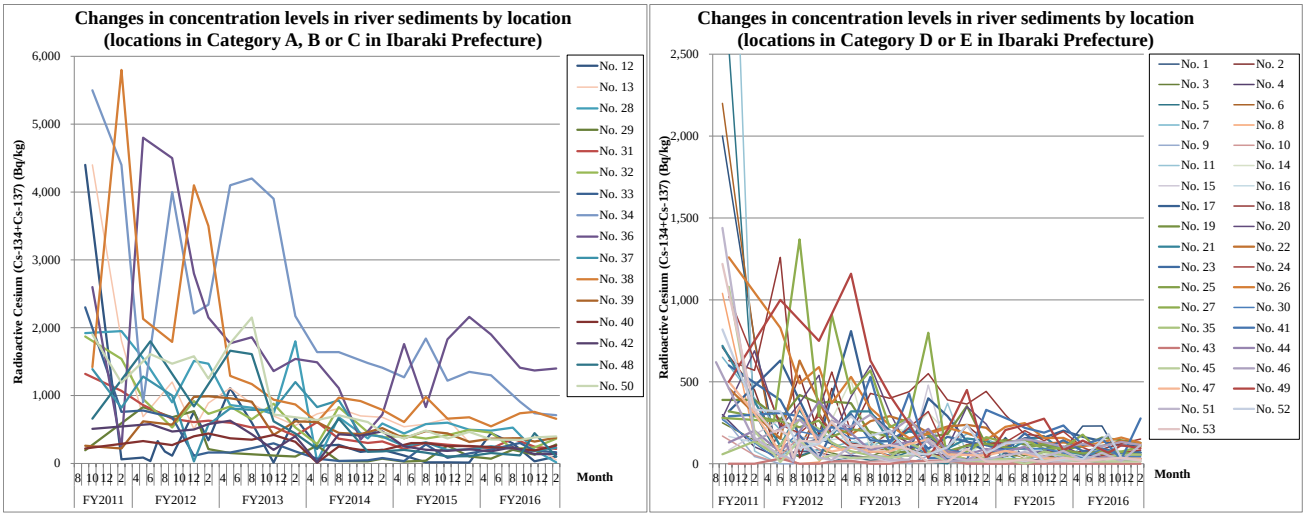
In Ibaraki Prefecture, surveys were conducted 19 to 25 times from August 2011 to February 2017 for river sediment samples collected at 53 locations (this analysis excludes the survey results from 39 locations where the survey was conducted only in 2011).

Regarding the concentration levels of detected values, two locations were categorized into Category A, one location into Category B, 13 locations into Category C, 19 locations into Category D, and 18 locations into Category E (see Table 4.3-11 and Table 4.3-12).

Concentration levels were generally decreasing at 46 locations, were unchanged at two locations and were fluctuating at five locations.

Table 4.3-11 Categorizations of detected values at respective locations
(Ibaraki Prefecture: river sediments)

Category	Percentile (percentile in all detected values)	Number of locations	Locations
A	Upper 5 percentile	2	No. 34, No. 36
B	Upper 5 to 10 percentile	1	No. 38
C	Upper 10 to 25 percentile	13	No. 12, No. 13, No. 28, No. 29, No. 31, No. 32, No. 33, No. 37, No. 39, No. 40, No. 42, No. 48, No. 50
D	Upper 25 to 50 percentile	19	No. 1, No. 2, No. 11, No. 17, No. 18, No. 19, No. 21, No. 22, No. 23, No. 24, No. 25, No. 26, No. 27, No. 30, No. 41, No. 46, No. 49, No. 51, No. 52
E	Lower than upper 25 to 50 percentile (lower 50%)	18	No. 3, No. 4, No. 5, No. 6, No. 7, No. 8, No. 9, No. 10, No. 14, No. 15, No. 16, No. 20, No. 35, No. 43, No. 44, No. 45, No. 47, No. 53



Notes: 1) For locations where surveys were conducted multiple times in one month, their average value is used in the figures.

2) Scales of the vertical axes differ in the left and right figures.

Figure 4.3-7 Changes in concentration levels over the years at respective locations
(Ibaraki Prefecture: river sediments)

Table 4.3-12 Detection of radioactive cesium at respective locations (Ibaraki Prefecture: river sediments) (No.1)

Location						River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																							
No.	Water area			Location	Municipality	FY2011								FY2012														
						8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Taga River System		Satone River	Yamagoya Bridge	Kitaibaraki City		2,000					760			166				121			153			105
2				Murayama Bridge			710					450			125				540			176		460	
3			Hanazono River	Kurabeishi			250					144			102				42			88		66	
4				Isonare Bridge			300					103			53				76			68		50	
5			Okita River	Sakae Bridge	Takahagi City		3,100					310			101				50			87		14	
6				Sakai Bridge	Kitaibaraki City		2,200					750			109				103			310		186	
7			Hananuki River	Shinhananuki Bridge	Takahagi City		650					400			248				82			82		102	
8	Kujigawa River System		Kujigawa River	Yamagata	Hitachiomiya City		1,040					157			62				0			10		111	
9				Sakaki Bridge	Hitachi City/Tokai Village		290					44			11	0	0	0	161			156		135	
10	Nakagawa River System	Nakagawa River Area	Nakagawa River	Noguchi	Hitachiomiya City/Shirosato Town		169					52			13				163			88		13	
11				Shimokunii	Mito City		5,500					78			16				128			116		246	
12				Katsuta Bridge	Mito City/Hitachinaka City		4,400					60			86	34	330	176	114			760		340	
13			Nakamaru River	Yanagisawa Bridge	Hitachinaka City			4,400				1,810			690				1,200			510		890	
14		Hinumagawa River Area	Hinumamae River	Nagaoka Bridge	Ibaraki Town			460								158						109			
15			Hinuma River	Takahashi				84								270						57			
16			Kansei River	Kansei Bridge				167								92						139			
17			Daiya River	Oya Bridge	Hokota City			320								630						143			
18			Hinuma River	Hinuma Bridge	Mito City/Oarai Town			630				570				1,260			36			330		560	
19	Tonegawa River System	Kitaura River Area	Hokota River	Asahi Bridge	Hokota City		390					390				270			420			370		380	
20			Tomoe River	Shintomoegawa Bridge			280					690				220			370			540		159	
21			Taiyo River	Tazuka Bridge			720									108			330			159		172	
22			Takeda River	Uchijuku-ohashi Bridge	Namegata City			460								152			630			380		230	
23			Yamada River	Nioroshi Bridge				600								390			174			35		190	
24			Kurakawa River	Kurakawa Bridge				1,020								239			187			290		183	
25			Gantsu River	JA Yokohashi Bridge				320								260			223			264		166	
26			Nagare River	Suhoi Bridge	Kashima City			1,260								830			490			590		370	
27		Kasumigaura River Area	Sonobe River	Sonobeshin Bridge	Omitama City		280								260				1,370			290		910	
28			Sanno River	Tokoro Bridge			1,920					1,950			1,550				900			1,510		1,470	
29			Koise River	Heiwa Bridge	Ishioka City		194								830				680			770		210	
30			Kajinashi River	Kamishuku Bridge	Namegata City		270								42				197			172		226	
31			Hishiki River	Hishiki Bridge	Kasumigaura City		1,320					1,070			860				660			610		630	
32			Ichinose River	Kawanaka Bridge			1,870					1,540			950				530			920		730	
33			Sakai River	Sakai Bridge/National Route 354	Tsuchiura City		2,300					760			780				680			112		160	
34			Shinkawa River	Shinten Bridge				5,500				4,400			900				4,000			2,210		2,340	
35			Sakura River	Eiri Bridge	Tsuchiura City/Tsukuba City		58					136			62				270			213		128	
36			Bizen River	Bizengawa Bridge	Tsuchiura City			2,600				228			4,800				4,500			2,800		2,150	
37			Hanamuro River	Shinwa Bridge				1,390				820			1,280				1,000			29		570	
38			Seimei River	Katsuhashi Bridge	Ami Town			1,420				5,800			2,130				1,790			4,100		3,500	
39			Onogawa River	Okuhara-ohashi Bridge	Ryugasaki City/Ushiku City		260					220			620				570			980		990	
40			Shintone River	Shintone Bridge	Inashiki City		220								330				270			400		440	
41		Hitachitonegawa River Area	Yorokoshi River	Horinouchi Bridge	Itako City			290								310			290			196		222	
42			Maekawa River	Ayame Bridge				510								580			470			500		580	
43		Kinugawa River Area	Kinugawa River	Kawashima Bridge	Chikusei City			0				0				32			0			0		14	
44				Takishita Bridge	Moriya City			130				202				100	40	119	11	196			380		289	
45			Tagawa River	Tagawa Bridge	Chikusei City			1,080				201				10			146			24		54	
46		Kokaigawa River Area	Kokai River	Kuroko Bridge		620						142				213			269			153		262	
47				Fumimaki Bridge	Toride City			500				310				68			350			112		75	
48			Yatagawa River	Maruyama Bridge	Tsukuba City			660								1,800						840			
49			Nishiyata River	Sakaimatsu Bridge				500								1,000						750			
50			Inari River	Oguki Bridge				1,900				1,190				1,610			1,470			1,580		1,250	
51		Tonegawa River Area	Tonegawa River	Kurihashi Bridge	Koga City		1,440					159				52	48	42	18	123			39		22	
52				Fukawa	Tone Town		820					330				320				95			122			
53				Sawara	Inashiki City		1,220					330			195	202	181	39	140			133		256	
						Total number of samples		1,150		Detection times		1,116													

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

Table 4.3-12 Detection of radioactive cesium at respective locations (Ibaraki Prefecture: river sediments) (No.2)

Location						River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																							
No.	Water area			Location	Municipality	FY2013												FY2014											
						4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Taga River System		Satone River	Yamagoya Bridge	Kitaibaraki City		97			81			52			49			55			44			66			23	
2				Murayama Bridge			126			116			187			128			137			81			234			137	
3			Hanazono River	Kurabeishi			36			45			91			94			56			89			60			21	
4				Isonare Bridge			50			38			47			89			54			57				112		155	
5			Okita River	Sakae Bridge	Takahagi City		42			21			30			73			12			0			92			11	
6				Sakai Bridge	Kitaibaraki City		101			68			98			83			50			50				24		61	
7			Hananuki River	Shinhananuki Bridge	Takahagi City		135			115			140			101			141			108			182			151	
8	Kujigawa River System		Kujigawa River	Yamagata	Hitachiomiya City		60			94			45			20			16			24			12			15	
9				Sakaki Bridge	Hitachi City/Tokai Village		55			111			92			0			49			18			14			14	
10	Nakagawa River System	Nakagawa River Area	Nakagawa River	Noguchi	Hitachiomiya City/Shirosato Town		11			15			18			12			15			11			12			0	
11				Shimokunii	Mito City		101			131			76			249			73			369			62			142	
12				Katsuta Bridge	Mito City/Hitachinaka City		1,110			600			13			670			258			274			170			202	
13			Nakamaru River	Yanagisawa Bridge	Hitachinaka City		1,110			880			700			560			730			810			700			680	
14		Hinumagawa River Area	Hinumamae River	Nagaoka Bridge	Ibaraki Town		510			90			226			193			312			188			61			126	
15			Hinuma River	Takahashi			19			39			16			18			480			55			16			13	
16			Kansei River	Kansei Bridge			159			82			79			86			51			24			113			31	
17			Daiya River	Oya Bridge	Hokota City		810			310			204			68			400			290			137			77	
18			Hinuma River	Hinuma Bridge	Mito City/Oarai Town		190			430			400			440			550			390			364			442	
19	Tonegawa River System	Kitaura River Area	Hokota River	Asahi Bridge	Hokota City		370			182			68			73			163			182			352			113	
20			Tomoe River	Shintomoegawa Bridge			410			600			314			87			156			99			348			242	
21			Taiyo River	Tazuka Bridge			320			320			136			198			174			93			154			141	
22			Takeda River	Uchijuku-ohashi Bridge	Namegata City		177			260			291			254			190			228			238			220	
23			Yamada River	Nioroshi Bridge			304			143			137			217			92			165			135			114	
24			Kurakawa River	Kurakawa Bridge			98			100			105			222			319			58			117			121	
25			Gantsu River	JA Yokohashi Bridge			211			195			164			151			185			77			110			122	
26			Nagare River	Suhoi Bridge	Kashima City		530			340			236			156			182			219			188			144	
27		Kasumigaura River Area	Sonobe River	Sonobeshin Bridge	Omitama City		430			570			223			281			800			11				97		162	
28			Sanno River	Tokoro Bridge			860			820			730			1,800			31			680				368		590	
29			Koise River	Heiwa Bridge	Ishioka City		153			135			116			101			263			34				31		70	
30			Kajinashi River	Kamishuku Bridge	Namegata City		154			163			97			120			57			88				55		68	
31			Hishiki River	Hishiki Bridge	Kasumigaura City		600			530			540			405			610			364				301		324	
32			Ichinose River	Kawanaka Bridge			840			650			880			530			284			830				460		382	
33			Sakai River	Sakai Bridge/National Route 354	Tsuchiura City		160			224			296			178			70			37				46		80	
34			Shinkawa River	Shinten Bridge			4,100			4,200			3,900			2,170			1,640			1,640				1,480		1,410	
35			Sakura River	Eiri Bridge	Tsuchiura City/Tsukuba City		76			52			39			126			73			79			21			37	
36			Bizen River	Bizengawa Bridge	Tsuchiura City		1,770			1,860			1,360			1,540			1,490			1,110			350			720	
37			Hanamuro River	Shinwa Bridge			810			790			790			1,200			830			930			432			396	
38			Seimei River	Katsuhashi Bridge	Ami Town		1,290			1,170			940			870			610			970			920			790	
39			Onogawa River	Okuhara-ohashi Bridge	Ryugasaki City/Ushiku City		960			910			420			620			610			450			432			520	
40			Shintone River	Shintone Bridge	Inashiki City		370			350			420			318			11			249			199			194	
41		Hitachitonegawa River Area	Yorokoshi River	Horinouchi Bridge	Itako City		210			530			117			430			34			36			22			329	
42			Maekawa River	Ayame Bridge			630			430			200			400			16			430			409			473	
43		Kinugawa River Area	Kinugawa River	Kawashima Bridge	Chikusei City		18			0			0			16			17			20			0			0	
44				Takishita Bridge	Moriya City		187			83			113			133			213			75			56			90	
45			Tagawa River	Tagawa Bridge	Chikusei City		35			40			36			52			65			16			17			16	
46		Kokaigawa River Area	Kokai River	Kuroko Bridge			226			300			186			275			131			13			23			76	
47				Fumimaki Bridge	Toride City		98			73			75			120			150			57			53			50	
48			Yatagawa River	Maruyama Bridge	Tsukuba City		1,660			1,610			620			440			212			660				171		177	
49			Nishiyata River	Sakaimatsu Bridge			1,160			630			420			244			37			208			450			30	
50			Inari River	Oguki Bridge			1,770			2,150			720			680			640			710				610		460	
51		Tonegawa River Area	Tonegawa River	Kurihashi Bridge	Koga City		109			55			23			26			149			42			20			29	
52				Fukawa	Tone Town		290			171			202			62			57			100			236			65	
53				Sawara	Inashiki City		117			101			115			88			11			14			90			15	

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

Table 4.3-12 Detection of radioactive cesium at respective locations
(Ibaraki Prefecture: river sediments) (No.3)

No.	Water area			Location	Municipality	River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																							Changes	Average of FY2016 (※2)	No.	Coefficient of variation	Trends(*3)
						FY2015												FY2016																
						4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3					
1	Taga River System		Satone River	Yamagoya Bridge	Kitaibaraki City		160			36			67			83			230			231			29			31			130	1	2.03	
2				Murayama Bridge			96			88			87			43			81			58			49			56			61	2	0.96	
3			Hanazono River	Kurabeishi			45			52			44			41			28			34			26			29			29	3	0.76	
4				Isonare Bridge			20			12			34			41			33			21			46			81			45	4	0.88	
5			Okita River	Sakae Bridge	Takahagi City		67			0			0			19				35		11			19			31			24	5	3.49	
6				Sakai Bridge	Kitaibaraki City		81			34			49			52				58		70			37			35			50	6	2.25	
7			Hananuki River	Shinhananuki Bridge	Takahagi City		101			86			88			75				41		61			43			43			47	7	0.95	
8	Kujigawa River System		Kujigawa River	Yamagata	Hitachiomiya City		20			15			18			18			28				0		33			13			19	8	2.64	
9				Sakaki Bridge	Hitachi City/Tokai Village		23			15			63			42			24			0			28			34			22	9	1.25	
10	Nakagawa River System	Nakagawa River Area	Nakagawa River	Noguchi	Hitachiomiya City/Shirosato Town		0			13			14			11			22				10		0			0			8.0	10	1.59	
11				Shimokunii	Mito City		33			31			91			12			111				114		57			57			85	11	3.25	
12				Katsuta Bridge	Mito City/Hitachinaka City		116			17			16			12			447			296			31			101			219	12	2.05	
13			Nakamaru River	Yanagisawa Bridge	Hitachinaka City		540			580			660			308			362			369			250			53			259	13	1.02	
14		Hinumagawa River Area	Hinumamae River	Nagaoka Bridge	Ibaraki Town		88			37			62			51			66				24		20			31			35	14	0.96	
15			Hinuma River	Takahashi			17			13			0			12			21				12		0			0			8.3	15	1.97	
16			Kansei River	Kansei Bridge			25			118			35			25			50				37		31			31			37	16	0.66	
17			Daiya River	Oya Bridge	Hokota City		99			156			160			202			165				129		112			111			129	17	0.82	
18			Hinuma River	Hinuma Bridge	Mito City/Oarai Town		298			179			169			56			139			89			124			151			126	18	0.77	
19	Tonegawa River System	Kitaura River Area	Hokota River	Asahi Bridge	Hokota City		147			118			113			89			106			160			143			128			134	19	0.58	
20			Tomoe River	Shintomoegawa Bridge			57			67			73			106			54			44			46			61			51	20	0.85	
21			Taiyo River	Tazuka Bridge			69			140			166			75			62			61			70			69			66	21	0.84	
22			Takeda River	Uchijuku-ohashi Bridge	Namegata City		116			143			124			130			117			108			139			114			120	22	0.58	
23			Yamada River	Nioroshi Bridge			77			186			85			144			77			93			65			68			76	23	0.78	
24			Kurakawa River	Kurakawa Bridge			131			202			141			197			100			51			70			84			76	24	1.06	
25			Gantsu River	JA Yokohashi Bridge				93		95			122			83			63			76			73			53			66	25	0.51	
26			Nagare River	Suhoi Bridge	Kashima City		225			248			157			158			105			132			160			127			131	26	0.87	
27		Kasumigaura River Area	Sonobe River	Sonobeshin Bridge	Omitama City		132			146			90			97			178			61			74			105			105	27	1.09	
28			Sanno River	Tokoro Bridge			441			580			600			497			484			528			198			17			307	28	0.70	
29			Koise River	Heiwa Bridge	Ishioka City		27			40			262			103			70			201			130			280			170	29	1.07	
30			Kajinashi River	Kamishuku Bridge	Namegata City		90			92			94			65			37			90			46			44			54	30	0.60	
31			Hishiki River	Hishiki Bridge	Kasumigaura City		214			305			275			252			216			364			246			214			260	31	0.59	
32			Ichinose River	Kawanaka Bridge			409			367			416			495			454			217			234			365			318	32	0.63	
33			Sakai River	Sakai Bridge/National Route 354	Tsuchiura City		35			281			82			147			203				301		187			165			214	33	1.49	
34			Shinkawa River	Shinten Bridge			1,270			1,840			1,220			1,350			1,300				910		740			712			916	34	0.64	
35			Sakura River	Eiri Bridge	Tsuchiura City/Tsukuba City		28			28			75			53			19				44		54			56			43	35	0.80	
36			Bizen River	Bizengawa Bridge	Tsuchiura City		1,760			830			1,830			2,160			1,900				1,410		1,370			1,400			1,520	36	0.62	
37			Hanamuro River	Shinwa Bridge			256			311			197			208			254				205		179			233			218	37	0.68	
38			Seimei River	Katsuhashi Bridge	Ami Town		610			980			660			680			546				740		759			657			676	38	0.92	
39			Onogawa River	Okuhara-ohashi Bridge	Ryugasaki City/Ushiku City		371			476			443			319			365				373		322			380			360	39	0.45	
40			Shintone River	Shintone Bridge	Inashiki City			300		299			255			258			240			222			191			263			229	40	0.35	
41		Hitachitonegawa River Area	Yorokoshi River	Horinouchi Bridge	Itako City			262		219			190			234			115			154			27			277			143	41	0.62	
42			Maekawa River	Ayame Bridge			251			202			185			209			177			240			137			139			173	42	0.52	
43		Kinugawa River Area	Kinugawa River	Kawashima Bridge	Chikusei City		0			0			0			0			0			0			0			0			0	43	1.77	
44				Takishita Bridge	Moriya City		74			103			18			29			19				44		18			31			28	44	0.83	
45			Tagawa River	Tagawa Bridge	Chikusei City		26			0			26			22			18			13			14			15			15	45	2.59	
46		Kokaigawa River Area	Kokai River	Kuroko Bridge			128			150			132			103			121			106			133			115			119	46	0.71	
47				Fumimaki Bridge	Toride City		79			60			34			32			28				32		32			30			31	47	1.10	
48			Yatagawa River	Maruyama Bridge	Tsukuba City		200			158			103			107			154				118		447			102			205	48	1.04	
49			Nishiyata River	Sakaimatsu Bridge			206			237			275			82			142				67		113			95			104	49	0.94	
50			Inari River	Oguki Bridge			370			486			368			464			354				346		383			399			371	50	0.65	
51		Tonegawa River Area	Tonegawa River	Kurihashi Bridge	Koga City		50			72			43			79			21			67			17			114			55	51	2.44	
52				Fukawa	Tone Town		123			134			14			26			28				182		34			20			66	52	1.10	
53				Sawara	Inashiki City		14			26			13			37			17			26			37			21			25	53	1.76	

A	B	C	D	E	Average
					166

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

*2: Arithmetic Average; calculated by assuming ND=0; Color codes show categories (see the right).

*3: Results of the analysis of trends at respective locations using the method explained on 4.3(1)2) Decreasing Increasing Unchanged Fluctuations

5) Tochigi Prefecture

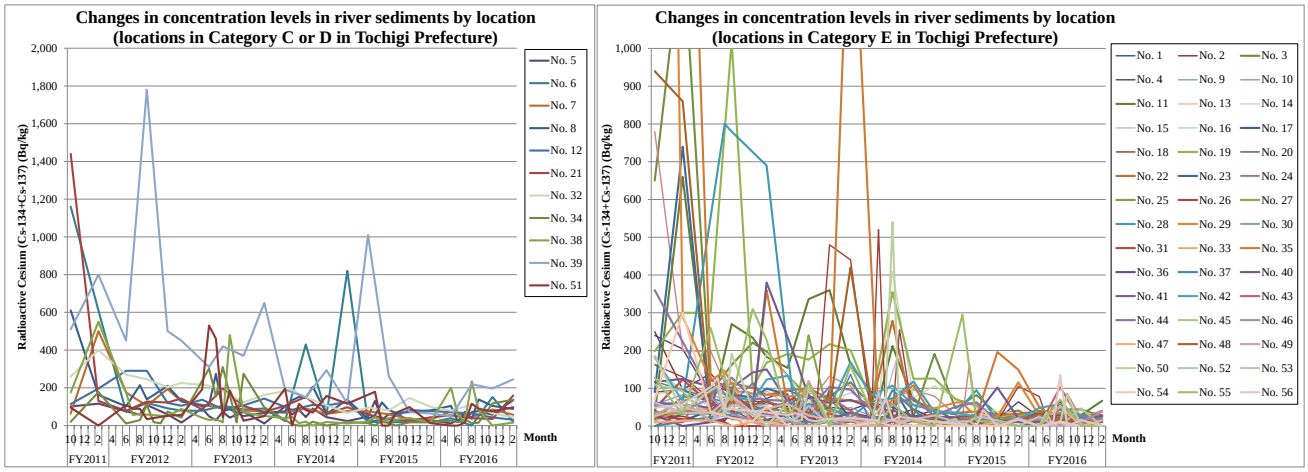
In Tochigi Prefecture, surveys were conducted 19 to 37 times from October 2011 to February 2017 at 56 locations (rivers) in public water areas (this analysis excludes the survey results from 49 locations where the survey was conducted only in 2011).

Regarding the concentration levels of detected values, one location was categorized into Category C, 10 locations were categorized into Category D and 45 locations were categorized into Category E (see Table 4.3-13 and Table 4.3-14).

Concentration levels were generally decreasing at 40 locations and fluctuating at 16 locations.

Table 4.3-13 Categorizations of detected values at respective locations
(Tochigi Prefecture: river sediments)

Category	Percentile (percentile in all detected values)	Number of locations	Locations
A	Upper 5 percentile	0	(None)
B	Upper 5 to 10 percentile	0	(None)
C	Upper 10 to 25 percentile	1	No. 39
D	Upper 25 to 50 percentile	10	No. 5, No. 6, No. 7, No. 8, No. 12, No. 21, No. 32, No. 34, No. 38, No. 51
E	Lower than upper 25 to 50 percentile (lower 50%)	45	No. 1, No. 2, No. 3, No. 4, No. 9, No. 10, No. 11, No. 13, No. 14, No. 15, No. 16, No. 17, No. 18, No. 19, No. 20, No. 22, No. 23, No. 24, No. 25, No. 26, No. 27, No. 28, No. 29, No. 30, No. 31, No. 33, No. 35, No. 36, No. 37, No. 40, No. 41, No. 42, No. 43, No. 44, No. 45, No. 46, No. 47, No. 48, No. 49, No. 50, No. 52, No. 53, No. 54, No. 55, No. 56



Notes: 1) For locations where surveys were conducted multiple times in one month, their average value is used in the figures.

2) Scales of the vertical axes differ in the left and right figures.

Figure 4.3-8 Changes in concentration levels over the years at respective locations
(Tochigi Prefecture: river sediments)

Table 4.3-14 Detection of radioactive cesium at respective locations (Tochigi Prefecture: river sediments) (No.1)

Location						River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																							
No.	Water area			Location	Municipality	FY2011								FY2012														
						8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Nakagawa River System		Nakagawa River	Ikuyobashishita	Nasushiobara City			90				96						42	93			19		15	
2				Komei Bridge				250				97				139			78			43		64	
3			Takaomata River	Takaomata Bridge	Nasu Town			650				1,290				89			162			221		197	
4			Yukawa River	Yukawa Bridge				240				204				79			75			54		73	
5			Nakagawa River	Kamikuroiso	Nasushiobara City/Nasumachi			101				116				64	87	44	72	109			59		16	
6			Yosasa River	Yosasa Bridge	Nasu Town			1,160				610				73			120			91		79	
7			Kurokawa River	Shinden Bridge				64				500				175			105			194		128	
8			Yosasa River	Kawada Bridge	Otawara City			610				162				102	102	189	239	139			209		130	
9			Nakagawa River	Kurobane				57				83				40	35	54	34	102			53		58	
10			Matsuba River	Tributary				780				199				75	320	114	115	62			82		69	
11			Sabigawa River	Udagawa Bridge				32				660				34			270			234		183	
12			Momura River	Momuranaka Bridge				114				196				290			290			120		105	
13			Hokigawa River	Yunohara	Nasushiobara City			83				100						84	98			58		36	
14				Sekiba Bridge				126				101				76			81			82		193	
15				Iwai Bridge	Otawara City			16				50				66			79			62		93	
16				Hokigawa Bridge				165				89				30	72	54	34	52			52		53	
17			Nakagawa River	Shinnaka Bridge	Nakagawa Town			40				14				51	31	30	107	38			56		16	
18			Mumogawa River	Kosei Bridge				28				26				12	12	14	14	34			43		30	
19			Arakawa River	Saikachi Bridge	Shioya Town			198				300				300			1,020			102		168	
20				Renjo Bridge	Sakura City			0				33				32			44			15		33	
21			Uchikawa River	Tanaka Bridge	Yaita City			1,440				130				78			127			122		143	
22				Asahi Bridge	Sakura City			18				77				82			114			101		82	
23			Arakawa River	Mukada Bridge	Nasu Karasuyama City			90				740				11	12	49	30	84			75		99	
24			Egawa River	Tributary				162				130				58	85	52	51	58			66		63	
25	Tonegawa River System	Kinugawa River System	Kinugawa River	Kawaji Daiichi Power Station, front	Nikko City			19				40						36	75			19		45	
26			Yunishi River	Maesawa Bridge				25										10	0					0	
27			Ojika River	Tributary				37				32						36	18			16		15	
28			Kinugawa River	Kosagoe				55				63						800	780					690	
29			Itaana River	Tributary				4,900				290				120		146	113	91	91	86			
30			Yukawa River	Tributary				118										63	60			114		72	
31			Daiya River	Shinkyo Bridge				47				123				58			37			54		38	
32			Shidobuchi River	Sujichigai Bridge				260				400				270			245			203		226	
33			Daiya River	Kaishin Bridge (Harigai)				13				45				45		24	69	15	0	57		13	
34			Kinugawa River	Sanuki	Shioya Town			20				177				11		29	109	18	12	74		42	
35			Nishi-Kinugawa River	Nishi-Kinugawa Bridge	Utsunomiya City			1,520				2,290				126			65			45		360	
36			Kinugawa River	Kinugawabashi Bridge(Hoshakuji Temple)				28				0				10			24			20		14	
37				Daidoizumi Bridge	Mooka City			0				12				24			30			42		51	
38			Egawa River	Tributary	Shimotsuke City			175				550				137	214	56	62	58			49		88	
39			Akabori River	Nikko City Hall, front	Nikko City			510				800				450			1,780			500		450	
40				Kiwadajima				117				125				104			93			40		380	
41			Tagawa River	Ozobashi Bridge	Utsunomiya City			62				57				28	69	104	28	101			142		150	
42			Kamagawa River	Tsukushi Bridge				182				65				99			78			68		123	
43			Tagawa River	Meiji Bridge	Kaminokawa Town			10				10				122			101			18		29	
44				Yanabashi Bridge	Oyama City			360				223				86			128			73		69	
45		Watarase River Area	Kurokawa River	Kaijima Bridge	Kanuma City			109				93				11			46			30		0	
46				Onari Bridge	Mibu Town			56				38				75			32			15		0	
47			Oashi River	Akaishi Bridge	Kanuma City			10				14				15			0			11		11	
48			Koyabu River	Koyabu Bridge				940				860				42			65			56		65	
49			Omoi River	Tamotsu Bridge	Tochigi City			30				66				12			79			10		0	
50				Otome-ohashi Bridge	Oyama City			186				40				154	34	106	27	191			46		0	
51		Uzuma River Area	Uzuma River	Uzuma Bridge	Tochigi City			95				0				82	135	89	89	34			52		56	
52		Watarase River Area	Watarase River	Watarasegawa River intake weir at Sori Power Station	Nikko City			63				34				36		20	38	55	53		34		27	
53				Hajika Bridge	Ashikaga City			26				48				34				80			36		46	
54				Nakabashi Bridge				71				300				37				22			12		53	
55				Watarase-ohashi Bridge	Tatebayashi City			128				30				260			67			310		228	
56				Shinkai Bridge	Tochigi City			48				57				43	164	127	46	45			40		36	

Total number of samples	1,491	Detection times	1,253

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

Table 4.3-14 Detection of radioactive cesium at respective locations (Tochigi Prefecture: river sediments) (No.2)

Location						River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																							
No.	Water area			Location	Municipality	FY2013												FY2014											
						4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Nakagawa River System		Nakagawa River	Ikuyobashishita	Nasushiobara City		13			12			14			23				18		26			12				
2				Komei Bridge			51			97			38			36			24			24			45			19	
3			Takaomata River	Takaomata Bridge	Nasu Town		133			76			79			116			52			20			25			191	
4			Yukawa River	Yukawa Bridge			95			73			50			43			62			49			25			43	
5			Nakagawa River	Kamikuroiso	Nasushiobara City/Nasumachi		91	49	28	73	42		74			11			102	58	83	45	90		44			24	
6			Yosasa River	Yosasa Bridge	Nasu Town		78			105			85			90			24			430			55			820	
7			Kurokawa River	Shinden Bridge				104		90			80			74			68			90			62			77	
8			Yosasa River	Kawada Bridge	Otawara City		103	109	274	77	87		50			67			75	134	152	146	206		61			137	
9			Nakagawa River	Kurobane			59	61	42	31	16		33			49			26	38	63	23	31		19			25	
10			Matsuba River	Tributary			68	36	80	119	84		132			106			19	73	61	59	80		96			79	
11			Sabigawa River	Udagawa Bridge			154			336			360			162				66		212			67			46	
12			Momura River	Momuranaka Bridge			137			87			107			143				83			110		106			125	
13			Hokigawa River	Yunohara	Nasushiobara City			72	56				42							12		16			11				
14				Sekiba Bridge				111		64			67			88				60		410			75			106	
15				Iwai Bridge	Otawara City		55			53			51			19				14			204		12			15	
16				Hokigawa Bridge			17	21	46	18	11		36			25			11	17	22	15	24		11			17	
17			Nakagawa River	Shinnaka Bridge	Nakagawa Town		33	19	14	57	0		94			18			19	17	19	15	42		15			12	
18			Mumogawa River	Kosei Bridge			31	22	20	19	16		14			15			16	11	18	0	20		16			15	
19			Arakawa River	Saikachi Bridge	Shioya Town		191			176			217			201			65			355			125			126	
20				Renjo Bridge	Sakura City		63			0			12			14			13			0			13			11	
21			Uchikawa River	Tanaka Bridge	Yaita City		85			195			103			72			105			152			63			97	
22				Asahi Bridge	Sakura City		94			100			72			68			54			279			19			33	
23			Arakawa River	Mukada Bridge	Nasu Karasuyama City		84	27	30	85	58		19			35			16	10	20	39	73		12			21	
24			Egawa River	Tributary			45	18	84	24	20		480			440			21	520	36	28	255		20			18	
25	Tonegawa River System	Kinugawa River System	Kinugawa River	Kawaji Daiichi Power Station, front	Nikko City			38		33			71			17			21			13			17			13	
26				Yunishi River	Maesawa Bridge			13		0			0			12			0			11			21				
27				Ojika River	Tributary			14		240			17			35			11			14			20			11	
28				Kinugawa River	Kosagoe			35		59			47			23			66			73			118			36	
29				Itaana River	Tributary			75	81	94	86	43	73						62	41	72	53	75		55			47	
30				Yukawa River	Tributary			0			0		11			137			0			10			0				
31				Daiya River	Shinkyo Bridge			75		21			33			15			12			20			17			20	
32				Shidobuchi River	Sujichigai Bridge			212		182			123			162				189		150			108			67	
33				Daiya River	Kaishin Bridge (Harigai)			16	15	0	15	11	18			12				24	11	13	0	12		0			0	
34				Kinugawa River	Sanuki	Shioya Town		470	134	154	310		17	274			97			14	0	0	0	20		0			19	
35			Nishi-Kinugawa River	Nishi-Kinugawa Bridge	Utsunomiya City		56			0			31			1,540			32			69			108			18	
36			Kinugawa River	Kinugawabashi Bridge(Hoshakuji Temple)			31			0			0			0			0			13			0			0	
37				Daidoizumi Bridge	Mooka City		0			10			11			0			22			95			43			0	
38			Egawa River	Tributary	Shimotsuke City		41	30	34	17	480		70			51			38	46	13	20	0		19			11	
39			Akabori River	Nikko City Hall, front	Nikko City			310		420			370			650			191			150			293			117	
40				Kiwadajima				187		78			61			69			48			41			26			25	
41			Tagawa River	Ozobashi Bridge	Utsunomiya City		64	23	18	13	36		17			35			20	12	27	12	13		14			16	
42			Kamagawa River	Tsukushi Bridge			133			27			50			169			81			107			56			40	
43			Tagawa River	Meiji Bridge	Kaminokawa Town		32			31			76			41			0			17			14			0	
44				Yanabashi Bridge	Oyama City		66			43			104			96			42			57			74			27	
45		Watarase River Area	Omoi River Area	Kurokawa River	Kaijima Bridge	Kanuma City	19			0			15			0			10			14			0			0	
46					Onari Bridge	Mibu Town	13			0			0			17				0		0			0			0	
47				Oashi River	Akaishi Bridge	Kanuma City	0			0			0			0			0			0			18			0	
48				Koyabu River	Koyabu Bridge		46			36			49			420			60			29			19			18	
49				Omoi River	Tamotsu Bridge	Tochigi City		0		119			0			0				0		0			0			0	
50					Otome-ohashi Bridge	Oyama City	62	13	15	101		53	0			0			15	43	65	540	0		0			0	
51			Uzuma River Area	Uzuma River	Uzuma Bridge	Tochigi City	192	530	460	44	186		26			50			195	0	115	82	69		157			116	
52			Watarase River Area	Watarase River	Watarasegawa River intake weir at Sori Power Station	Nikko City	18	19	32	54		20	15			21			15	90	18	15	13		18			28	
53					Hajika Bridge	Ashikaga City	59			28			16			15			0			15			0			14	
54					Nakabashi Bridge		0			0			0			0				10		0			0			0	
55					Watarase-ohashi Bridge	Tatebayashi City	21			112			0			160				0		59			12			0	
56					Shinkai Bridge	Tochigi City	29	34	30	16	13		19			22				17	11	77	16	24			18		11	

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

Table 4.3-14 Detection of radioactive cesium at respective locations (Tochigi Prefecture: river sediments) (No.3)

No.	Location: Water area		Location	Municipality	River sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1) FY2015 4	5	6	7	8	9	10	11	12	1	2	3	FY2016 4	5	6	7	8	9	10	11	12	1	2	3	Changes	Average of FY2016 (*2)	No.	Coefficient of variation	Trends(*3)
1	Nakagawa River System	Nakagawa River	Ikuyobashishita	Nasushiobara City		11			15			0			21			14			0			13			18		11	1	1.08	
2			Komei Bridge			17			21			11			16			19			18			11			29		19	2	1.06	
3		Takaomata River	Takaomata Bridge	Nasu Town		47			82			31			41			12			44			44			26		32	3	1.73	
4		Yukawa River	Yukawa Bridge			30			15			17			64			24			32			27			19		26	4	0.89	
5		Nakagawa River	Kamikuroiso	Nasushiobara City/Nasumachi		47	131	32	59	66		24			29			11	30	30	71	77		57			135		59	5	0.53	
6		Yosasa River	Yosasa Bridge	Nasu Town		19			17			19			17			39			0			151			19		52	6	1.62	
7		Kurokawa River	Shinden Bridge			75			60			35			30			75			44			85			57		65	7	0.94	
8		Yosasa River	Kawada Bridge	Otawara City		36	54	123	82	68		71			80			104	21	73	36	138		104			88		81	8	0.80	
9		Nakagawa River	Kurobane			23	15	18	21	29		23			19			17	19	32	16	36		24			15		23	9	0.56	
10		Matsuba River	Tributary			30	24	165	29	40		30			27			40	36	27	29	86		21			42		40	10	1.36	
11		Sabigawa River	Udagawa Bridge			14			30			23			24			26			10			29			67		33	11	1.16	
12		Momura River	Momuranaka Bridge			21			35			82			77			71			64			43			31		52	12	0.64	
13		Hokigawa River	Yunohara	Nasushiobara City			0		32			24			32			0			14			0			0		3.5	13	0.88	
14			Sekiba Bridge			74			49			39			34			21			25			29			15		23	14	0.94	
15			Iwai Bridge	Otawara City		18			23			13			17			16			13			12			17		15	15	1.05	
16			Hokigawa Bridge			0	13	45	12	10		13			14			0	0	0	11	14		14			15		7.7	16	1.09	
17		Nakagawa River	Shinnaka Bridge	Nakagawa Town		12	15	16	13	11		12			10			10	0	10	0	27		0			0		6.7	17	0.99	
18		Mumogawa River	Kosei Bridge			13	0	17	0	14		14			12			0	0	0	14	14		0			24		7.4	18	0.67	
19		Arakawa River	Saikachi Bridge	Shioya Town		71			55			14			26			40			22			24			22		27	19	1.23	
20			Renjo Bridge	Sakura City		0			17			0			0			0			14			0			13		6.8	20	1.13	
21		Uchikawa River	Tanaka Bridge	Yaita City		59			32			26			43			54			39			35			159		72	21	1.91	
22			Asahi Bridge	Sakura City		35			38			29			32			40			30			30			29		32	22	0.85	
23		Arakawa River	Mukada Bridge	Nasu Karasuyama City		0	15	12	12	12		11			0			15	16	19	13	11		10			11		13.6	23	2.37	
24		Egawa River	Tributary			14	16	12	21	0		12			105			78	24	16	68	0		21			16		32	24	1.53	
25	Tonegawa River System	Kinugawa River System	Kinugawa River	Kawaji Daiichi Power Station, front	Nikko City		18			0			24			16			28			35			10			25		25	25	0.66	
26			Yunishi River	Maesawa Bridge			0			14			0			13			0			0			0			0		0	26	1.31	
27			Ojika River	Tributary			0			21			0			0			0			0			0			0		0	27	2.04	
28			Kinugawa River	Kosagoe			33			95			14			16			16			44			29			17		27	28	1.73	
29			Itaana River	Tributary			62	63	41	34	23		25			116			27	20	54	23	18		21			27		27	29	3.95	
30			Yukawa River	Tributary				0		0			17			0			10			0			0			0		2.5	30	1.51	
31			Daiya River	Shinkyo Bridge			14			15			11			13			15			18			15			10		15	31	0.88	
32			Shidobuchi River	Sujichigai Bridge			95			81			146			100			78			111			64			44		74	32	0.54	
33			Daiya River	Kaishin Bridge (Harigai)			19	11	18	15	11		0			20			16	18	0	16	0		0			0		7.1	33	1.03	
34			Kinugawa River	Sanuki	Shioya Town		13	0	25	12	0		17			19			26	18	34	12	15		117			137		51	34	1.54	
35			Nishi-Kinugawa River	Nishi-Kinugawa Bridge	Utsunomiya City		14			25			196			149			50			14			0			27		23	35	2.03	
36			Kinugawa River	Kinugawabashi Bridge(Hoshakuji Temple)				0		0			12			15			0			0			0			0		0	36	1.37	
37				Daidoizumi Bridge	Mooka City			0		0			11			13			32			19			0			0		13	37	1.24	
38			Egawa River	Tributary	Shimotsuke City		21	45	18	40	31		40			17			200	57	20	234	82		0			16		87	38	1.45	
39			Akabori River	Nikko City Hall, front	Nikko City		1,010			262			72			64			49			219			196			245		177	39	0.94	
40				Kiwadajima			23			29			102			20			34			27			18			27		27	40	1.06	
41			Tagawa River	Ozobashi Bridge	Utsunomiya City		10	14	14	12	0		11			11			0	12	0	0	0		0			0		1.7	41	1.24	
42			Kamagawa River	Tsukushi Bridge			35			25			14			18			48			58			20			18		36	42	0.71	
43			Tagawa River	Meiji Bridge	Kaminokawa Town		0			0			0			19			0			103			10			0		28	43	1.30	
44				Yanabashi Bridge	Oyama City		51			63			12			22			24			24			24			15		22	44	1.03	
45		Watarase River Area	Omoi River Area	Kurokawa River	Kaijima Bridge	Kanuma City		0			0			0			0			0			0			47			0		12	45	1.71	
46					Onari Bridge	Mibu Town		0			0			0			0			0			0			10			38		12	46	1.59	
47				Oashi River	Akaishi Bridge	Kanuma City		0			0			10			0			0			53			0			0		13	47	1.88	
48				Koyabu River	Koyabu Bridge			19			13			14			13			33			20			0			0		13	48	2.06	
49				Omoi River	Tamotsu Bridge	Tochigi City		0			0			0			0			0			0			0			0		0	49	2.22	
50					Otome-ohashi Bridge	Oyama City		19	0	14	0	0		0			0			0	36	0	10	82		0			0		18.3	50	1.95	
51			Uzuma River Area	Uzuma River	Uzuma Bridge	Tochigi City			163	195	0	0	67		98			13		0	0	15	116	88		75			97		56	51	1.10	
52			Watarase River Area	Watarase River	Watarasegawa River intake weir at Sori Power Station	Nikko City		11		13		13	23	23		15			0		25	14	0	10	0		0			0		7.0	52	0.81	
53					Hajika Bridge	Ashikaga City				0		0			0			21			0			11			0			15		6.5	53	1.04	
54					Nakabashi Bridge					0		0			0			0			0			11			0			0		2.8	54	2.76	
55					Watarase-ohashi Bridge	Tatebayashi City				295			14			10			0			0			70			0			0		18	55	1.29	
56					Shinkai Bridge	Tochigi City			0	12	0	0	42		0			17		0	0	11	135	0		16			0		23	56	1.20	

	A	B	C	D	E

28 Average

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

*2: Arithmetic Average; calculated by assuming ND=0; Color codes show categories (see the right).

*3: Results of the analysis of trends at respective locations using the method explained on 4.3(1)2) Decreasing Increasing Unchanged Fluctuations

6) Gunma Prefecture

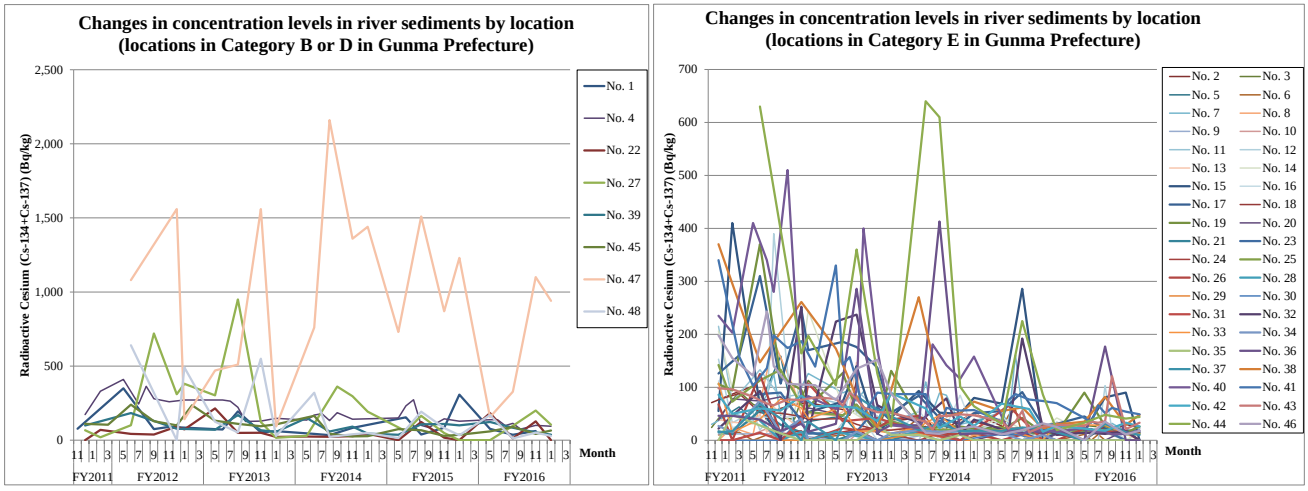
In Gunma Prefecture, surveys were conducted 12 to 37 times from November 2011 to January 2017 at 48 locations (rivers) in public water areas (this analysis excludes the survey results from eight locations where the survey was conducted only in 2011).

Regarding the concentration levels of detected values, one location was categorized into Category B, seven locations into Category D, and 40 locations into Category E (see Table 4.3-15 and Table 4.3-16).

Concentration levels were generally decreasing at 32 locations, were unchanged at one location and fluctuating at 15 locations.

Table 4.3-15 Categorizations of detected values at respective locations
(Gunma Prefecture: river sediments)

Category	Percentile (percentile in all detected values)	Number of locations	Locations
A	Upper 5 percentile	0	(None)
B	Upper 5 to 10 percentile	1	No. 47
C	Upper 10 to 25 percentile	0	(None)
D	Upper 25 to 50 percentile	7	No. 1, No. 4, No. 22, No. 27, No. 39, No. 45, No. 48
E	Lower than upper 25 to 50 percentile (lower 50%)	40	No. 2, No. 3, No. 5, No. 6, No. 7, No. 8, No. 9, No. 10, No. 11, No. 12, No. 13, No. 14, No. 15, No. 16, No. 17, No. 18, No. 19, No. 20, No. 21, No. 23, No. 24, No. 25, No. 26, No. 28, No. 29, No. 30, No. 31, No. 32, No. 33, No. 34, No. 35, No. 36, No. 37, No. 38, No. 40, No. 41, No. 42, No. 43, No. 44, No. 46



Notes: 1) For locations where surveys were conducted multiple times in one month, their average value is used in the figures.

2) Scales of the vertical axes differ in the left and right figures.

Figure 4.3-9 Changes in concentration levels over the years at respective locations
(Gunma Prefecture: river sediments)

Table 4.3-16 Detection of radioactive cesium at respective locations (Gunma Prefecture: river sediments) (No.1)

Location						River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																				
No.	Water area			Location	Municipality	FY2011								FY2012												
						8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
1	Tonegawa River System	Tonegawa River Area	Tonegawa River	Hirose Bridge	Minakami Town				77						350				74		90					
2				Tsukiyono Bridge					71			87			102		37	55 54	60		68		71			
3			Akaya River	Kosode Bridge					24				92		68				42		40		113			
4			Sakura River	In Ooaza Yachi	Kawaba Village					173		330			410		244	227 500	279		259		271			
5			Katashina River	Kirinoki Bridge	Katashina Village					38			63		38				159		31					
6				Tonemachitakatoya	Numata City					10			15		0		10	0 15	0		0					
7				Futae Bridge					30			51			39		86	96 154	47		74		126			
8			Agatsuma River	Shinto Bridge	Naganohara Town					0		24			11			187			95		0			
9			Shirasuna River	Shuttatsu Bridge	Nakanojo Town					12									12							
10			Agatsuma River	Downstream of Azuma Bridge	Higashi-Agatsuma Town					0		0			11		22	0 14	14		10		0			
11			Nakuta River	Tonoda Bridge	Takayama Village					215		73				133			81		85		83			
12			Agatsuma River	Agatsuma Bridge	Shibukawa City					153		33			53	19	37	170 610			0		11			
13			Tonegawa River	Taisho Bridge						39		34			31	49	15	56 69			30		50			
14			Takizawa River	Shintakizawa Bridge	Shibukawa City/Yoshioka Town					206		97				80			50		48		245			
15			Tonegawa River	Gunma-ohashi Bridge	Maebashi City					55		410				64			0			37	53			
16				Fukushima Bridge	Tamamura Town					112		23				44			43			46	39			
17		Karasu River Area	Nagai River	Kamigonda Bridge	Takasaki City					126			160			310			107			247	170			
18			Karasu River	Karasugawa Bridge						77			88			52			51			45	39			
19			Usui River	Nakase Bridge	Annaka City					106		94				370			120			95	63			
20				Hanataka Bridge	Takasaki City					38		78				74			82			40	61			
21			Kabura River	Tadakawa Bridge	Shimonita Town					17		11				56			29			15	17			
22				Kaburagawa Bridge	Takasaki City/Fujioka City					0		69				42			38			91	73			
23			Ogawa River	Kinzan Bridge	Kanra Town											87			90			36	13			
24			Nanmoku River	Ozawa Bridge	Nanmoku Village											68			10			18	0			
25			Someya River	Yakushi Bridge	Shinto Village					142		73				113			133			67	53			
26			Inogawa River	Kamakura Bridge	Takasaki City					68		0				125			12			11	0			
27			Karasu River	Iwakura Bridge	Takasaki City/Tamamura Town					67		19				101			720			310	380			
28			Kanna River	Shinkaname Bridge	Ueno Village											37			0			16	0			
29			Kanna River	Morito Bridge	Kanna Town					0		0				0			0			0	0			
30			Kanna River	Tobukyo Bridge	Fujioka City/Kamikawa Town					0		0				0			0			43	0			
31			Kanna River	Kannagawa Bridge	Kamisato Town					0		0				14			0			36	107			
32		Tonegawa River Area	Tonegawa River	Bando-ohashi Bridge	Honjo City					22		46				93			0			252	17			
33			Akagishirakawa River	In Shimohosoi Town	Maebashi City					108		15				40			78			61	41			
34			Momonoki River	Utsuboi Bridge						27		15				75			14			41	0			
35			Arato River	Okuhara Bridge						0		48							13			0	0			
36			Kasukawa River	Hozumi Bridge	Isesaki City					46		46				39			18			31	16			
37			Hirose River	Nakajima Bridge						15		17				68			41			0	35			
38			Hayakawa River	Hayakawa Bridge						370						147						261				
39				Maejima Bridge	Ota City					99						183						77				
40			Tonegawa River	Tone-ozeki Weir	Chiyoda Town /Gyoda City					235		203			410		340	280		640 380		72	83			
41		Watarase River Area	Koguro River	Kayano Bridge	Kiryu City					340			158		103		136	198		228 120		187		139		
42			Watarase River	Takatsudo	Midori City					86		50				60			56			84		64		
43				Intake for Akaiwayosui water channel	Kiryu City					98		96			82		69	66		74 80		76		81		
44			Tatara River	Ejiri Bridge	Oura Town											630						164	197			
45			Kiryu River	Kannon Bridge	Kiryu City					110			104			240			128			100		235		
46				Sakai Bridge	Kiryu City/Ashikaga City					198		155			122		243	140		95 118		105		104		
47			Tsuruuda River	Lake Jonuma	Tatebayashi City											1,080						1,560	141			
48			Yatagawa River	Togoda Bridge	Meiwa Town/Itakura Town											640						0	490			
						Total number of samples		1,142		Detection times		911														

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

Table 4.3-16 Detection of radioactive cesium at respective locations (Gunma Prefecture: river sediments) (No.2)

Location						River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																							
No.	Water area			Location	Municipality	FY2013												FY2014											
						4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Tonegawa River System	Tonegawa River Area	Tonegawa River	Hirose Bridge	Minakami Town			72		194			52		61					42		34			83				
2				Tsukiyono Bridge				70	46	47	115	40		60		36					33	55	25	50	23		38		51		
3			Akaya River	Kosode Bridge				39			60			13		90					16		17			19		24		
4			Sakura River	In Ooaza Yachi	Kawaba Village			282	260	263	222	126		129		147			135	169		179	132	185		141				
5			Katashina River	Kirinoki Bridge	Katashina Village			46			17			17		34			15				13			17				
6				Tonemachitakatoya	Numata City			10	10	0	0	0		0		0			42	0		0	0	0		0				
7				Futae Bridge				99	80	95	74	92		39		34			54	110		53	89	85		30		36		
8			Agatsuma River	Shinto Bridge	Naganohara Town			0			0			0		0				38			27			0		10		
9			Shirasuna River	Shuttatsu Bridge	Nakanojo Town			0			12			0		0				10			0			0		0		
10			Agatsuma River	Downstream of Azuma Bridge	Higashi-Agatsuma Town		0	0	0	12	0			0		0			0	0		0	0	11		0		0		
11			Nakuta River	Tonoda Bridge	Takayama Village			68		93				60		38				19			15			17		21		
12			Agatsuma River	Agatsuma Bridge	Shibukawa City		16	34	95	51	56			46		10			0	26		11	11	0		13		17		
13			Tonegawa River	Taisho Bridge			46	54	65	147	16			15		20			25	20		14	12	15		35		53		
14			Takizawa River	Shintakizawa Bridge	Shibukawa City/Yoshioka Town			65		48				24		39			23				15			24		22		
15			Tonegawa River	Gunma-ohashi Bridge	Maebashi City			73		140				12		43			93				52			50		80		
16				Fukushima Bridge	Tamamura Town			64		56				0		0			57				0			85		16		
17		Karasu River Area	Nagai River	Kamigonda Bridge	Takasaki City			186		176				137		52			84				42			31		51		
18			Karasu River	Karasugawa Bridge				41		30				19		19				26			13			11		35		
19			Usui River	Nakase Bridge	Annaka City			127		57				19		131				17			27			26		22		
20				Hanataka Bridge	Takasaki City			47		68				12		0			0				0			13		0		
21			Kabura River	Tadakawa Bridge	Shimonita Town		0			13				0		0			17				12			0		0		
22				Kaburagawa Bridge	Takasaki City/Fujioka City		214			49				50		22			24				23			27		43		
23			Ogawa River	Kinzan Bridge	Kanra Town		13			16				63		36				13			37			18		18		
24			Nanmoku River	Ozawa Bridge	Nanmoku Village		13			21				0		11			0				13			0		0		
25			Someya River	Yakushi Bridge	Shinto Village			47		67				24		35			23				20			20		17		
26			Inogawa River	Kamakura Bridge	Takasaki City			23		19				23		39			46				10			12		14		
27			Karasu River	Iwakura Bridge	Takasaki City/Tamamura Town		302			950				122		16			29					362		296		192		
28			Kanna River	Shinkaname Bridge	Ueno Village		16							0					17							0				
29			Kanna River	Morito Bridge	Kanna Town		0							0					13							0				
30			Kanna River	Tobukyo Bridge	Fujioka City/Kamikawa Town		0							0					0							0				
31			Kanna River	Kannagawa Bridge	Kamisato Town			36						42					16							0				
32		Tonegawa River Area	Tonegawa River	Bando-ohashi Bridge	Honjo City		224			237				66		53			33					79		11		39		
33			Akagishirakawa River	In Shimohosoi Town	Maebashi City			63		17				18		13			25				47			15		10		
34			Momonoki River	Utsuboi Bridge				0		16				0		13			19				16			17		15		
35			Arato River	Okuhara Bridge				0		0				26		10			10				0			10		0		
36			Kasukawa River	Hozumi Bridge	Isesaki City		31			286				15		29			28				413			11		13		
37			Hirose River	Nakajima Bridge			0			83				57		45			19				32			17		18		
38			Hayakawa River	Hayakawa Bridge			173			82				25		95			270					45		51		73		
39				Maejima Bridge	Ota City		70			169				67		56			150				58			91		44		
40			Tonegawa River	Tone-ozeki Weir	Chiyoda Town /Gyoda City		59	75	50	95	400			172		28			23	45		181		178	105	116		158		
41		Watarase River Area	Koguro River	Kayano Bridge	Kiryu City		330	143	157	113	48			90		87				102	72	41	26	61		56		57		
42			Watarase River	Takatsudo	Midori City		65			61				36		89				60			23			45		27		
43				Intake for Akaiwayosui water channel	Kiryu City		78	65	90	78	62			53		52				35	35	20	46	46		49		47		
44			Tatara River	Ejiri Bridge	Oura Town		104			360				126		26				640			610			101		64		
45			Kiryu River	Kannon Bridge	Kiryu City		131			110				94		107				164			43			25		27		
46				Sakai Bridge	Kiryu City/Ashikaga City		76			135				152		88				14			12			22		26		
47			Tsuruuda River	Lake Jonuma	Tatebayashi City		470			510				1,560		92				760			2,160			1,360		1,440		
48			Yatagawa River	Togoda Bridge	Meiwa Town/Itakura Town		124			52				550		28				320			22			40		48		

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

Table 4.3-16 Detection of radioactive cesium at respective locations (Gunma Prefecture: river sediments) (No.3)

Location						FY2015												FY2016												Changes	Average of FY2016 (*2)	No.	Coefficient of variation	Trends(*3)
No.	Water area			Location	Municipality	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3						
1	Tonegawa River System	Tonegawa River Area	Tonegawa River	Hirose Bridge	Minakami Town			154		38			84		307				76			36			62						58	1	0.87	
2				Tsukiyono Bridge			27	15	18	18	15		19		22				21	22	12	21	17		30		23				21	2	0.60	
3			Akaya River	Kosode Bridge			25			11			13		13				28			24			13		13				20	3	0.82	
4			Sakura River	In Ooaza Yachi	Kawaba Village		150	231	273	100	85		144		128				138	138	98	113	74		100		94				108	4	0.49	
5			Katashina River	Kirinoki Bridge	Katashina Village		18			15			14		17				15			25			0		0				10	5	1.15	
6				Tonemachitakatoya	Numata City		21	47	58	10	0		0		0				11	0	11	0	0		0		0				3.1	6	1.84	
7				Futae Bridge			53	31	161	59	19		18		24				14	15	14	21	32		17		21				19	7	0.67	
8			Agatsuma River	Shinto Bridge	Naganohara Town		0			10			0		20				0			0			0		0				0	8	2.26	
9			Shirasuna River	Shuttatsu Bridge	Nakanojo Town		0			0			0		19				0			0			0		0				0	9	1.72	
10			Agatsuma River	Downstream of Azuma Bridge	Higashi-Agatsuma Town		0	0	0	0	0		0		0				0	0	0	0	0		0		0				0	10	2.20	
11			Nakuta River	Tonoda Bridge	Takayama Village		19			17			20		25				15			17			17		22				18	11	0.95	
12			Agatsuma River	Agatsuma Bridge	Shibukawa City		0	0	0	0	12		0		0				0	0	0	103	18		0		13				19	12	2.38	
13			Tonegawa River	Taisho Bridge			12	11	15	14	0		12		16				26	15	27	13	14		12		0				15	13	0.90	
14			Takizawa River	Shintakizawa Bridge	Shibukawa City/Yoshioka Town		42			20			18		42				16			14			0		16				12	14	1.16	
15			Tonegawa River	Gunma-ohashi Bridge	Maebashi City		69			286			0		14				17			81			90		0				47	15	1.23	
16				Fukushima Bridge	Tamamura Town		37			11			0		35				0			36			0		0				9.0	16	0.96	
17		Karasu River Area	Nagai River	Kamigonda Bridge	Takasaki City		55			91			28		31				45			21			19		15				25	17	0.82	
18			Karasu River	Karasugawa Bridge			22			23			11		0				0			27			16		14				14	18	0.75	
19			Usui River	Nakase Bridge	Annaka City		20			42			14		13				90			27			14		26				39	19	1.14	
20				Hanataka Bridge	Takasaki City		13			15			0		12				0			0			19		0				4.8	20	1.13	
21			Kabura River	Tadakawa Bridge	Shimonita Town		0			0			0		0				0			0			0		0				0	21	1.61	
22				Kaburagawa Bridge	Takasaki City/Fujioka City		0			123			17		0				183			12			127		0				81	22	1.06	
23			Ogawa River	Kinzan Bridge	Kanra Town		10			11			23		13				15			18			0		0				8.3	23	0.97	
24			Nanmoku River	Ozawa Bridge	Nanmoku Village		0			0			0		0				0			0			0		0				0	24	2.06	
25			Someya River	Yakushi Bridge	Shinto Village		23			19			29		21				16			19			11		12				15	25	0.88	
26			Inogawa River	Kamakura Bridge	Takasaki City		0			11			0		0				22			16			16		0				14	26	1.35	
27			Karasu River	Iwakura Bridge	Takasaki City/Tamamura Town			60		164			48		0				0			96			200		104				100	27	1.16	
28			Kanna River	Shinkaname Bridge	Ueno Village		0						0						0						0						0	28	1.66	
29			Kanna River	Morito Bridge	Kanna Town		0						0						0						0						0	29	3.74	
30			Kanna River	Tobukyo Bridge	Fujioka City/Kamikawa Town			14					0						0						0						0	30	2.90	
31			Kanna River	Kannagawa Bridge	Kamisato Town			65					0						0						0						0	31	1.42	
32		Tonegawa River Area	Tonegawa River	Bando-ohashi Bridge	Honjo City			16		192			23		10				14			12			17		0				11	32	1.23	
33			Akagishirakawa River	In Shimohosoi Town	Maebashi City		20			11			0		32				29			28			13		12				21	33	0.83	
34			Momonoki River	Utsuboi Bridge			14			0			10		0				0			0			0		0				0	34	1.32	
35			Arato River	Okuhara Bridge			0			0			0		0				0			0			0		0				0	35	2.12	
36			Kasukawa River	Hozumi Bridge	Isesaki City		12			23			13		20				0			177			0		0				44	36	1.79	
37			Hirose River	Nakajima Bridge			18			24			21		15				0			31			15		10				14	37	0.81	
38			Hayakawa River	Hayakawa Bridge			55			62			22		30				35			82			29		48				49	38	0.96	
39				Maejima Bridge	Ota City		36			107			109		100				123			84			52		37				74	39	0.48	
40			Tonegawa River	Tone-ozeki Weir	Chiyoda Town /Gyoda City			16	18	16	11	18		19		16				23	17	15	16	11		12		18				16	40	1.21	
41		Watarase River Area	Koguro River	Kayano Bridge	Kiryu City		36		76		87		74		70				42	33	66	51	61		54		49				51	41	0.72	
42			Watarase River	Takatsudo	Midori City		69				59		16		27				22			18			33		26				25	42	0.47	
43				Intake for Akaiwayosui water channel	Kiryu City		36		22	35	55	15		26		29				27	35	33	36	121		21		33				44	43	0.48	
44			Tatara River	Ejiri Bridge	Oura Town		31				225		86		19				33			48			41		44				42	44	1.14	
45			Kiryu River	Kannon Bridge	Kiryu City		74				67		29		36				59			90			42		65				64	45	0.63	
46				Sakai Bridge	Kiryu City/Ashikaga City		11				19		32		25				0			35			11		18				16	46	0.86	
47			Tsuruuda River	Lake Jonuma	Tatebayashi City		730				1,510		870		1,230				156			327			1,100		940				631	47	0.61	
48			Yatagawa River	Togoda Bridge	Meiwa Town/Itakura Town		14				192		82		33				169			12			51		29				65	48	1.31	

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

*2: Arithmetic Average; calculated by assuming ND=0; Color codes show categories (see the right).

*3: Results of the analysis of trends at respective locations using the method explained on 4.3(1)2)

A	B	C	D	E

38 (Average)

↘ Decreasing ↗ Increasing ⇝ Unchanged ∿ Fluctuations

7) Chiba and Saitama Prefectures and Tokyo Metropolis

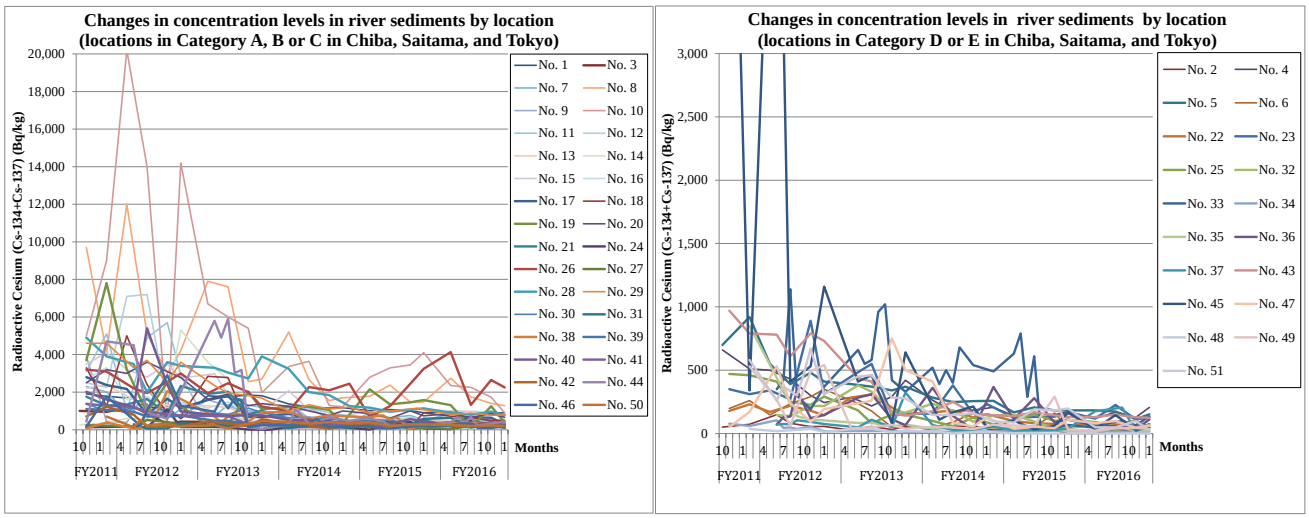
In Chiba and Saitama Prefectures and Tokyo Metropolis, surveys were conducted 20 to 36 times from October 2011 to January 2017 at 51 locations (rivers) in public water areas (47 locations in Chiba Prefecture, two locations in Saitama Prefecture, and two locations in Tokyo Metropolis).

Regarding the concentration levels of detected values, six locations were categorized into Category A, eight locations into Category B, 18 locations into Category C, 13 locations into Category D, and six locations into Category E (see Table 4.3-17 and Table 4.3-18).

Concentration levels were generally decreasing at 41 locations, were unchanged at two locations and fluctuating at eight locations.

Table 4.3-17 Categorizations of detected values at respective locations
(Chiba and Saitama Prefectures and Tokyo Metropolis: river sediments)

Category	Percentile (percentile in all detected values)	Number of locations	Locations
A	Upper 5 percentile	6	No. 1, No. 8, No. 10, No. 15, No. 26, No. 28
B	Upper 5 to 10 percentile	8	No. 3, No. 7, No. 12, No. 17, No. 18, No. 19, No. 20, No. 29
C	Upper 10 to 25 percentile	18	No. 9, No. 11, No. 13, No. 14, No. 16, No. 21, No. 24, No. 27, No. 30, No. 31, No. 38, No. 39, No. 40, No. 41, No. 42, No. 44, No. 46, No. 50
D	Upper 25 to 50 percentile	13	No. 4, No. 5, No. 6, No. 22, No. 23, No. 32, No. 33, No. 36, No. 37, No. 43, No. 45, No. 47, No. 51
E	Lower than upper 25 to 50 percentile (lower 50%)	6	No. 2, No. 25, No. 34, No. 35, No. 48, No. 49



Notes: 1) For locations where surveys were conducted multiple times in one month, their average value is used in the figures.

2) Scales of the vertical axes differ in the left and right figures.

Figure 4.3-10 Changes in concentration levels over the years at respective locations
(Chiba and Saitama Prefectures and Tokyo Metropolis: river sediments)

Table 4.3-18 Detection of radioactive cesium at respective locations (Chiba and Saitama Prefectures and Tokyo Metropolis: river sediments) (No.1)

Location						River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																				
No.	Prefecture	Water area		Location	Municipality	FY2011							FY2012													
						8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Chiba Prefecture	Tonegawa River System	Shogen River	Fukama-ohashi Bridge	Inzai City /Sakae Town				1,910			1,780				1,660		1,190			1,200		590		
2				Shinbei Bridge				50				72				149		81			54		56		
3			Nagato River	Intake at Maeshinden Water Purification Plant	Sakae Town			1,000				950				1,230		850			310		430		
4				Nagato Bridge				660				510			500			430			300		244		
5				Fujimi Bridge				700				920			550			390			480		410		
6			Ryudai River	Ryumatsuno Bridge	Narita City				197			260			147			234			290		350		
7			Nekona River	Shinkawa Floodgate					2,300			2,010			910			1,620			640		1,080		
8		Feeder rivers of Lake Teganuma	Ohori River	Kitakashiwa Bridge	Kashiwa City				9,700			4,100			12,000			5,100			3,000		4,200		
9			Otsu River	Sanno Bridge, under	Kamagaya City				3,900			440			390			2,140			900		710		
10				Kaminuma Bridge	Kashiwa City				5,000			9,000			20,200			14,000			380		14,200		
11			Someiriotoshi	Someishinbashi Bridge					3,100			5,100			990			4,900			5,700		2,900		
12			Kanayamaotoshi	Downstream of Karuizawasakai Bridge	Kamagaya City /Shiroi City				2,500			2,260			7,100			7,200			1,300		1,430		
13				Nauchi Bridge	Shiroi City				2,200			2,400			1,800			1,270			1,330		1,210		
14			Kamenari River	Kamenari Bridge	Inzai City			256				360			600			560			1,620		5,300		
15		Feeder rivers of Lake Inbanuma	Igusasuiro Channel	Downstream of Igusasuiro Channel	Kamagaya City				3,500			4,100			3,200			2,800			3,500		2,750		
16			Futae River	Tomigaya Bridge	Funabashi City /Shiroi City				2,700			3,300			1,640			1,760			1,150		1,460		
17			Kanzaki River	Kanzaki Bridge	Yachiyo City /Inzai City				2,800			2,380			2,170			830			1,650		1,150		
18			Kanno River	Kanno Bridge	Yachiyo City				3,300			1,250			5,000			2,410			880		730		
19			Inba Discharge Channel(Upper reaches)	Yachiyo Bridge					3,700			7,800			3,200			910			2,530		1,280		
20			Teguri River	Mumei Bridge	Sakura City				2,500			3,200			3,000			3,600			3,100		2,780		
21			Moroto River	Moroto Bridge	Inzai City				1,760			1,290			1,340			1,640			850		2,330		
22			Kashima River	Iwatomi Bridge	Sakura City				178			230			170			218			179		144		
23			Takasaki River	Ryuto Bridge					350			310			340			270			890		310		
24			Kashima River	Kashima Bridge					130			149			173			126			1,080		143		
25			Inbasuiro Channel	Tsurumaki Bridge	Inzai City				470			460				410		250			226		291		
26		Edogawa River System	Toneunga Canal	Unga Bridge	Nagareyama City/Noda City				3,200			3,100				2,210		1,950			2,550		3,000		
27			Edogawa River	Nagareyama Bridge	Nagareyama City/Misato City				240			220				166		520			410		275		
28			Sakagawa River	Benten Bridge	Matsudo City				4,900			3,900				3,500		1,990			3,600		3,400		
29			Shinsaka River	Sakane Bridge					4,600			4,600				3,300		3,700			2,520		3,600		
30			Edogawa River	Shinkatsushika Bridge	Matsudo City/Katsushika City				1,360			1,010				1,120		1,110			740		700		
31				Ichikawa Bridge	Ichikawa City/Edogawa City											290		64			73		350		
32				Vicinity of Keiyo Road												145		137			218		216		
33				Gyotokukadozeki Weir (upperreaches)	Ichikawa City											350	420	1,140	300		190		370		
34				Shingyotokubashi Bridge					78			59				104	44	48	35		53		17		
35			Kyu-Edogawa River	Edogawa Floodgate, down	Ichikawa City/Edogawa City							850							136		109		103		
36				8 km Point to the estuary												71	128	134	340		121		145		
37				Imai Bridge												70	75	73	104		92		75		
38				Urayasu Bridge	Urayasu City/Edogawa City				75			380				70	71	1,360	580		2,050		1,640		
39			Mamagawa River	Nemoto Floodgate	Ichikawa City				1,100			1,050				960		700			700		750		
40			Kokubu River	Suwada Bridge					2,020			1,610				1,200		5,400			2,390		970		
41			Haruki River	Before the confluence with Kokubu River					1,380			1,270				1,210		930			840		760		
42			Hasen-okashiwa River	Downstream of Nakazawashinbashi Bridge	Kamagaya City/Ichikawa City				710			1,220				800		153			189		166		
43			Okashiwa River	Sengen Bridge	Ichikawa City				970			790				780		610			790		730		
44			Mamagawa River	Mitomae Bridge					430			4,700				4,500		920			580		2,020		
45		Ebigawa River		Yachiyo Bridge	Funabashi City				6,400			340				6,000		410			530		1,160		
46		Inba Discharge Channel (lower		Shinhanamigawa Bridge	Chiba City				167			1,770				530	208	1,020	1,730		2,900		1,270		
47		Miyako River		Miyako Bridge					50			171				530		241			91		193		
48	Saitama Prefecture	Arakawa River System	Arakawa River Middle Reaches	Onari Bridge	Konosu City							35				19		25			37		12		
49			Arakawa River Lower Reaches	Sasame Bridge	Toda City							530				266		61			490		540		
50	Tokyo Metropolis			Kasai Bridge	Koto City /Edogawa City							700				131	520	217	280		300		175		
51			Sumida River	Ryogoku Bridge	Chuo City							580				260	370		300	470	670		310		

Total number of samples	1,170	Detection times	1,157

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

Table 4.3-18 Detection of radioactive cesium at respective locations (Chiba and Saitama Prefectures and Tokyo Metropolis: river sediments) (No.2)

Location						River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																								
No.	Prefecture	Water area		Location	Municipality	FY2013												FY2014												
						4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Chiba Prefecture	Tonegawa River System	Shogen River	Fukama-ohashi Bridge	Inzai City /Sakae Town		1,800			1,750			1,840		1,810				1,370			1,210			1,150		1,170		
2				Shinbei Bridge			26			56			31		55				31			57			59			27	
3			Nagato River	Intake at Maeshinden Water Purification Plant	Sakae Town		420			210			320		420				171			229			369			178	
4				Nagato Bridge			285			217			291		420				263			173			185			207	
5				Fujimi Bridge			390			370			340		370				283			248			255			258	
6			Ryudai River	Ryumatsuno Bridge	Narita City			236		177			49		45				46			89			161		48		
7			Nekona River	Shinkawa Floodgate				720		1,330			1,020		910				920			1,160			580		221		
8		Feeder rivers of Lake Teganuma	Ohori River	Kitakashiwa Bridge	Kashiwa City		7,900			7,600			2,560		2,690				5,200			2,660			1,550		1,700		
9			Otsu River	Sanno Bridge, under	Kamagaya City		1,600			1,250			930		820					1,120		610			680		470		
10				Kaminuma Bridge	Kashiwa City		6,700			6,000			5,400		1,970				3,360			3,640			1,290		1,220		
11			Someiriotoshi	Someishinbashi Bridge			305			430			1,310		1,190				1,100			1,160			900		790		
12			Kanayamaotoshi	Downstream of Karuizawasakai Bridge	Kamagaya City /Shiroi City		920			820			460		460				440			440			440		305		
13				Nauchi Bridge	Shiroi City		1,280			1,170			750		710				129			510			510		392		
14			Kamenari River	Kamenari Bridge	Inzai City		3,600			2,680			162		222				265			390			410		419		
15		Feeder rivers of Lake Inbanuma	Igusasuiro Channel	Downstream of Igusasuiro Channel	Kamagaya City			2,980		1,890			800		970				2,070			1,060			740			750	
16			Futae River	Tomigaya Bridge	Funabashi City /Shiroi City		1,150			1,480			760		760					730		640			600		456		
17			Kanzaki River	Kanzaki Bridge	Yachiyo City /Inzai City		1,590			1,790			680		670				850			550			458		309		
18			Kanno River	Kanno Bridge	Yachiyo City		2,840			2,780			126		58				265			620			640		540		
19			Inba Discharge Channel(Upper reaches)	Yachiyo Bridge			202			231			2,030		1,080				1,220			1,220			1,050		352		
20			Teguri River	Mumei Bridge	Sakura City		1,620			1,900			1,280		1,390				1,250			1,000			760		1,000		
21			Moroto River	Moroto Bridge	Inzai City		1,910			2,020			810		1,010				540			420			234		408		
22			Kashima River	Iwatomi Bridge	Sakura City		284			307			205		154				167			181			126		153		
23			Takasaki River	Ryuto Bridge			450			550			143			154			157			380			155		232		
24			Kashima River	Kashima Bridge				149		127			12			0			132			139			120		126		
25			Inbasuiro Channel	Tsurumaki Bridge	Inzai City			182		81			150		149				99			58			125			70	
26		Edogawa River System	Toneunga Canal	Unga Bridge	Nagareyama City/Noda City		1,940			2,480			2,000		1,240				980			2,270			2,100			2450	
27			Edogawa River	Nagareyama Bridge	Nagareyama City/Misato City		191			450			348		282				216			155			175			292	
28			Sakagawa River	Benten Bridge	Matsudo City			3,300		3,040			2,730		3,900				3,240			2,000			1,840			1260	
29			Shinsaka River	Sakane Bridge				2,350		1,950			1,820		1,680				990			1,330			1,100			1200	
30			Edogawa River	Shinkatsushika Bridge	Matsudo City/Katsushika City			890		820			1,150		920				630			670			570			490	
31				Ichikawa Bridge	Ichikawa City/Edogawa City			258		206			250		287				92			219			171			114	
32				Vicinity of Keiyo Road				380		330			175		164				235			180			93			142	
33				Gyotokukadozeki Weir (upperreaches)	Ichikawa City			660	550	580	960	1,020	420		330				520	390	500	400	680		540			490	
34				Shingyotokubashi Bridge				20		19			20		12				16			11			15			16	
35			Kyu-Edogawa River	Edogawa Floodgate, down	Ichikawa City/Edogawa City			83		84			56		70				38			42			31			50	
36				8 km Point to the estuary				283		310			112		65				360			139			30			368	
37				Imai Bridge				48		108			50		323				67			27			31			54	
38				Urayasu Bridge	Urayasu City/Edogawa City			700	380	700	850	810	440		940				920	840	680	590	650		760			700	
39			Mamagawa River	Nemoto Floodgate	Ichikawa City			480		480			222		295				279			335			260			255	
40			Kokubu River	Suwada Bridge				790		730			770		770				520			530			406			430	
41			Haruki River	Before the confluence with Kokubu River				730		710			304		309				306			321			286			277	
42			Hasen-okashiwa River	Downstream of Nakazawashinbashi Bridge	Kamagaya City/Ichikawa City		440			350			178		560				323			215			56			277	
43			Okashiwa River	Sengen Bridge	Ichikawa City			440		410			158		141				175			251			156			144	
44			Mamagawa River	Mitomae Bridge				5,800	4,900	5,900	3,010	3,180	138		34				295	1,060	730	314	411		670			460	
45		Ebigawa River		Yachiyo Bridge	Funabashi City			410		460			80		640					108		167			213		52		
46		Inba Discharge Channel (lower		Shinhanamigawa Bridge	Chiba City			960	1,640	1,130	1,680	1,590	146		232					329	154	174	284	570		131		160		
47		Miyako River		Miyako Bridge				238		259			750		500				410			85			56		125		
48	Saitama Prefecture	Arakawa River System	Arakawa River Middle Reaches	Onari Bridge	Konosu City		34			38			10		19				17			0			10			10	
49			Arakawa River Lower Reaches	Sasame Bridge	Toda City		41			49			67		36				53			48			35			68	
50	Tokyo Metropolis			Kasai Bridge	Koto City /Edogawa City			248		75			316		450				430			317			410			330	
51			Sumida River	Ryogoku Bridge	Chuo City			450		460			283		278				145			147			160			96	

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0".

Table 4.3-18 Detection of radioactive cesium at respective locations

(Chiba and Saitama Prefectures and Tokyo Metropolis: river sediments) (No.3)

Location						River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																									Average of FY2016 (*2)	No.	Coefficient of variation	Trends(*3)
No.	Prefecture	Water area		Location	Municipality	FY2015												FY2016												Changes				
						4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3					
1	Chiba Prefecture	Tonegawa River System	Shogen River	Fukama-ohashi Bridge	Inzai City /Sakae Town		1,010			1,070			1,000		910				960			800			888		900				887	1	0.32	Decreasing
2	Chiba Prefecture	Tonegawa River System	Shogen River	Shinbei Bridge	Inzai City /Sakae Town		30			18			25		0				0			28			19		25				18	2	0.74	Decreasing
3	Chiba Prefecture	Tonegawa River System	Nagato River	Intake at Maeshinden Water Purification Plant	Sakae Town		431			438			389		411				407			499			489		358				438	3	0.58	Decreasing
4	Chiba Prefecture	Tonegawa River System	Nagato River	Nagato Bridge	Sakae Town		138			155			148		173				119			168			127		206				155	4	0.54	Decreasing
5	Chiba Prefecture	Tonegawa River System	Nagato River	Fujimi Bridge	Sakae Town		167			206			182		183				182			173			114		151				155	5	0.59	Decreasing
6	Chiba Prefecture	Tonegawa River System	Ryudai River	Ryumatsuno Bridge	Narita City		31			48			161		44				90			65			105		35				74	6	0.72	Decreasing
7	Chiba Prefecture	Tonegawa River System	Nekona River	Shinkawa Floodgate	Narita City		880			640			760		508				840			582			373		497				573	7	0.55	Decreasing
8	Chiba Prefecture	Feeder rivers of Lake Teganuma	Ohori River	Kitakashiwa Bridge	Kashiwa City		1,780			2,380			1,480		1,470				2,740			1,750			1,400		1,280				1,793	8	0.78	Decreasing
9	Chiba Prefecture	Feeder rivers of Lake Teganuma	Otsu River	Sanno Bridge, under	Kamagaya City		385			471			460		432				298			427			403		304				358	9	0.94	Decreasing
10	Chiba Prefecture	Feeder rivers of Lake Teganuma	Otsu River	Kaminuma Bridge	Kashiwa City		2,790			3,290			3,450		4,100				2,350			2,260			1,730		900				1,810	10	0.98	Decreasing
11	Chiba Prefecture	Feeder rivers of Lake Teganuma	Someiriotoshi	Someishinbashi Bridge	Kashiwa City		640			510			510		605				324			24			493		383				306	11	1.12	Decreasing
12	Chiba Prefecture	Feeder rivers of Lake Teganuma	Kanayamaotoshi	Downstream of Karuizawasakai Bridge	Kamagaya City /Shiroi City		510			469			660		560				611			666			397		660				584	12	1.40	Decreasing
13	Chiba Prefecture	Feeder rivers of Lake Teganuma	Kanayamaotoshi	Nauchi Bridge	Shiroi City		590			600			518		534				364			414			393		409				395	13	0.70	Decreasing
14	Chiba Prefecture	Feeder rivers of Lake Teganuma	Kamenari River	Kamenari Bridge	Inzai City		750			519			363		302				366			255			406		257				321	14	1.43	Fluctuations
15	Chiba Prefecture	Feeder rivers of Lake Inbanuma	Igusasuiro Channel	Downstream of Igusasuiro Channel	Kamagaya City		1,110			920			1,080		1,060				1,010				970		780		800				890	15	0.64	Decreasing
16	Chiba Prefecture	Feeder rivers of Lake Inbanuma	Futae River	Tomigaya Bridge	Funabashi City /Shiroi City		459			510			439		447				363				388		379		367				374	16	0.79	Decreasing
17	Chiba Prefecture	Feeder rivers of Lake Inbanuma	Kanzaki River	Kanzaki Bridge	Yachiyo City /Inzai City		403			411			416		97				337			660			637		296				483	17	0.79	Decreasing
18	Chiba Prefecture	Feeder rivers of Lake Inbanuma	Kanno River	Kanno Bridge	Yachiyo City		198			262			105		900				720			655			471		504				588	18	1.12	Decreasing
19	Chiba Prefecture	Feeder rivers of Lake Inbanuma	Inba Discharge Channel(Upper reaches)	Yachiyo Bridge	Yachiyo City		2,150			1,350			1,460		1,580				1,310			106			1,250		390				764	19	1.00	Decreasing
20	Chiba Prefecture	Feeder rivers of Lake Inbanuma	Teguri River	Mumei Bridge	Sakura City		860			610			1,010		740				860			660			850		667				759	20	0.62	Decreasing
21	Chiba Prefecture	Feeder rivers of Lake Inbanuma	Moroto River	Moroto Bridge	Inzai City		354			300			208		511				181			219			145		159				176	21	0.83	Decreasing
22	Chiba Prefecture	Feeder rivers of Lake Inbanuma	Kashima River	Iwatomi Bridge	Sakura City		98			81			76		63				83			72			57		68				70	22	0.48	Decreasing
23	Chiba Prefecture	Feeder rivers of Lake Inbanuma	Takasaki River	Ryuto Bridge	Sakura City		125			131			133		161				118			225			111		127				145	23	0.70	Decreasing
24	Chiba Prefecture	Feeder rivers of Lake Inbanuma	Kashima River	Kashima Bridge	Sakura City		13			266			404		79				35			432			312		255				259	24	1.14	Fluctuations
25	Chiba Prefecture	Feeder rivers of Lake Inbanuma	Inbasuiro Channel	Tsurumaki Bridge	Inzai City		104			151			100		107				90			25			55		20				48	25	0.80	Decreasing
26	Chiba Prefecture	Edogawa River System	Toneunga Canal	Unga Bridge	Nagareyama City/Noda City		690			1,260			2,440		3,240				4,130			1,320			2,650		2,250				2,588	26	0.37	Unchanged
27	Chiba Prefecture	Edogawa River System	Edogawa River	Nagareyama Bridge	Nagareyama City/Misato City		127			326			38		105				39			200			329		102				168	27	0.54	Unchanged
28	Chiba Prefecture	Edogawa River System	Sakagawa River	Benten Bridge	Matsudo City		1,170			970			1,070		1,140				900			800			970		778				862	28	0.56	Decreasing
29	Chiba Prefecture	Edogawa River System	Shinsaka River	Sakane Bridge	Matsudo City		880			1,000				1,140	1,070				810			890			770		790				815	29	0.66	Decreasing
30	Chiba Prefecture	Edogawa River System	Edogawa River	Shinkatsushika Bridge	Matsudo City/Katsushika City		508			510			306		340				417			149			190		193				237	30	0.51	Decreasing
31	Chiba Prefecture	Edogawa River System	Edogawa River	Ichikawa Bridge	Ichikawa City/Edogawa City		231			242			278		580				629			146			174		108				264	31	0.62	Fluctuations
32	Chiba Prefecture	Edogawa River System	Edogawa River	Vicinity of Keiyo Road	Ichikawa City/Edogawa City		144			95			38		41				70				89		50		49				65	32	0.62	Decreasing
33	Chiba Prefecture	Edogawa River System	Edogawa River	Gyotokukadozeki Weir (upperreaches)	Ichikawa City		630	790	289	610	21		43		67				46	52	82		42 153		65		135				82	33	0.73	Fluctuations
34	Chiba Prefecture	Edogawa River System	Edogawa River	Shingyotokubashi Bridge	Ichikawa City		17			18			25		27				23			12			16		0				13	34	0.82	Decreasing
35	Chiba Prefecture	Edogawa River System	Kyu-Edogawa River	Edogawa Floodgate, down	Ichikawa City/Edogawa City		35			57			26		22				15				51		17		24				27	35	1.90	Decreasing
36	Chiba Prefecture	Edogawa River System	Kyu-Edogawa River	8 km Point to the estuary	Ichikawa City/Edogawa City		114			279			87		110				60				58		32		111				65	36	0.70	Fluctuations
37	Chiba Prefecture	Edogawa River System	Kyu-Edogawa River	Imai Bridge	Ichikawa City/Edogawa City		25			28			27		39				175				205		18		76				119	37	0.88	Fluctuations
38	Chiba Prefecture	Edogawa River System	Kyu-Edogawa River	Urayasu Bridge	Urayasu City/Edogawa City		650	740	760	539	660		29		322				371	370	335	375	369		342		329				356	38	0.67	Fluctuations
39	Chiba Prefecture	Edogawa River System	Mamagawa River	Nemoto Floodgate	Ichikawa City		214			207			232		214				203			186			217		225				208	39	0.69	Decreasing
40	Chiba Prefecture	Edogawa River System	Kokubu River	Suwada Bridge	Ichikawa City		304			293			570		437				223			271			385		243				281	40	1.19	Decreasing
41	Chiba Prefecture	Edogawa River System	Haruki River	Before the confluence with Kokubu River	Ichikawa City		210			242			198		281				275			256			134		225				223	41	0.75	Decreasing
42	Chiba Prefecture	Edogawa River System	Hasen-okashiwa River	Downstream of Nakazawashinbashi Bridge	Kamagaya City/Ichikawa City		328			196			261		267				201			226			207		213				212	42	0.78	Decreasing
43	Chiba Prefecture	Edogawa River System	Okashiwa River	Sengen Bridge	Ichikawa City		137			168			143		131				130			149			127		124				133	43	0.83	Decreasing
44	Chiba Prefecture	Edogawa River System	Mamagawa River	Mitomae Bridge	Ichikawa City		640	487	440	196	137		178		176				380	664	332	680	216		331		434				434	44	1.33	Decreasing
45	Chiba Prefecture	Ebigawa River		Yachiyo Bridge	Funabashi City		102			31			61		165				35			145			29		44				63	45	2.21	Decreasing
46	Chiba Prefecture	Inba Discharge Channel (lower		Shinhanamigawa Bridge	Chiba City		199	96	74	79	95		169		197				212	333	331	340	99		89		211				231	46	1.16	Decreasing
47	Chiba Prefecture	Miyako River		Miyako Bridge	Chiba City		37			53			42		107				82			98			45		64				72	47	1.00	Fluctuations
48	Saitama Prefecture	Arakawa River System	Arakawa River Middle Reaches	Onari Bridge	Konosu City		0			0			0		0				0			0			0		0				0	48	1.10	Decreasing
49	Saitama Prefecture	Arakawa River System	Arakawa River Lower Reaches	Sasame Bridge	Toda City		63			60			291		31				22			43			43		35				36	49	1.28	Decreasing
50	Tokyo Metropolis	Arakawa River System		Kasai Bridge	Koto City /Edogawa City		404			210			279		272				253			197			224		193				217	50	0.46	Unchanged
51	Tokyo Metropolis	Arakawa River System	Sumida River	Ryogoku Bridge	Chuo City		86			191			183		197				49			48			99		27				56	51	0.69	Decreasing
																															397	Average		

Color categories: A B C D E

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

*2: Arithmetic Average; calculated by assuming ND=0; Color codes show categories (see the right).

*3: Results of the analysis of trends at respective locations using the method explained on 4.3(1)2) — Decreasing, Increasing, Unchanged, Fluctuations

(2)-2 Lakes

1) Miyagi Prefecture

In Miyagi Prefecture, surveys were conducted 11 to 21 times from October 2011 to December 2016 for lake sediment samples collected at 21 locations.

Regarding the concentration levels of detected values, one location was categorized into Category C, three locations were categorized into Category D and 17 locations were categorized into Category E (see Table 4.3-19 and Table 4.3-20).

Concentration levels were generally decreasing at 12 locations, unchanged at three locations, and fluctuating at six locations.

Table 4.3-19 Categorizations of detected values at respective locations
(Miyagi Prefecture: lake sediments)

Category	Percentile (percentile in all detected values)	Number of locations	Locations
A	Upper 5 percentile	0	(None)
B	Upper 5 to 10 percentile	0	(None)
C	Upper 10 to 25 percentile	1	No. 16
D	Upper 25 to 50 percentile	3	No. 9, No. 13, No. 17
E	Upper 50 to 100 percentile (lower 50%)	17	No. 1, No. 2, No. 3, No. 4, No. 5, No. 6, No. 7, No. 8, No. 10, No. 11, No. 12, No. 14, No. 15, No. 18, No. 19, No. 20, No. 21

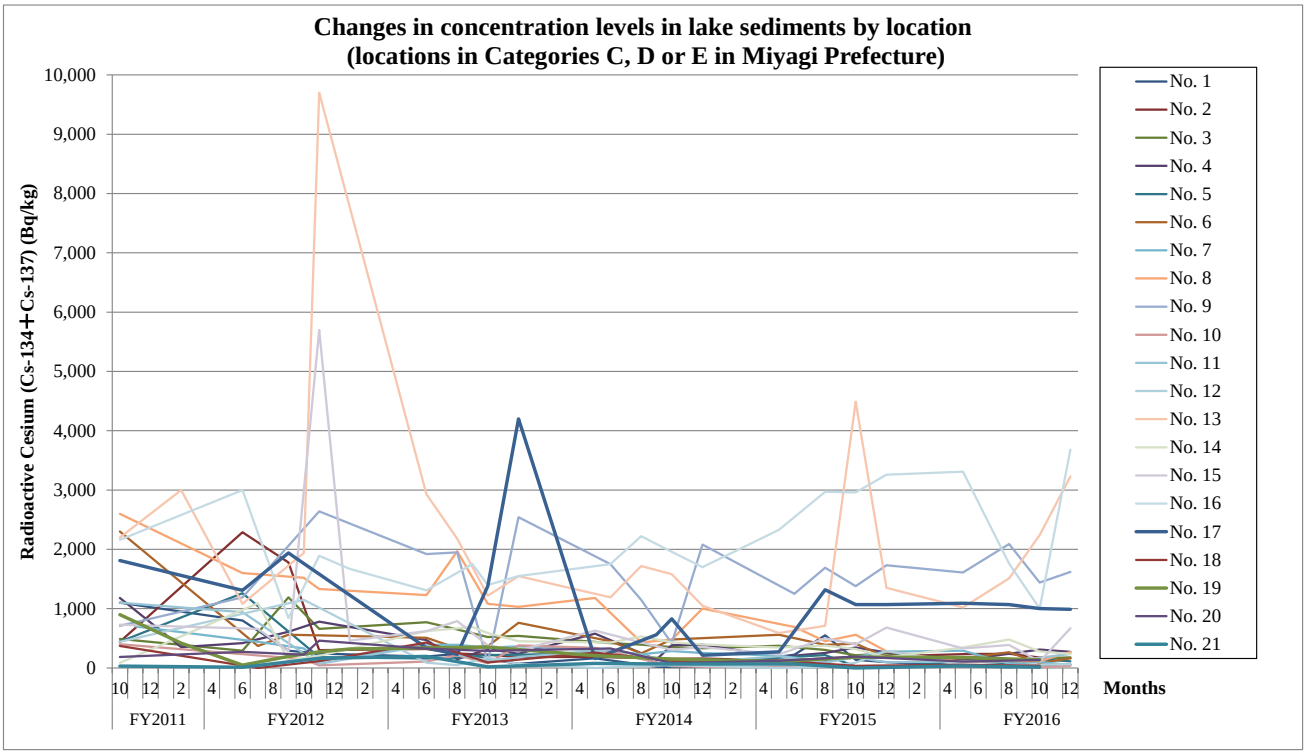


Figure 4.3-11 Changes in concentration levels over the years at respective locations
(Miyagi Prefecture: lake sediments)

Table 4.3-20 Detection of radioactive cesium at respective locations (Miyagi Prefecture: lake sediments) (No.1)

No.	Water area		Location	Municipality	Lake Sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																			
					FY2011								FY2012											
					8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Kitakami River System	Kurikoma Dam	Dam site	Kurihara City			1,100								800			290		242				
2		Hanayama Dam	Dam site				440								2,290			1,780		300				
3		Narugo Dam	Dam site	Osaki City			490								290			1,190		660				
4		Lake Naganuma	Dam site				1,180				350				420			610		780				
5		Shukunosawatameike Pond	Pond exit	Kurihara City			440								1,260					183				
6	Naruse River System	Futatsuishi Dam	Dam site	Kami Town			2,300									370		560		550				
7		Urushizawa Dam	Dam site					700								440			330	115				
8		Minamikawa Dam	Dam site	Taiwa Town			2,600								1,600				1,520	1,330				
9	Sunaoshi River System	Sonoseki Dam	Dam site	Rifu Town			710								1,190					2,640				
10	Nanakita River System	Nanakita Dam	Dam site	Sendai City			400								232				148	44				
11	Marutazawatameike Pond		Pond exit				1,100								940					69				
12	Natori River System	Okura Dam	Dam site				440												1,150					
13	Lake Amanuma		Lake exit				2,200				3,000				1,080				1,940	9,700				
14	Natori River System	Kamafusa Dam	Dam site	Kawasaki Town			85									1,090		126		204				
15	Abukuma River System	Kawarago Dam	Dam site	Shiroishi City			730									660		280		5,700		460		
16		Shichikashuku Dam	Dam site	Shichikashuku Town			2,160								3,000			840		1,890		1,670		
17	Lake Bagyunuma		Lake exit	Shiroishi City			1,810								1,310			1,940						
18	Abukuma River System	Murata Dam	Dam site	Murata Town			370									0				115				
19	Kitakami River System	Lake Izunuma	Lake exit	Tome City			900				420				48			195		270		320		
20	Natori River System	Tarumizu Dam	Dam site	Natori City			185								270				222	460				
21	Naruse River System	Miyatoko Dam	Dam site	Taiwa Town			31								12					163				
					Total number of samples		385	Detection times		381														

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

No.	Water area		Location	Municipality	Lake Sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																					
					FY2013												FY2014										
					4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Kitakami River System	Kurikoma Dam	Dam site	Kurihara City			193		241		154		69					164				23	14		18			
2		Hanayama Dam	Dam site				320		243		225		184					185			168		153		161			
3		Narugo Dam	Dam site	Osaki City			770		650		520		540						420		394		350		331			
4		Lake Naganuma	Dam site				470		146		318		238					580				141	384		392			
5		Shukunosawatameike Pond	Pond exit	Kurihara City			161		176		216		225					246			164		19		76			
6	Naruse River System	Futatsuishi Dam	Dam site	Kami Town			510		331		369		760						450		245		480					
7		Urushizawa Dam	Dam site				390		390		343		364						286		231		284		252			
8		Minamikawa Dam	Dam site	Taiwa Town			1,230		1,970		1,080		1,030					1,180			432		476		1,000			
9	Sunaoshi River System	Sonoseki Dam	Dam site	Rifu Town			1,920		1,950		88		2,540						1,750		1,150		415		2,080			
10	Nanakita River System	Nanakita Dam	Dam site	Sendai City			107		213		80		380					340				91	33		20			
11	Marutazawatameike Pond		Pond exit				380		222		129		181						313			165	109		94			
12	Natori River System	Okura Dam	Dam site				88		47		175		68					0				41	46		35			
13	Lake Amanuma		Lake exit				2,930		2,180		1,220		1,550						1,190		1,720		1,580		1,050			
14	Natori River System	Kamafusa Dam	Dam site	Kawasaki Town			620			690	590		450						430		530		431		395			
15	Abukuma River System	Kawarago Dam	Dam site	Shiroishi City			620		790		380		297					630			430		306		352			
16		Shichikashuku Dam	Dam site	Shichikashuku Town			1,310			1,750	1,400		1,550						1,750		2,220		1,960		1,700			
17	Lake Bagyunuma		Lake exit	Shiroishi City			340		231		1,380		4,200					160				560	830		215			
18	Abukuma River System	Murata Dam	Dam site	Murata Town			430				92							259					121					
19	Kitakami River System	Lake Izunuma	Lake exit	Tome City			340				350							208					149					
20	Natori River System	Tarumizu Dam	Dam site	Natori City			326				288								329				79					
21	Naruse River System	Miyatoko Dam	Dam site	Taiwa Town			195				18							75					66					

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

Table 4.3-20 Detection of radioactive cesium at respective locations (Miyagi Prefecture: lake sediments) (No.2)

Location					Lake Sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																								Changes	Average of FY2016 (*2)	No.	coefficient of variation	Trends (*3)
No.	Water area		Location	Municipality	FY2015												FY2016																
					4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3					
1	Kitakami River System	Kurikoma Dam	Dam site	Kurihara City			224		550		137		100					23			13		43		60					35	1	1.28	Decreasing
2		Hanayama Dam	Dam site			124			123		204		196					234			241		175		165					204	2	1.44	Decreasing
3		Narugo Dam	Dam site	Osaki City		375			304		214		244					149			147		154		179					157	3	0.61	Decreasing
4		Lake Naganuma	Dam site			185			252		346		263					133			241		310		270					239	4	0.64	Decreasing
5		Shukunosawatameike Pond	Pond exit	Kurihara City		173			218		24		10					118			80		146		112					114	5	1.28	Decreasing
6	Naruse River System	Futatsuishi Dam	Dam site	Kami Town		560			390		410		182					164			266		81		163					169	6	0.98	Decreasing
7		Urushizawa Dam	Dam site			209			105		188		276					290			74		99		51					129	7	0.56	Decreasing
8		Minamikawa Dam	Dam site	Taiwa Town			690		451		560		282					103			116		114		268					150	8	0.75	Decreasing
9	Sunaoshi River System	Sonoseki Dam	Dam site	Rifu Town			1,250		1,690		1,380		1,730					1,610			2,090		1,440		1,620					1,690	9	0.42	Unchanged
10	Nanakita River System	Nanakita Dam	Dam site	Sendai City		18			70		32		37					26			23		12		38					25	10	1.08	Decreasing
11	Marutazawatameike Pond		Pond exit			199			90		179		94					110			113		171		236					158	11	1.09	Decreasing
12	Natori River System	Okura Dam	Dam site			0			20		89		288					57			32		54		65					52	12	1.82	Decreasing
13	Lake Amanuma		Lake exit			590			710		4,490		1,350					1,020			1,510		2,240		3,230					2,000	13	0.89	Fluctuations
14	Natori River System	Kamafusa Dam	Dam site	Kawasaki Town		345			377		319		180					344			479		279		235					334	14	0.56	Fluctuations
15	Abukuma River System	Kawarago Dam	Dam site	Shiroishi City		231			500		396		680					329			386		109		670					374	15	1.63	Fluctuations
16		Shichikashuku Dam	Dam site	Shichikashuku Town		2,330			2,970		2,960		3,260					3,310			1,760		1,000		3,680					2,438	16	0.38	Unchanged
17	Lake Bagyunuma		Lake exit	Shiroishi City		270			1,320		1,070		1,070					1,090			1,070		1,000		990					1,038	17	0.83	Fluctuations
18	Abukuma River System	Murata Dam	Dam site	Murata Town		121					36							55					39							47	18	0.95	Fluctuations
19	Kitakami River System	Lake Izunuma	Lake exit	Tome City		108					181							174					136							155	19	0.77	Decreasing
20	Natori River System	Tarumizu Dam	Dam site	Natori City		121					190							108					135							122	20	0.50	Unchanged
21	Naruse River System	Miyatoko Dam	Dam site	Taiwa Town			67				0							35					12							24	21	1.04	Fluctuations
																														460	Average		

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

*2: Arithmetic Average; calculated by assuming ND=0; Color codes show categories (see the right). A B C D E

*3: Results of the analysis of trends at respective locations using the method explained on 4.3(1) 2) Decreasing Increasing Unchanged Fluctuations

2) Fukushima Prefecture

(i) Hamadori

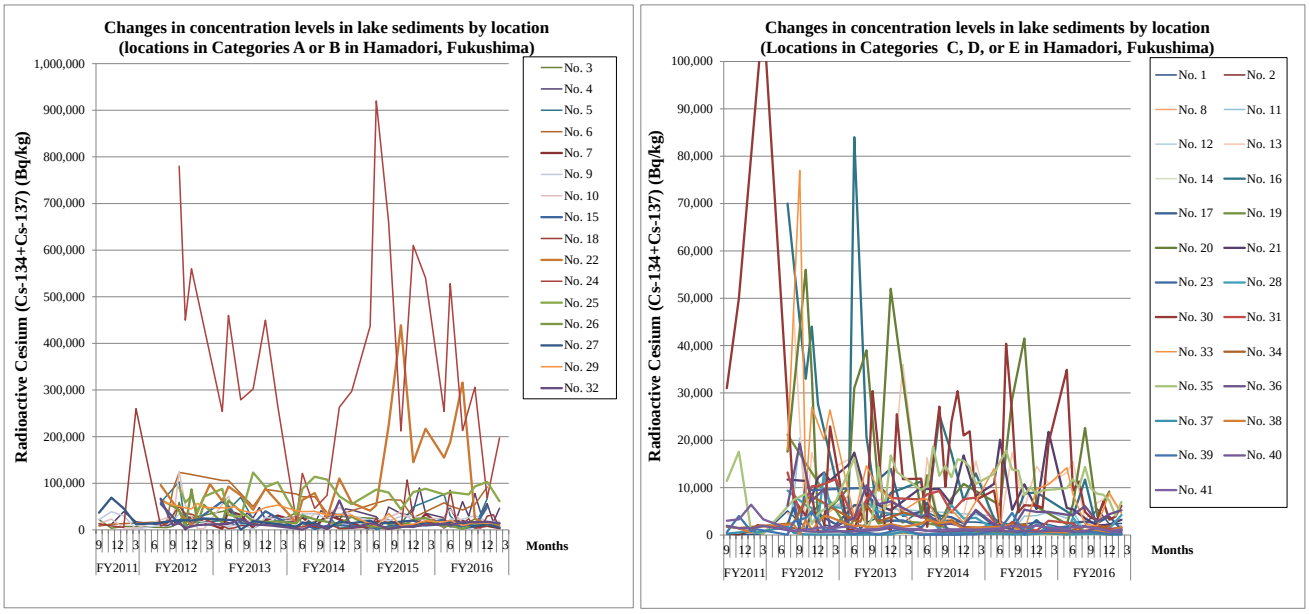
In Hamadori, Fukushima Prefecture, surveys were conducted 19 to 54 times from September 2011 to February 2017 for lake sediment samples collected at 41 locations.

Regarding the concentration levels of detected values, eight locations were categorized into Category A, eight locations into Category B, 11 locations into Category C, nine locations into Category D, and five locations into Category E (see Table 4.3-21 and Table 4.3-22).

Concentration levels were generally decreasing at 21 locations, were unchanged at four locations, were fluctuating at 15 locations, and were generally increasing at one location.

Table 4.3-21 Categorizations of detected values at respective locations
(Hamadori, Fukushima Prefecture: lake sediments)

Category	Percentile (percentile in all detected values)	Number of locations	Locations
A	Upper 5 percentile	8	No. 4, No. 5, No. 6, No. 10, No. 18, No. 22, No. 24, No. 25
B	Upper 5 to 10 percentile	8	No. 3, No. 7, No. 9, No. 15, No. 26, No. 27, No. 29, No. 32
C	Upper 10 to 25 percentile	11	No. 1, No. 11, No. 13, No. 16, No. 17, No. 20, No. 21, No. 30, No. 33, No. 35, No. 36
D	Upper 25 to 50 percentile	9	No. 2, No. 8, No. 23, No. 28, No. 31, No. 34, No. 38, No. 40, No. 41
E	Upper 50 to 100 percentile (lower 50%)	5	No. 12, No. 14, No. 19, No. 37, No. 39



Notes: 1) For locations where surveys were conducted multiple times in one month, their average value is used in the figures.

2) Scales of the vertical axes differ in the left and right figures.

Figure 4.3-12 Changes in concentration levels over the years at respective locations
(Hamadori, Fukushima Prefecture: lake sediments)

Table 4.3-22 Detection of radioactive cesium at respective locations (Hamadori, Fukushima Prefecture: lake sediments) (No.1)

No.	Location: Water area		Location	Lake Sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																				
				FY2011								FY2012												
				8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
1	Soso (farm pond)	Takei	Shinchi Town		140		129		154		209				5,100			1,580	4,400	6,300	2,180		1,560	
2		Uchizawa	Soma City		250		45		830	2,140														
3	Matsugabo Dam (Lake Utagawa)				22,000		3,600		7,500							4,900	7,800	59,000	23,400					
4	Mano Dam		Iitate Village		9,900		11,500		39,000		17,400					8,800	14,400	19,000	42	1,270 21,800		9,400 38,000		
5	Soso (farm pond)	Ainosawa													59,000			103,000	8,100	15,500				
6	Ganbe Dam Reservoir				8,200		12,200									18,000	87,000	123,000	121,000					
7	Soso (farm pond)	Fugane Dam													12,000			20,500	26,600	26,500				
8		Sasatoge													4,700			4,000	2,900	2,760				
9	Takanokura Dam Reservoir		Minamisoma City		22,000		39,000		30,000		1,560					12,400	19,100	35,000	23,600					
10	Yokokawa Dam Reservoir				13,800		23,000		4,500		3,500					25,900	14,200	125,000	53,000		2,900	2,020		
11	Soso (farm pond)	Tarayachi													420	7,600	20,500	7,200				6,400		
12		Takeshiyachi																1,180	1,340	1,240	790			
13		Ryugasaku														47,000		1,080	17,400	12,500				
14		Uwatashiro	Kawamata Town												4,200			5,100	690	820				
15		Koakuto	Namie Town												56,000			13,000	32,000	13,000				
16		Yosouchi	Iitate Village												70,000			33,000	44,000	27,700				
17		Myobusaku No. 2	Minamisoma City												2,240	5,800	1,180	830	5,100				2,250	
18	Ogaki Dam		Namie Town		13,100		8,400		5,100		260,000				8,200	13,600		51,000	35,000	30,000 37,000				
19	Soso (farm pond)	Uenokawa	Katsurao Village												21,200									
20		Heigoiri	Iitate Village												17,600			56,000	34,000	2,790				
21		Mekurasawa No. 2	Namie Town												11,700			11,400	7,900	12,100	13,200	11,500		
22		Joroku													96,000			40,000	23,800	10,000			98,000	
23	Furumichigawa Power Plant Dam		Tamura City													7,600	1,580	11,000	9,500					
24	Soso(farm pond)	Sawairi No. 1	Futaba Town															780,000	450,000	560,000				
25		Suzunai No. 4	Okuma Town															91,000	59,000	72,000	40,000	71,000		
26		Nishihaguro	Futaba Town												65,000			43,000	5,200	87,000	13,900	54,000		
27	Sakashita Dam		Okuma Town		37,000		69,000		46,000		11,800				15,100	17,600		20,600	20,700	20,100	21,900	24,600		
28	Soso (farm pond)	Atamamori 2													9,400			6,300	5,700	2,790	13,000	5,900		
29		Yonomori	Tomioka Town												62,000		54,000		47,000	45,000	57,000	48,000		
30	Takikawa Dam		Kawauchi Village		31,000		50,000		80,000		110,000				28,000	7,600		4,100	8,600	760 630	690	850 45,000		
31	Soso(farm pond)	Takinosawa	Tomioka Town												13,200		4,700		10,300	10,300			11,800	
32		Kamisigeoka No. 1	Naraha Town												67,000		9,500	14,800	4,200		10,400			
33		Shimoshigeoka													18,100		77,000	8,400	27,000		20,100	26,400		
34	Komachi Dam		Ono Town		1,730		1,460									2,480		7,500	8,200					
35	Kido Dam		Naraha Town		11,400		17,600		810		290					7,400		8,700	2,290	4,700 4,200			7,200	
36	Soso(farm pond)	Otsutsumi													6,200		19,300	13,200	7,200		9,700	1,450		
37	Iwaki(farm pond)	Shinike	Iwaki City		310		540		830	510					1,780	500		132						
38	Kodama Dam Reservoir (Lake Kodama)						1,360		600	1,710						2,280	213	3,200	960		4,000	3,800		
39	Iwaki (farm pond)	Kanoritsutsumishita			600		4,000		820	1,200					48	2,800		3,600	5,000		990	1,240		
40	Takashiba Dam Reservoir (Lake Takashiba)				1,940		1,430		1,410		1,920					800	1,070	790	690		700	710		
41	Shitoki Dam Reservoir				3,000		3,300		6,400		3,300					930	980	1,120	1,310		1,690	1,400		
				total number of samples	1,275		Detection times		1,274															

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

Table 4.3-22 Detection of radioactive cesium at respective locations (Hamadori, Fukushima Prefecture: lake sediments) (No.2)

No.	Location: Water area		Location	Lake Sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																								
				FY2013														FY2014											
				4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Soso (farm pond)	Takei	Shinchi Town			4,300	1,280	2,650		3,700		4,400		2,580			5,200	4,800		3,530		2,830		2,740		2,730	
2		Uchizawa	Soma City			350	370	530		340		277		254			390	222		307		213		282		239	
3	Matsugabo Dam (Lake Utagawa)					42,000	26,200	20,900		10,800		15,400		16,800			36,900	10,400		17,200		25,100		28,800			
4	Mano Dam		Iitate Village		19,800		5,000 17,500	17,200	36,000	25,500	48,000	22,600	32,800	13,900			20,400	27,200	17,600	12,400	41,000	31,700	38,300	21,100	45,000	42,700	
5	Soso (farm pond)	Ainosawa			19,400	43,000		70,000		22,700		14,200					28,700	33,900		7,200		33,000		3,530			
6	Ganbe Dam Reservoir				106,000	106,000		78,000		50,000		87,000					77,000	71,000		71,000		36,800		32,800			
7	Soso (farm pond)	Fugane Dam			2,540	41,000		32,000		4,100		19,900		30,900			17,800	26,900		3,610		33,000		22,400		14,100	
8		Sasatoge			8,200	1,030		7,500		5,100		6,600					1,090	2,960		3,090		3,390		980			
9	Takanokura Dam Reservoir		Minamisoma City			7,300	9,800	13,200		960		26,800		23,400			27,200	33,900		35,100		24,200		35,200			
10	Yokokawa Dam Reservoir					72,000	29,300	12,500		24,300		12,300					22,900	11,900		34,700		35,700		48,000		32,200	
11	Soso (farm pond)	Tarayachi																									
12		Takeshiyachi				550 1,180		600		410		520		600			1,240	294		293		1,080		265		225	
13		Ryugasaku				26,600 6,600		6,600		7,400		8,000		36,000			3,670	16,300		1,590		2,410		4,140		15,600	
14		Uwatashiro	Kawamata Town		380	1,060		780		311		140					165	193		190		226		660			
15		Koakuto	Namie Town		61,000	51,000		14,600		12,500		40,000					3,260	16,300		1,530		8,900		10,300			
16		Yosouchi	Iitate Village		520	84,000		20,700		3,030		8,900					11,300	4,000		25,300		17,300		7,300		13,000	
17		Myobusaku No. 2	Minamisoma City			10,800 1,750		6,400		11,800		14,000		4,000			4,900	6,800		4,080		3,760		2,460		5,000	
18	Ogaki Dam		Namie Town		8,100	2,800	4,500	9,300	8,300	13,100	11,000	9,300	10,000					6,000	10,100	6,800	6,100	740	8,900	2,440	3,090			
19	Soso (farm pond)	Uenokawa	Katsurao Village		1,100	3,600		6,400		2,420		3,050					2,580	2,450		2,030		1,070		810		710	
20		Heigoiri	Iitate Village		9,900	31,000		39,000		9,400		52,000					4,200	12,600		1,910		7,700		10,800			
21		Mekurasawa No. 2	Namie Town		14,800	17,400		8,300		6,300		5,200					10,000	9,700		9,700		6,500		16,800		8,300	
22		Joroku			62,000	93,000		74,000		43,000		89,000					16,000	64,000		79,000		25,600		110,000		58,000	
23	Furumichigawa Power Plant Dam		Tamura City		9,800		9,900	10,000		3,200		2,980		3,100			1,620	2,830		3,750		87		161			
24	Soso(farm pond)	Sawairi No. 1	Futaba Town		254,000	460,000		279,000		302,000		450,000		266,000			20,500	121,000		46,000		74,000		263,000		297,000	
25		Suzunai No. 4	Okuma Town		88,000	32,000		27,700		123,000		92,000		102,000			31,600	88,000		114,000		108,000		72,000		55,000	
26		Nishihaguro	Futaba Town		15,100	63,000		39,000		18,500		17,100		18,200			13,800	31,000		22,600		17,200		12,900		28,300	
27	Sakashita Dam		Okuma Town			17,700 25,000	20,700	350		18,800		15,300					7,200	14,800		14,700		2,600		17,100		14,300	
28	Soso (farm pond)	Atamamori 2			5,700	3,900		7,000		4,900		4,500					4,100	4,200		1,160		6,300		3,470		3,620	
29		Yonomori	Tomioka Town			47,000	50,000	42,000		36,000		48,000		53,000			41,000	39,000		39,900		31,600		32,800		30,900	
30	Takikawa Dam		Kawauchi Village		990	1,320	4,700	2,320	30,400	17,300	2,130	930	25,500	11,800			11,900	1,740	16,300	27,100	10,200	23,900	30,400	21,000	21,900	7,400	
31	Soso(farm pond)	Takinosawa	Tomioka Town			4,100 2,060		7,400		10,500		7,800					7,500	8,600		9,300		4,800		7,600		7,900	
32		Kamisigeoka No. 1	Naraha Town			16,000 9,800		23,400		11,000		10,600					2,940	590		11,800		2,370		63,000		3,890	
33		Shimoshigeoka				4,900 2,660		14,600		9,500		7,900		5,100			7,600	7,600		2,410		5,300		2,600		7,100	
34	Komachi Dam		Ono Town			3,100	2,790	6,300		2,860		3,700		4,800				3,320 3,650		1,880		3,100		1,690			
35	Kido Dam		Naraha Town			16,200	14,800 4,200	820	3,900	14,300	5,400	16,800	13,300				9,500	10,300	18,700	12,500	14,600	12,200	16,000	15,700	14,400	10,800	
36	Soso(farm pond)	Otsutsumi				5,700 1,470		10,500		6,500		7,100					3,650	4,500		2,390		2,370		1,840		5,300	
37	Iwaki(farm pond)	Shinike	Iwaki City			89	78	112		68		111		750			18	141		380		610				304	
38	Kodama Dam Reservoir (Lake Kodama)					1,740	2,020	1,730		1,770		2,300		1,740			2,340	3,190		2,520		2,790		1,290		1,480	
39	Iwaki (farm pond)	Kanoritsutsumishita				170	500	510		82		730		1,310			32	92		53		80		150		140	
40	Takashiba Dam Reservoir (Lake Takashiba)				790		870	880		1,050		1,530		1,140			1,050	860		720		780		950		990	
41	Shitoki Dam Reservoir				1,820		1,120	1,200		1,270		2,000		1,340			1,230	900		1,110		1,200		1,220		1,130	

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

Table 4.3-22 Detection of radioactive cesium at respective locations (Hamadori, Fukushima Prefecture: lake sediments) (No.3)

No.	Location: Water area		Location	Lake Sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																										Changes	Average of FY2016 (*2)	No.	coefficient of variation	Trends (*3)
				FY2015														FY2016																	
				4	5	6		7	8	9	10			11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3					
1	Soso (farm pond)	Takei	Shinchi Town			2,530	1,750		1,810		2,330				2,650		2,190			1,300	1,980		1,970		5,510		2,340		2,450			2,592	1	0.59	
2		Uchizawa	Soma City			139	540		250		1,060				446		650			600	432		910		1,500		1,270		970			947	2	0.83	
3	Matsugabo Dam (Lake Utagawa)					16,900	31,400		11,700		15,000				11,100		14,800			20,300	16,600		9,300		23,400		8,500					15,620	3	0.63	
4	Mano Dam		Iitate Village			38,400	17,800	12,000	49,000		24,900	47,200	29,700	38,100	32,100	40,800	90,000	35,600		26,000	46,700	22,900	60,500	29,300	78,000	33,900	56,300	16,300	46,500			41,640	4	0.60	
5	Soso (farm pond)	Ainosawa			10,400	334			8,400		13,600	16,200	6,700			49,500				76,000	30,100		2,810		5,910		66,800					36,324	5	0.94	
6	Ganbe Dam Reservoir					55,000	60,000		65,000		54,000	73,000	64,000			26,100				58,000	51,200		42,700		54,400		92,000					59,660	6	0.48	
7	Soso (farm pond)	Fugane Dam			1,930	17,500			20,100		10,300	10,100	11,200			6,100		34,200		4,870	15,600		20,100		4,630		8,600		3,450			9,542	7	0.66	
8		Sasatoge			1,920	670			384		650	1,610	455			477				880	680		1,080		1,860		746					1,049	8	0.90	
9	Takanokura Dam Reservoir		Minamisoma City		20,400	22,800			19,200		28,700	26,400	32,400			29,800		20,800		5,590	22,900		22,700		30,700		17,600		18,800			19,715	9	0.44	
10	Yokokawa Dam Reservoir				1,240	8,500			27,500		43,400	34,300	35,900			19,500		24,500		24,000	44,100		15,500		16,300		16,400		11,600			21,317	10	0.88	
11		Tarayachi			4,040	1,180			770		3,760	5,500	2,700			4,100		4,860		3,540	5,000		660		2,460		1,020		1,950			2,438	11	1.02	
12		Takeshiyachi			820	466			247		49	343	34			258		111		218	639		0		1,160		125		459			434	12	0.75	
13		Ryugasaku			900	1,390			17,400		3,550	6,300	6,300			14,500		10,800		13,200	15,500		3,040		6,780		8,400		4,410			8,555	13	0.97	
14	Soso (farm pond)	Uwatashiro	Kawamata Town			402	1,270		1,840		349					16				16	61		72		82		118					70	14	1.60	
15		Koakuto	Namie Town		5,000	4,690			6,300		8,900					6,600				22,500	7,100		8,600		6,470		49,900					18,914	15	0.96	
16		Yosouchi	Iitate Village		3,430	2,660			2,010		5,070	8,600	12,500			9,000				4,970	4,010		11,700		1,060		1,100					4,568	16	1.28	
17		Myobusaku No. 2	Minamisoma City		2,010	1,510			1,840		1,360	294	1,360			3,150		1,060		1,650	2,600		2,820		2,530		3,900		1,160			2,443	17	0.86	
18	Ogaki Dam		Namie Town		6,300	25,300		2,890	1,400		5,500			107,000	26,900	14,700	18,500		6,600	85,000	17,900	13,100	23,600	4,830	4,110	29,400	32,600	3,950			22,109	18	1.88	
19		Uenokawa	Katsurao Village			500	620		252		525				335		690			502	517		286		233		114		212			311	19	1.98	
20	Soso (farm pond)	Heigoiri	Iitate Village			7,600	5,000		28,700		44,500	41,300	38,700			6,000				2,290	6,500		22,600		3,980		9,200					8,914	20	0.88	
21		Mekurasawa No. 2	Namie Town		10,800	20,100			5,300		10,700					5,500		21,800		5,680	5,430		3,520		2,000		2,200		3,220			3,675	21	0.54	
22		Joroku			41,100	53,000			223,000		439,000					145,000		217,000		155,000	188,000		316,000		24,000		11,700		7,610			117,052	22	1.00	
23	Furumichigawa Power Plant Dam		Tamura City			2,980	2,830		860		98					336		1,320		1,790	365		690		759		592		910			851	23	1.08	
24	Soso(farm pond)	Sawairi No. 1	Futaba Town		437,000	920,000			660,000		212,000					610,000		540,000		254,000	528,000		213,000		306,000		68,000		197,000			261,000	24	0.64	
25		Suzunai No. 4	Okuma Town			94,000	79,000		80,000		43,800					81,000		88,000		76,000	81,000			76,000	93,000		103,000		61,500			81,750	25	0.32	
26		Nishihaguro	Futaba Town		6,600	7,600			3,730		5,400					22,200		25,500		7,200	9,300		1,880		14,100		10,100		13,700			9,380	26	0.89	
27	Sakashita Dam		Okuma Town		19,600	13,800			14,800		17,500					19,800		9,500		12,200	17,900		14,300		7,600		12,100		4,670			11,462	27	0.67	
28	Soso (farm pond)	Atamamori 2			1,280	730			910		1,610					202		2,030		244	3,670		269		1,020		1,370		4,240			1,802	28	0.78	
29		Yonomori	Tomioka Town		12,700	8,200			35,200		9,200					12,400		19,600		16,900	20,400		9,400		15,300		14,100		13,900			15,000	29	0.50	
30	Takikawa Dam		Kawauchi Village		9,400	1,790		40,400	25,600	4,760	6,300			6,200	6,300	5,700	19,500		34,900	9,400	11,300	4,870	3,640	3,160	7,100	3,220	3,890	6,190			8,767	30	1.27	
31		Takinosawa	Tomioka Town		2,930	680			2,760		1,780					870		3,010		2,600	2,470		337		2,120		1,280		1,510			1,720	31	0.72	
32	Soso(farm pond)	Kamisigeoka No. 1	Naraha Town		14,100	11,700			2,520		6,300					7,400		10,300		13,100	9,800		16,500		16,500		17,400		13,900			14,533	32	1.07	
33		Shimoshigeoka			14,000	2,600			1,600		650					9,700		10,700		14,200	8,600		2,370		1,850		8,900		4,630			6,758	33	1.28	
34	Komachi Dam		Ono Town			1,200	1,600		2,320		2,160					448				142	1,140		1,800		1,610		1,880					1,314	34	0.71	
35	Kido Dam		Naraha Town		12,900	15,500		17,800	13,800	13,600	8,400			10,100	8,700	9,400			9,900	11,800	10,000	14,400	9,800	8,700	8,500	7,280	4,130	6,980			9,149	35	0.47	
36	Soso(farm pond)	Otsutsumi			2,280	1,870			1,200		5,340					4,890		4,890		4,280	4,290		6,060		2,840		4,390		5,220			4,513	36	0.72	
37	Iwaki(farm pond)	Shinke	Iwaki City			241	288		139		187					257		377		145	143		234		259				110			178	37	1.04	
38	Kodama Dam Reservoir (Lake Kodama)					2,430	1,040		2,120		750					670		679		565	640		890		800		711		1,720			888	38	0.58	
39	Iwaki (farm pond)	Kanoritsutsumishita				640	1,730		4,700		172					2,240		1,200		860	640		760		548		129		243			530	39	1.22	
40	Takashiba Dam Reservoir (Lake Takashiba)					780	1,010		700		900					710		900		930	730		754		1,490		850		652			901	40	0.34	
41	Shitoki Dam Reservoir					1,460	1,310		1,960		1,590					1,980		1,510		1,320	1,650		1,770		1,400		840		1,170			1,358	41	0.62	

	A	B	C	D	E		Average
							20,238

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

*2: Arithmetic Average; calculated by assuming ND=0; Color codes show categories (see the right).

*3: Results of the analysis of trends at respective locations using the method explained on 4.3(1)2) Decreasing Increasing Unchanged Fluctuations

(ii) Nakadori

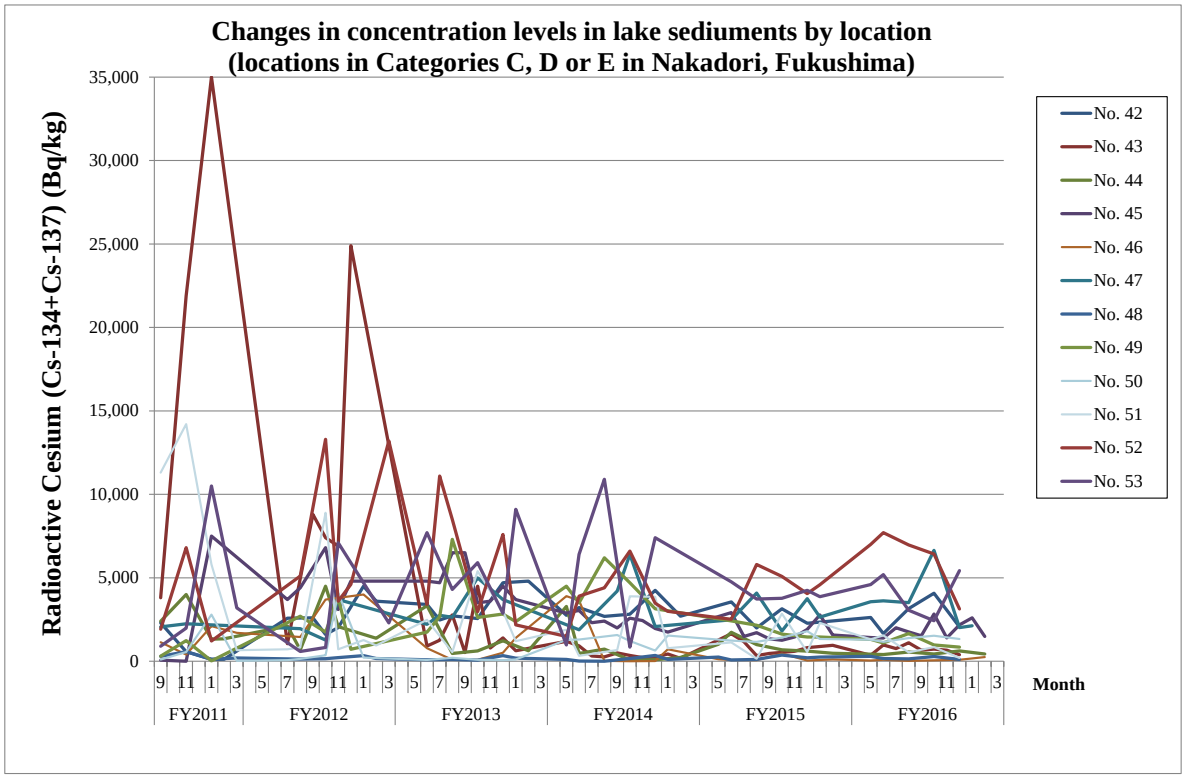
In Nakadori, Fukushima Prefecture, surveys were conducted 27 to 46 times from September 2011 to February 2017 for lake sediment samples collected at 12 locations.

Regarding the concentration levels of detected values, four locations were categorized into Category C, five locations into Category D, and three locations into Category E (see Table 4.3-23 and Table 4.3-24).

Concentration levels were generally decreasing at five locations, were unchanged at two locations, and fluctuating at five locations.

Table 4.3-23 Categorizations of detected values at respective locations
(Nakadori, Fukushima Prefecture: lake sediments)

Category	Percentile (percentile in all detected values)	Number of locations	Locations
A	Upper 5 percentile	0	(None)
B	Upper 5 to 10 percentile	0	(None)
C	Upper 10 to 25 percentile	4	No. 42, No. 47, No. 52, No. 53
D	Upper 25 to 50 percentile	5	No. 43, No. 45, No. 49, No. 50, No. 51
E	Upper 50 to 100 percentile (lower 50%)	3	No. 44, No. 46, No. 48



Notes: 1) For locations where surveys were conducted multiple times in one month, their average value is used in the figures.

Figure 4.3-13 Changes in concentration levels over the years at respective locations
(Nakadori, Fukushima Prefecture: lake sediments)

Table 4.3-24 Detection of radioactive cesium at respective locations (Nakadori, Fukushima Prefecture: lake sediments) (No.1)

Location			Lake Sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																			
No.	Water area	Location	FY2011								FY2012											
			8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
42	Surikamigawa Dam Reservoir	Fukushima City		2,300		570		104	116					2,580		2,600	1,600	2,020		4,500	3,600	
43	Lake Handanuma (farm pond)	Kori Town		3,800		21,900		35,000						1,050		8,800	7,400	6,900	24,900			
44	Oike Pond (farm pond)	Motomiya City		2,400		4,000		1,320	1,340					2,110	680		4,500	2,070	1,840		1,380	
45	Miharu Dam	Miharu Town		69		0		7,500						3,700	4,400		6,800	3,100	4,800			
46	Hounokusa (farm pond)	Koriyama City		1,140		400		2,100		1,700					1,450		3,700			4,000		
47	Lake Hatori	Tenei Village		2,060		2,240									1,950		1,270	3,700				
48	Hirodaira (farm pond)	Sukagawa City		290		570		119		191				139	133		148	217		340	163	
49	Sengosawa Dam Reservoir	Ishikawa Town		300		1,240		17							2,700		1,740	3,800	720			
50	Watariike Pond (farm pond)	Yabuki Town		102		550		2,800		17				63	144		360	4,100		222		
51	Izumikawa (farm pond)	Shirakawa City		11,300		14,200		5,800		660				720	820		8,900	710		1,270	940	
52	Hokkawa Dam	Nishigo Village		1,920		6,800		1,210							5,100		13,300	3,600	4,600			13,200
53	Lake Nanko	Shirakawa City		900		1,980		10,500		3,200					580		820	7,100				2,300
			total number of samples		402	Detection times		399														

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

Location			Lake Sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																									
No.	Water area	Location	FY2013														FY2014											
			4	5	6		7		8	9	10	11	12	1	2	3	4	5	6		7	8	9	10	11	12	1	2	3
42	Surikamigawa Dam Reservoir	Fukushima City			3,400		2,470		2,720		2,560		4,700		4,800			2,750	3,220			2,690		2,820		4,250		2,700	
43	Lake Handanuma (farm pond)	Kori Town			930	890	1,260		2,770	520	4,500	790	1,400	630				1,190	920		317	257	500	346	216	233	437	176	
44	Oike Pond (farm pond)	Motomiya City			960	5,700			470		620		1,220		630			3,280	470			730		71		85		226	
45	Miharu Dam	Miharu Town			4,800		4,600	4,800	6,500	6,500	3,500	3,600	4,500	3,700				2,880	3,040		2,310	2,410	1,990	2,580	2,440	1,960	1,740		
46	Hounokusa (farm pond)	Koriyama City			1,460	92			83		88		510	1,400				3,900	3,640			18		0		13	710		
47	Lake Hatori	Tenei Village			2,210		2,750		2,630		5,000		3,700						2,340	1,440			4,200	6,400		2,080			
48	Hirodaira (farm pond)	Sukagawa City			88	75			106		69		340	179				104	16			0		159		351	107		
49	Sengosawa Dam Reservoir	Ishikawa Town			1,740		2,670		7,300		2,620		2,830	2,370				4,500	3,500			6,200		4,700		3,140			
50	Watariike Pond (farm pond)	Yabuki Town			75	99			202		88		68	107				1,280	1,300				1,570	1,210		640	1,540		
51	Izumikawa (farm pond)	Shirakawa City			3,200	1,770			540		5,400		3,000	1,200				1,880	326				670	3,890		3,860	780		
52	Hokkawa Dam	Nishigo Village			3,400		11,100		8,500		2,970		7,600	2,180				1,480	3,900			4,400		6,600		3,480	2,990		
53	Lake Nanko	Shirakawa City			8,600	6,800			4,300		5,900		2,870	9,100				970	6,400			10,900		840		7,400			

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

Table 4.3-24 Detection of radioactive cesium at respective locations (Nakadori, Fukushima Prefecture: lake sediments) (No.2)

Location			Lake Sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																								Average of FY2016 (*2)	No.	coefficient of variation	Trends (*3)
No.	Water area	Location	FY2015												FY2016											Changes				
			4	5	6		7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3					
42	Surikamigawa Dam Reservoir	Fukushima City			4,020	3,090		1,990		3,140		2,280					2,620	1,660		3,150		4,070		2,060					2,712	42	0.43	
43	Lake Handanuma (farm pond)	Kori Town			2,780	520	1,170	335	464	529	600	810		950			356	970	760	1,110	663	728	656	395					705	43	2.18	
44	Oike Pond (farm pond)	Motomiya City		1,020	1,730			1,000		680		610		479			420	403		548		433		613		430			475	44	1.00	
45	Miharu Dam	Miharu Town			2,070	3,770	1,480	1,710	1,340	1,260	1,450	1,910	2,770	1,570			1,420	1,390	2,000	1,750	1,530	2,830	1,400	2,180	2,600	1,480			1,858	45	0.60	
46	Hounokusa (farm pond)	Koriyama City		123	81			68		454		44		107			40	92		23		51		83		246			89	46	1.43	
47	Lake Hatori	Tenei Village			1,900	3,070		4,080		1,810		3,750	2,640				3,570	3,620		3,510		6,640		2,020	2,120				3,580	47	0.45	
48	Hirodaira (farm pond)	Sukagawa City		244	75			113		368		201	245				296	162		143		280		110					198	48	0.64	
49	Sengosawa Dam Reservoir	Ishikawa Town			1,200	3,640		2,160		1,620		1,450	1,450				1,310	1,090		1,660		970		850					1,176	49	0.71	
50	Watariike Pond (farm pond)	Yabuki Town			1,200	1,260		1,160		1,420		1,800	1,330				1,290	1,160		1,390		1,530		1,330					1,340	50	0.91	
51	Izumikawa (farm pond)	Shirakawa City			870	1,390		153		2,850		552	2,300				1,310	1,550		527		850		190					885	51	1.28	
52	Hokkawa Dam	Nishigo Village			2,570	2,450		5,800		5,080		4,050	4,580				7,000	7,700		6,970		6,420		3,130					6,244	52	0.59	
53	Lake Nanko	Shirakawa City			6,200	3,320		3,730		3,770		4,250	3,870				4,590	5,190		3,060		2,430		5,430					4,140	53	0.63	

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

*2: Arithmetic Average; calculated by assuming ND=0; Color codes show categories (see the right).

*3: Results of the analysis of trends at respective locations using the method explained on 4.3(1) 2)

A	B	C	D	E

1,950 Average

Decreasing Increasing Unchanged Fluctuations

(iii) Aizu

In Aizu, Fukushima Prefecture, surveys were conducted 18 to 50 times from September 2011 to February 2017 for lake sediment samples collected at 31 locations.

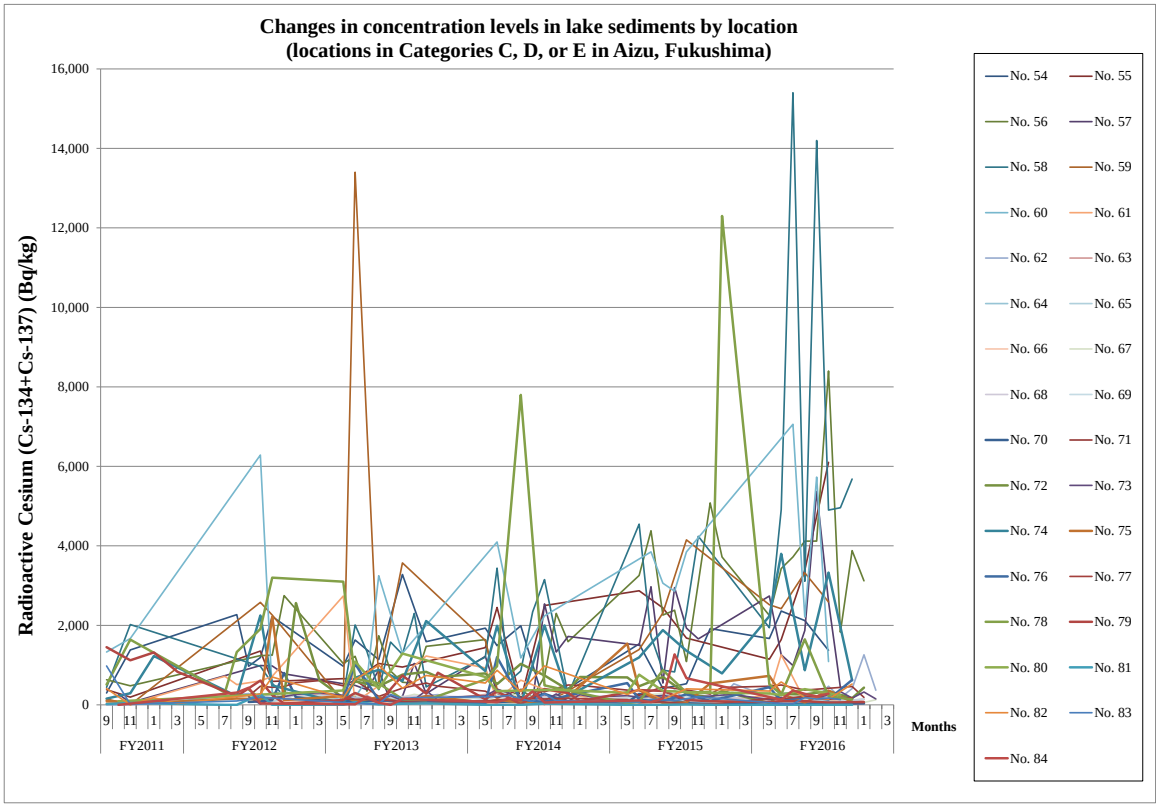
Regarding the concentration levels of detected values, seven locations were categorized into Category C, two locations were categorized into Category D and 22 locations were categorized into Category E (see Table 4.3-25 and Table 4.3-26).

Concentration levels were generally decreasing at eight locations, unchanged at four locations, fluctuating at 13 locations, and increasing at six locations.

Table 4.3-25 Categorizations of detected values at respective locations

(Aizu, Fukushima Prefecture: lake sediments)

Category	Percentile (percentile in all detected values)	Number of locations	Locations
A	Upper 5 percentile	0	(None)
B	Upper 5 to 10 percentile	0	(None)
C	Upper 10 to 25 percentile	7	No. 55, No. 56, No. 57, No. 58, No. 59, No. 60, No. 74
D	Upper 25 to 50 percentile	2	No. 54, No. 78
E	Upper 50 to 100 percentile (lower 50%)	22	No. 61, No. 62, No. 63, No. 64, No. 65, No. 66, No. 67, No. 68, No. 69, No. 70, No. 71, No. 72, No. 73, No. 75, No. 76, No. 77, No. 79, No. 80, No. 81, No. 82, No. 83, No. 84



Notes: 1) For locations where surveys were conducted multiple times in one month, their average value is used in the figures.

Figure 4.3-14 Changes in concentration levels over the years at respective locations

(Aizu, Fukushima Prefecture: lake sediments)

Table 4.3-26 Detection of radioactive cesium at respective locations (Aizu, Fukushima Prefecture: lake sediments) (No.1)

Location				Lake Sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																			
No.	Water area		Location	FY2011								FY2012											
				8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
54	Nicchu Dam		Kitakata City		298		1,380									2,270	970	1,190	2,220				
55	Lake Sohara		Kitashiobara Village		380		196											530	2,180	590				
56	Lake Hibara				630		480											1,420	1,060	1,250	2,750			
57	Lake Onogawa					270	57											1,870	111	980	780			
58	Lake Akimoto		Inawashiro Town		440		2,020											1,760	177	540	219			
59	Lake Bishamonnuma		Kitashiobara Village		150		0											1,260	3,900	2,260				
60	Lake Oguninuma				1,330		1,670											2,370	10,200	310				
61	Aizu(farm pond)	Lake Onuma	Nishiaizu Town		61		28									720	510		600	720				
62	Lake Inawashiro	Center	Aizuwakamatsu City		0		0		44		93							286	133	76	33	126		122
63		Takahashi River Estuary	Inawashiro Town															86	154	270	166	128		284
64		Oguro River Estuary																200	76	179	114	127		245
65		Tenjinhama Beach																111	110	99	132	135		
66		Hishinuma River Estuary																83	108	39	96	89		68
67		Intake of Asakasosui																126	118	115	251	108		116
68		Hamajihama Beach	Koriyama City															235	203	240	169	242		221
69		Funatsu Port																223	213	186	370	182		223
70		Offshore of Funatsu River Estuary																74	86	118	800	186		116
71		Seishogahama Beach																220	470	440	460	560		610
72		Haragawa River Estuary	Aizuwakamatsu City															390	151	168	215	2,560		610
73		Koishigahama Floodgate	Inawashiro Town															206	22	161	209	263		306
74	Higashiyama Dam Reservoir		Aizuwakamatsu City		157		290		1,230							220		2,250	490					
75	Lake Numazawa	Center	Kaneyama Town		100		59		63		84					160		138	2,210	120				
76		Midpoint between the center of the lake and off the estuary																						
77		Offshore of Maenosawa River Estuary																						
78	Aizu (farm pond)		Aizumisato Town		510		1,640								310	1,330		1,910	3,200					
79	Okawa Dam Reservoir		Aizuwakamatsu City		1,450		1,120		1,320		830					218		610	242	35	44	69		
80	Tagokura Reservoir		Tadami Town			90										229								
81	Minamiaizu (farm pond)	Fukui			22		47								0	0		270	0					
82	Tajima Dam Reservoir (Lake Funehana)		Minamiaizu Town		410		0		177		34					207		270	700					
83	Okutadami Reservoir		Tadami Town		980		18									97		190						
84	Lake Ozenuma		Hinoemata Village			0										310	430	34						
				total number of samples		911	Detection times		887															

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

Table 4.3-26 Detection of radioactive cesium at respective locations (Aizu, Fukushima Prefecture: lake sediments) (No.2)

Location				Lake Sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																						
No.	Water area		Location	FY2013												FY2014										
				4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
54	Nicchu Dam		Kitakata City		970	1,630		1,140		3,280		1,590					1,930	1,490		1,990		43					
55	Lake Sohara		Kitashiobara Village		660	650		1,040		950							1,440	2,450		130		2,500					
56	Lake Hibara				1,040	1,220	342	1,740	850	570	540	1,470					1,640	287	196	373	192	710	2,300	1,590			
57	Lake Onogawa				530	490	380	870	86	210	1,040	282					1,220	309	168	97	62	2,540	1,330	1,720			
58	Lake Akimoto		Inawashiro Town		214	2,010	1,340	380	1,580	1,270	2,300	450					1,200	3,440	590	850	2,340	3,150	1,710	257			
59	Lake Bishamonnuma		Kitashiobara Village		82	13,400		570		3,570							1,620	400		140		11					
60	Lake Oguninuma					198	620	3,250		1,300								4,100	2,670	1,180		2,240					
61	Aizu(farm pond)	Lake Onuma	Nishiaizu Town		2,740	59		480		740		1,230					930	129		620		385					
62	Lake Inawashiro	Center	Aizuwakamatsu City		190	178	229	86	103	215	99	237	256	199			149	29	114	63	319	97	119	194	67	193	
63		Takahashi River Estuary	Inawashiro Town		171	300		130		147		153	139				261	291		142		233		195	98		
64		Oguro River Estuary			110	84		163		130		114	126				90	99		95		96		110	88		
65		Tenjinhama Beach			208	122		80		157		105	83				198	99		106		201		47	148		
66		Hishinuma River Estuary			85	50		57		82		60	15				39	47		49		25		47	23		
67		Intake of Asakasosui			236	249	172	123	241	194	263	216	222	152			182	91	255	247	201	160	170	248	440	103	
68		Hamajihama Beach	Koriyama City		194	162		151		205		228					189	189		151		206		213	161		
69		Funatsu Port			186	141		187		107		138	160				192	382		101		141		224	109		
70		Offshore of Funatsu River Estuary			88	97		107		92		70					87	74		91		278		73	79		
71		Seishogahama Beach			480	620		211		420		550	470				344	174		387		331		500	490		
72		Haragawa River Estuary	Aizuwakamatsu City		176	590		470		760		830	700				790	520		1,030		740		379	700		
73		Koishigahama Floodgate	Inawashiro Town		241	133	144	134	228	111	133	361	114	195			226	389	303	30	363	109	274	89	257	200	
74	Higashiyama Dam Reservoir		Aizuwakamatsu City		24	680		880		600		2,110					850	1,990		18		2,000		214			
75	Lake Numazawa	Center	Kaneyama Town		219	90		191		62		221					57	127		58		70		197			
76		Midpoint between the center of the lake and off the estuary			146	1,030		118		77		103					37	1,200		129		74		237			
77		Offshore of Maenosawa River Estuary			144	139		134		79		54					98	118		163		148		163			
78	Aizu (farm pond)		Aizumisato Town		3,100	660		540		142		117					640	970		7,800		490					
79	Okawa Dam Reservoir		Aizuwakamatsu City		120	297		49		740		286	810				139	344		14		400		298	90		
80	Tagokura Reservoir		Tadami Town		360	1,090		410		1,290							700	343		360			378				
81	Minamiaizu (farm pond)	Fukui			0	70		12		28		39					0	0		0		30					
82	Tajima Dam Reservoir (Lake Funehana)		Minamiaizu Town		175	630		1,000		420		740					550	870		333		980					
83	Okutadami Reservoir		Tadami Town			38	24	34	259	160	180							209	236	148	86	277	103				
84	Lake Ozenuma		Hinoemata Village			13	202	51	0	242	57							70	160	117	550	122	59					

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

Table 4.3-26 Detection of radioactive cesium at respective locations (Aizu, Fukushima Prefecture: lake sediments) (No.3)

Location				Lake Sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																										Changes	Average of FY2016 (*2)	No.	coefficient of variation	Trends (*3)
No.	Water area		Location	FY2015												FY2016																		
				4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3						
54	Nicchu Dam		Kitakata City			180	2,890		413		530		1,920				1,670	2,360		2,120		1,370							1,880	54	0.56	
55	Lake Sohara		Kitashiobara Village			2,450	3,290		2,440		1,680						1,150	1,640		3,390		6,100							3,070	55	0.83	
56	Lake Hibara					1,970	4,540	4,380	2,260	2,380	1,090	3,070	5,080	3,720			2,250	3,430	3,720	4,120	4,120	8,400	1,830	3,880	3,120				3,874	56	0.80	
57	Lake Onogawa					1,530	1,470	2,970	550	2,950	1,930	1,660					2,740	1,260	990	1,870	5,370	2,600	437						2,181	57	0.94	
58	Lake Akimoto		Inawashiro Town			3,190	5,900	1,720	870	830	2,330	4,240					1,940	4,910	15,400	3,110	14,200	4,900	4,960	5,680					6,888	58	1.21	
59	Lake Bishamonnuma		Kitashiobara Village			452	2,330		2,310		4,150						2,520	2,420		3,320		2,590							2,713	59	1.28	
60	Lake Oguninuma							3,850	3,060	2,860	3,850								7,060	2,210	5,730	1,090							4,023	60	0.82	
61	Aizu(farm pond)	Lake Onuma	Nishiaizu Town		0	17		172		351		0				263	1,260		114		115		148					380	61	1.21	
62	Lake Inawashiro	Center	Aizuwakamatsu City		81	159	214	212	372	87	102	156	198	530		199	285	313	267	183	468	177	409	1,260	369				393	62	0.95	
63		Takahashi River Estuary	Inawashiro Town		97	99		86		155		93	141			163	136		100		150		99	133					130	63	0.40	
64		Oguro River Estuary			75	85		75		89		78	65			76	78		72		73		76	61					73	64	0.41	
65		Tenjinhama Beach			83	71		62		95		39	92			63	73		115		93		53	80					80	65	0.42	
66		Hishinuma River Estuary			28	27		28		25		30	45			22	12		27		27		29	35					25	66	0.56	
67		Intake of Asakasosui			162	211	262	278	156	225	272	211	178	359		238	187	219	227	193	189	138	119	59	129				170	67	0.36	
68		Hamajihama Beach	Koriyama City		175	138		152		149		156	176			177	158		167		177		123	148					158	68	0.18	
69		Funatsu Port			174	146		244		202		221	123			138	177		127		156		105	146					142	69	0.37	
70		Offshore of Funatsu River Estuary			54	273		166		42		22	13			68	22		25		57		31	34					40	70	1.28	
71		Seishogahama Beach			370	241		455		374		272	438			469	500		373		418		463	188					402	71	0.29	
72		Haragawa River Estuary	Aizuwakamatsu City		690	469		700		279		188	348			45	276		262		344		167	434					255	72	0.86	
73		Koishigahama Floodgate	Inawashiro Town		229	193	211	235	190	121	205	219	246	256		131	189	112	198	189	242	334	170	324	148				204	73	0.41	
74	Higashiyama Dam Reservoir		Aizuwakamatsu City			520	1,870		1,880		1,360			790			2,230	3,800		870		3,330		619					2,170	74	0.84	
75	Lake Numazawa	Center	Kaneyama Town		1,540	372		45		60		537				730	279		57		358		74						300	75	1.63	
76		Midpoint between the center of the lake and off the estuary			550	130		101		265		100				443	94		207		135		627						301	76	1.12	
77		Offshore of Maenosawa River Estuary			131	53		72		26		15				161	149		216		141		179						169	77	0.45	
78	Aizu (farm pond)		Aizumisato Town		41	79		870		308		327	12,300			517	259		1,650		218		137						556	78	1.77	
79	Okawa Dam Reservoir		Aizuwakamatsu City			526	218	350		124		89				75	95		95		54		70	68					76	79	1.12	
80	Tagokura Reservoir		Tadami Town		303	760		351			310					289	247		395			241							293	80	0.69	
81	Minamiaizu (farm pond)	Fukui			0	0		0		10		0				0	0		0		0		0						0	81	2.61	
82	Tajima Dam Reservoir (Lake Funehana)		Minamiaizu Town		260	384		134		404						347	576		179		146		524						354	82	0.67	
83	Okutadami Reservoir		Tadami Town			71	140	131	109	154	203						31	25	184	146	172	133							115	83	1.09	
84	Lake Ozenuma		Hinoemata Village			112	70	160	1,160	1,380	670						130	361	276	75	345	284							245	84	1.24	

A	B	C	D	E		
					1,021	Average

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

*2: Arithmetic Average; calculated by assuming ND=0; Color codes show categories (see the right).

*3: Results of the analysis of trends at respective locations using the method explained on4.3(1) 2)

Decreasing　Increasing　Unchanged　Fluctuations

3) Ibaraki Prefecture

In Ibaraki Prefecture, surveys were conducted 13 to 22 times from September 2011 to February 2017 for lake sediment samples collected at 19 locations.

Regarding the concentration levels of detected values, one location was categorized into Category C, five locations into Category D, and 13 locations into Category E (see Table 4.3-27 and Table 4.3-28).

Concentration levels were generally decreasing at nine locations, unchanged at six locations, and fluctuating at four locations.

Table 4.3-27 Categorizations of detected values at respective locations
(Ibaraki Prefecture: lake sediments)

Category	Percentile (percentile in all detected values)	Number of locations	Locations
A	Upper 5 percentile	0	(None)
B	Upper 5 to 10 percentile	0	(None)
C	Upper 10 to 25 percentile	1	No. 13
D	Upper 25 to 50 percentile	5	No. 12, No. 14, No. 15, No. 16, No. 17
E	Upper 50 to 100 percentile (lower 50%)	13	No. 1, No. 2, No. 3, No. 4, No. 5, No. 6, No. 7, No. 8, No. 9, No. 10, No. 11, No. 18, No. 19

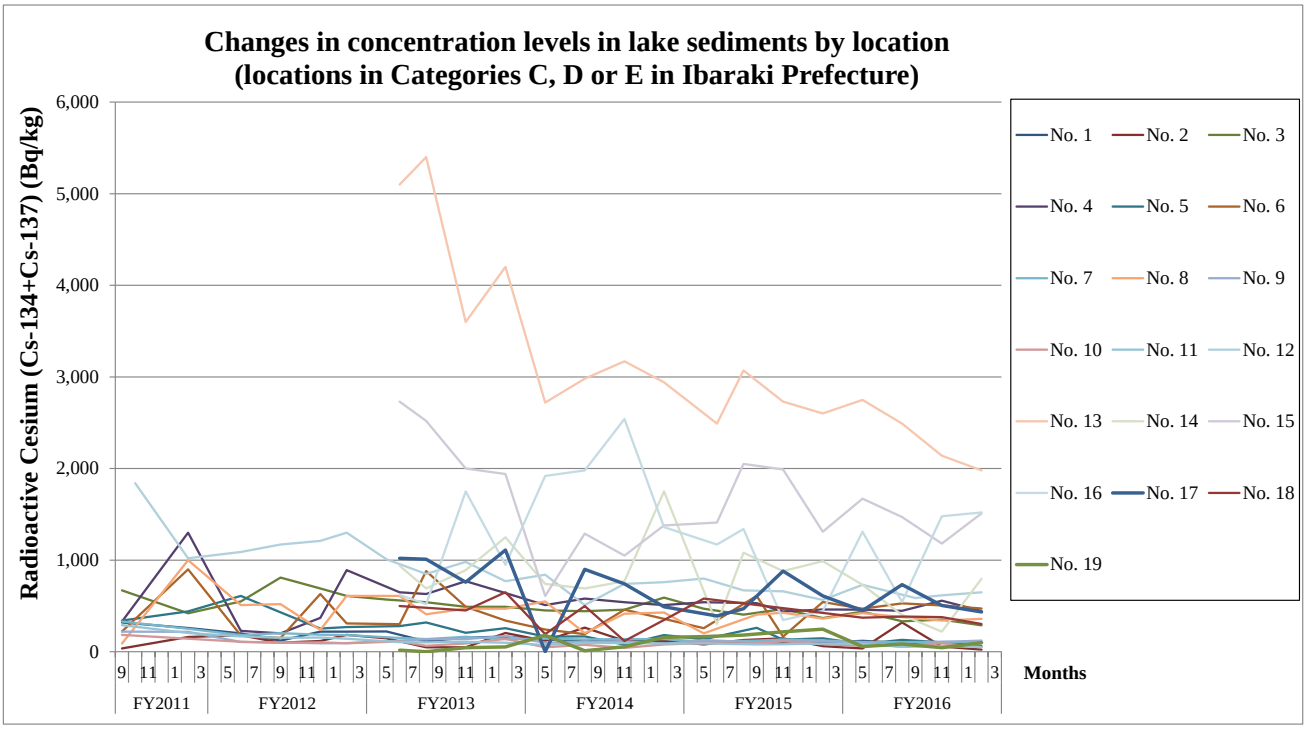


Figure 4.3-15 Changes in concentration levels over the years at respective locations
(Ibaraki Prefecture: lake sediments)

Table 4.3-28 Detection of radioactive cesium at respective locations (Ibaraki Prefecture: lake sediments) (No.1)

Location				Lake Sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																			
No.	Water area		Location	FY2011								FY2012											
				8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Hinuma	Hiroura	Ibaraki Town		320					260				200			122			219		219	
2		Miyamae			37					162				179			98			118		184	
3		Oyazawa			670					420				550			810			690		610	
4	Lake Kasumigaura	Offshore of Tamatsukuri	Namegata City		330					1,300				228			201			370		890	
5		Offshore of Kakeuma	Ami Town		340					440				610			430			252		270	
6		Center	Miho Village		221					900				178			151			630		310	
7		Offshore of Aso	Inashiki City		330					250				183			202			186		183	
8	Lake Kitaura	Offshore of Kamaya	Namegata City		90					1,000				510			520			239		610	
9		Jingu Bridge	Itako City		220					217				106			103			93		95	
10	Hitachitone River	Lake Sotonasakaura			184					143				110			97			102		93	
11		Ikisu	Kamisu City		290					205				168			152			154		142	
12	Lake Ushikunuma	Center of Lake Ushikunuma	Ryugasaki City			1,840				1,020				1,090			1,170			1,210		1,300	
13	Mizunuma Dam	Center	Kitaibaraki City																				
14	Koyama Dam		Takahagi City																				
15	Hananuki Dam																						
16	Jyuou Dam		Hitachi City																				
17	Ryuji Dam		Hitachiota City																				
18	Fujiigawa Dam		Shirosato Town																				
19	Iida Dam		Kasama City																				

total number of samples	373	Detection times	371

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

Table 4.3-28 Detection of radioactive cesium at respective locations

(Ibaraki Prefecture: lake sediments) (No.2)

Location				Lake Sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																							
No.	Water area		Location	FY2013												FY2014											
				4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Hinuma	Hiroura	Ibaraki Town		221			114			155			165			136			111			136			94	
2		Miyamae			146			49			49			204			119			264			120			119	
3		Oyazawa			570			540			490			490			450			442			460			590	
4	Lake Kasumigaura	Offshore of Tamatsukuri	Namegata City			650		630			770			640			510			580			540			510	
5		Offshore of Kakeuma	Ami Town			280		320			208			257			165			168			78			182	
6		Center	Miho Village			300		880			490			340			242			192			460			360	
7		Offshore of Aso	Inashiki City			150		139			164			138			143			134			139			138	
8	Lake Kitaura	Offshore of Kamaya	Namegata City			610		410			470			470			550			203			416			429	
9		Jingu Bridge	Itako City			121		136			139			172			99			107			115			86	
10	Hitachitone River	Lake Sotonasakaura				113		66			91			141			49			76			42			79	
11		Ikisu	Kamisu City			104		102			108			98			74			97			95			91	
12	Lake Ushikunuma	Center of Lake Ushikunuma	Ryugasaki City		1,010			850			980			770			840			510			740			760	
13	Mizunuma Dam	Center	Kitaibaraki City			5,100		5,400			3,600			4,200			2,720			2,980			3,170			2,940	
14	Koyama Dam		Takahagi City			940		690			890			1,250			740			690			770			1,750	
15	Hananuki Dam					2,730		2,520			2,000			1,940			610			1,290			1,050			1,380	
16	Jyuou Dam		Hitachi City			620		520			1,750			950			1,920			1,980			2,540			1,360	
17	Ryuji Dam		Hitachiota City			1,020		1,010			760			1,110			0			900			740			490	
18	Fujiigawa Dam		Shirosato Town			500		480			450			650			193			498			117			346	
19	Iida Dam		Kasama City			18		0			45			53			180			11			55			156	

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

Table 4.3-28 Detection of radioactive cesium at respective locations (Ibaraki Prefecture: lake sediments) (No.3)

Location				Lake Sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																							Changes	Average of FY2016 (*2)	No.	coefficient of variation	Trends (*3)
				FY2015												FY2016															
No.	Water area		Location	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3					
1	Hinuma	Hiroura	Ibaraki Town		101			99			95			99			120			97			96			94			102	1	0.43	
2		Miyamae			80			128			146			61			36			319			56			23			109	2	0.62	
3		Oyazawa			470			405			465			367			439			332			351			288			353	3	0.25	
4	Lake Kasumigaura	Offshore of Tamatsukuri	Namegata City		540				530		439			461			460			446			557			444			477	4	0.42	
5		Offshore of Kakeuma	Ami Town		137				261		132			147			83			130			103			62			95	5	0.59	
6		Center	Miho Village		257				610		165			543			470			528			506			471			494	6	0.51	
7		Offshore of Aso	Inashiki City		108				121		133			124			107			105			108			106			107	7	0.35	
8	Lake Kitaura	Offshore of Kamaya	Namegata City		200				405		427			361			421			378			340			359			375	8	0.43	
9		Jingu Bridge	Itako City		128				102		118			117			100			53			107			122			96	9	0.32	
10	Hitachitone River	Lake Sotonasakaura			94				89		115			81			64			67			93			51			69	10	0.36	
11		Ikisu	Kamisu City		91				80		82			91			86			53			64			51			64	11	0.49	
12	Lake Ushikunuma	Center of Lake Ushikunuma	Ryugasaki City		800			670			660			565			730				586		616			650			646	12	0.35	
13	Mizunuma Dam	Center	Kitaibaraki City			2,490		3,070			2,730			2,600			2,750			2,490			2,140			1,980			2,340	13	0.31	
14	Koyama Dam		Takahagi City			302		1,080			880			990			730			400			220			797			537	14	0.45	
15	Hananuki Dam					1,410		2,050			1,990			1,310			1,670			1,470			1,180			1,510			1,458	15	0.34	
16	Jyuou Dam		Hitachi City			1,170		1,340			346			445			1,310			543			1,480			1,520			1,213	16	0.51	
17	Ryuji Dam		Hitachiota City			391		469			880			610			449			732			505			435			530	17	0.44	
18	Fujiigawa Dam		Shirosato Town		580												372			385			378			302			359	18	0.36	
19	Iida Dam		Kasama City		165			182			218			246			56			83			45			98			71	19	0.78	

A	B	C	D	E

499 Average

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

*2: Arithmetic Average; calculated by assuming ND=0; Color codes show categories (see the right).

*3: Results of the analysis of trends at respective locations using the method explained on 4.3(1) 2) Decreasing Increasing Unchanged Fluctuations

4) Tochigi Prefecture

In Tochigi Prefecture, surveys were conducted 18 to 22 times from October 2011 to December 2016 for lake sediment samples collected at eight locations.

Regarding the concentration levels of detected values, three locations were categorized into Category D, and five locations into Category E (see Table 4.3-29 and Table 4.3-30).

Concentration levels were generally decreasing at two locations, fluctuating at four locations, and increasing at two locations.

Table 4.3-29 Categorizations of detected values at respective locations

(Tochigi Prefecture: lake sediments)

Category	Percentile (percentile in all detected values)	Number of locations	Locations
A	Upper 5 percentile	0	(None)
B	Upper 5 to 10 percentile	0	(None)
C	Upper 10 to 25 percentile	0	(None)
D	Upper 25 to 50 percentile	3	No. 1, No. 3, No. 7
E	Upper 50 to 100 percentile (lower 50%)	5	No. 2, No. 4, No. 5, No. 6, No. 8

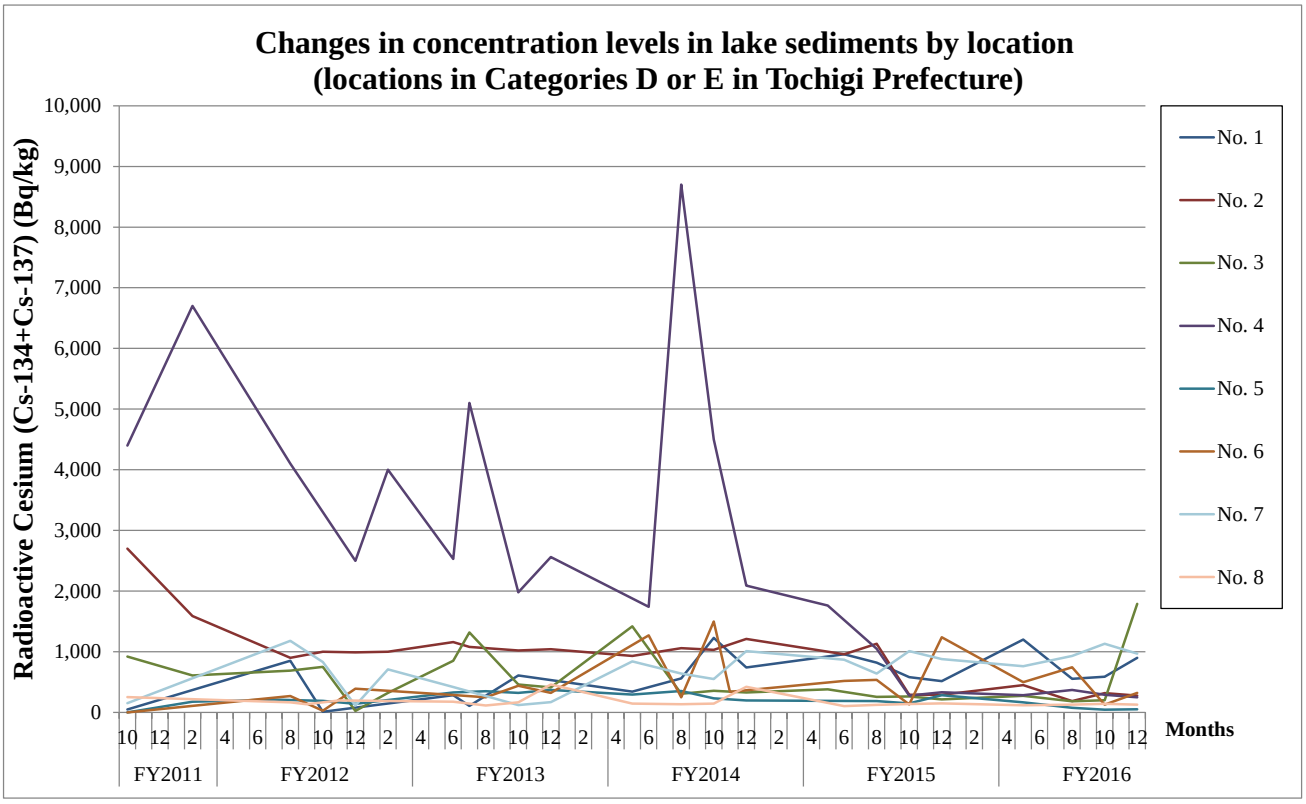


Figure 4.3-16 Changes in concentration levels over the years at respective locations

(Tochigi Prefecture: lake sediments)

Table 4.3-30 Detection of radioactive cesium at respective locations

(Tochigi Prefecture: lake sediments)

Location					Lake Sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																			
					FY2011								FY2012											
No.	Water area	Location		Municipality	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Nakagawa River System	Miyama Dam Reservoir	Center	Nasushiobara City			48										850		11					
2		Shiobara Dam Reservoir	Center				2,700				1,590						900		1,000		990		1,000	
3	Kinugawa River System	Kawaji Dam Reservoir	Center	Nikko City			920				610						690		750		25		320	
4		Ikari Dam Reservoir	Center				4,400				6,700						4,100		3,300		2,500		4,000	
5		Kawamata Dam Reservoir	Center				0				176					212			190		140			
6		Lake Yuno	Center				0										270		28		390			
7		Lake Chuzenji	Center				153										1,180		830		115		710	
8	Watarase River System	Watarase Reservoir	Center	Tochigi City			251										165	134		197				
					total number of samples		166	Detection times		164														

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

Location					Lake Sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																					
					FY2013												FY2014											
No.	Water area	Location		Municipality	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Nakagawa River System	Miyama Dam Reservoir	Center	Nasushiobara City			284	106			610							343			560		1,230		740			
2		Shiobara Dam Reservoir	Center				1,160	1,080			1,020		1,040					930			1,060		1,030		1,210			
3	Kinugawa River System	Kawaji Dam Reservoir	Center	Nikko City			850	1,320			460		410					1,420			307		355		330			
4		Ikari Dam Reservoir	Center				2,530	5,100			1,980		2,560						1,740		8,700		4,500		2,090			
5		Kawamata Dam Reservoir	Center				330		350		321		370					293			354		232		196			
6		Lake Yuno	Center				286		248		440		320						1,270		250		1,500	339				
7		Lake Chuzenji	Center				420		270		122		168					840			640		550		1,010			
8	Watarase River System	Watarase Reservoir	Center	Tochigi City			177		113		164		460					146			134		144		421			

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

Location					Lake Sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																								Changes	Average of FY2016 (*2)	No.	coefficient of variation	Trends (*3)
					FY2015												FY2016														
No.	Water area	Location		Municipality	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3					
1	Nakagawa River System	Miyama Dam Reservoir	Center	Nasushiobara City			960		820		580		514					1,200			554		589		900					811	1	0.59	
2		Shiobara Dam Reservoir	Center				960		1,130		290		290					450			185		317		276					307	2	0.58	
3	Kinugawa River System	Kawaji Dam Reservoir	Center	Nikko City		382			257		261		215					274			183		199		1,790					612	3	0.81	
4		Ikari Dam Reservoir	Center			1,760			1,050		275		333					283			369		290		250					298	4	0.85	
5		Kawamata Dam Reservoir	Center			191			185		147		285					165			77		44		52					85	5	0.53	
6		Lake Yuno	Center				520		535		132		1,240					497			743		126		320					422	6	0.88	
7		Lake Chuzenji	Center				870		640		1,010		880					760			930		1,130		970					948	7	0.51	
8	Watarase River System	Watarase Reservoir	Center	Tochigi City			103		123		137		148					118			128		143		129					130	8	0.54	

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

*2: Arithmetic Average; calculated by assuming ND=0; Color codes show categories (see the right).

*3: Results of the analysis of trends at respective locations using the method explained on 4.3(1) 2)

A	B	C	D	E	451	Average

Decreasing　Increasing　Unchanged　Fluctuations

5) Gunma Prefecture

In Gunma Prefecture, surveys were conducted 16 to 22 times from November 2011 to December 2016 for lake sediment samples collected at 24 locations.

Regarding the concentration levels of detected values, 13 locations were categorized into Category D and 11 locations were categorized into Category E (see Table 4.3-31 and Table 4.3-32).

Concentration levels were generally decreasing at 10 locations, unchanged at six locations, fluctuating at seven locations, and increasing at one location.

Table 4.3-31 Categorizations of detected values at respective locations
(Gunma Prefecture: lake sediments)

Category	Percentile (percentile in all detected values)	Number of locations	Locations
A	Upper 5 percentile	0	(None)
B	Upper 5 to 10 percentile	0	(None)
C	Upper 10 to 25 percentile	0	(None)
D	Upper 25 to 50 percentile	13	No. 1, No. 2, No. 3, No. 5, No. 7, No. 9, No. 10, No. 12, No. 13, No. 15, No. 16, No. 17, No. 22
E	Upper 50 to 100 percentile (lower 50%)	11	No. 4, No. 6, No. 8, No. 11, No. 14, No. 18, No. 19, No. 20, No. 21, No. 23, No. 24

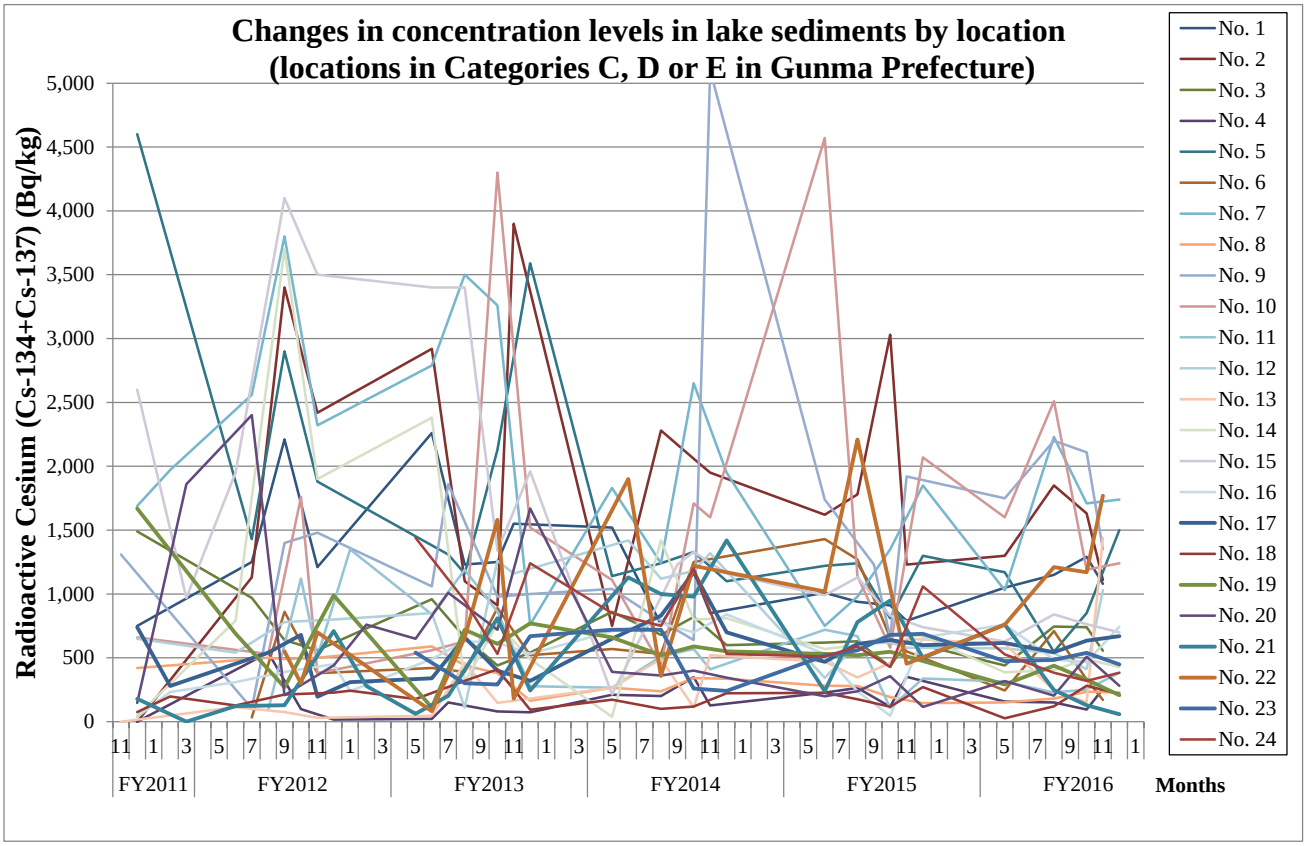


Figure 4.3-17 Changes in concentration levels over the years at respective locations
(Gunma Prefecture: lake sediments)

Table 4.3-32 Detection of radioactive cesium at respective locations (Gunma Prefecture: lake sediments) (No.1)

Location					Lake Sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																				
No.	Water area	Location		Municipality	FY2011								FY2012												
					8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
1	Tonegawa River	Lake Okutone (Yagisawa Dam)	Center	Minakami Town					750							1,250		2,210		1,210					
2		Lake Naramata (Naramata Dam)	Center						0							1,130		3,400		2,420					
3		Lake Dogen (Sudagai Dam)	Center						1,490							970		640		560					
4		Lake Marunuma (Marunuma Dam)	Center	Katashina Village					0								540		98		16				
5		Lake Fujiwara (Fujiwara Dam)	Center	Minakami Town					4,600							1,430		2,900		1,880					
6		Lake Tanbara (Tanbara Dam)	Center	Numata City												33		860		380					
7		Lake Akaya (Aimata Dam)	Center	Minakami Town					1,690		1,970					2,560		3,800		2,320					
8		Lake Sonohara (Sonohara Dam)	Center	Numata City					420								500	490		500					
9		Lake Akagionuma	Center	Maebashi City				1,310								104		1,400		1,480					
10	Agatsuma River Area	Lake Okushima (Shimagawa Dam)	Center	Nakanojo Town					660								530		1,760	380					
11		Lake Shimako (Nakanojo Dam)	Center														94		1,120	510		1,350			
12		Lake Tashiro (Kazawa Dam)	Center	Tsumagoi Village					650						540			780			800				
13	Karasu River	Lake Haruna	Center	Takasaki City/Higashi-Agatsuma Town				0							114			76		30					
14		Lake Kirizumi (Kirizumi Dam)	Center	Annaka City					49						790			3,700		1,900					
15		Lake Usui (Sakamoto Dam)	Center						2,600			970			1,950			4,100		3,500					
16		Lake Arafune (Dodairagawa Dam)	Center	Shimonita Town					37		233				310			390			450	239			
17		Lake Oshio (Oshio Dam)	Center	Tomioka City					740		280						540		680	196		310			
18		Lake Kanna (Shimokubo Dam)	Center	Fujioka City/Kamikawa Town					75		197				128			213			228	242			
19		Lake Hebikami (Shiozawa Dam)	Center	Kanna Town					1,670						690			270			990				
20	Watarase River Area	Lake Kusaki (Kusaki Dam)	Center	Midori City					147			1,860				2,400		207			440		760		
21		Lake Umeda (Kiryugawa Dam)	Center	Kiryu City					179			0			123			129			710		280		
22	Nakatsu River	Lake Nozori (Nozori Dam)	Center	Nakanojo Town														550	300	700					
23	Watarase River Area	Lake Jonuma	Center	Tatebayashi City																					
24		Lake Tataranuma	Center																						
					total number of sample		479	Detection times		475															

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

Table 4.3-32 Detection of radioactive cesium at respective locations (Gunma Prefecture: lake sediments) (No.2)

Location					Lake Sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																						
No.	Water area	Location		Municipality	FY2013												FY2014										
					4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Tonegawa River	Lake Okutone (Yagisawa Dam)	Center	Minakami Town			2,260		1,230		1,250	1,550						1,520			760		1,170	850				
2		Lake Naramata (Naramata Dam)	Center				2,920		1,100		910	3,900						750			2,280		2,060	1,950				
3		Lake Dogen (Sudagai Dam)	Center				960		660		440		540					860			680		820		600			
4		Lake Marunuma (Marunuma Dam)	Center	Katashina Village			21	151			81		74					211			201		349	127				
5		Lake Fujiwara (Fujiwara Dam)	Center	Minakami Town				1,310	1,160		2,130		3,590					1,140			1,240		1,330		1,100			
6		Lake Tanbara (Tanbara Dam)	Center	Numata City			420		390		890		520					570			530		1,250					
7		Lake Akaya (Aimata Dam)	Center	Minakami Town			2,790		3,500		3,260		760					1,830			1,240		2,650		1,950			
8		Lake Sonohara (Sonohara Dam)	Center	Numata City			590		440		380		164					266			237		342		336			
9		Lake Akagionuma	Center	Maebashi City			1,060	1,860			980		1,000					1,040			790		640	5,100				
10	Agatsuma River Area	Lake Okushima (Shimagawa Dam)	Center	Nakanojo Town			560		630		4,300		1,520					1,110			438		1,710	1,600				
11		Lake Shimako (Nakanojo Dam)	Center				840		1,190		860		278					266			510		570	410				
12		Lake Tashiro (Kazawa Dam)	Center	Tsumagoi Village			850		110		1,260	1,160							1,420		1,120		1,180	1,320				
13	Karasu River	Lake Haruna	Center	Takasaki City/Higashi-Agatsuma Town			47		460		148							266			490		112	520				
14		Lake Kirizumi (Kirizumi Dam)	Center	Annaka City			2,380		310		770		490					38			1,420		800		810			
15		Lake Usui (Sakamoto Dam)	Center				3,400		3,400		1,340		1,960					215				1,230	1,330		1,160			
16		Lake Arafune (Dodairagawa Dam)	Center	Shimonita Town			490		630		620		530					710			770		700		840			
17		Lake Oshio (Oshio Dam)	Center	Tomioka City			340		660		400		320					650			830		1,170		700			
18		Lake Kanna (Shimokubo Dam)	Center	Fujioka City/Kamikawa Town		178			320		410		93					173			100		119		222			
19		Lake Hebikami (Shiozawa Dam)	Center	Kanna Town			111		720		610		770					660			520		590		550			
20	Watarase River Area	Lake Kusaki (Kusaki Dam)	Center	Midori City		650		1,010			720		1,670					390			361		400		345			
21		Lake Umeda (Kiryugawa Dam)	Center	Kiryu City		62		203			810		245						1,130		1,000		980		1,420			
22	Nakatsu River	Lake Nozori (Nozori Dam)	Center	Nakanojo Town			82		660		1,580	181							1,900		358		1,220					
23	Watarase River Area	Lake Jonuma	Center	Tatebayashi City		540			301		291		670					720			720		260		241			
24		Lake Tataranuma	Center			1,440			950		530		1,240					850			750		1,200		530			

Table 4.3-32 Detection of radioactive cesium at respective locations (Gunma Prefecture: lake sediments) (No.3)

No.	Water area	Location		Municipality	FY2015 4	5	6	7	8	9	10	11	12	1	2	3	FY2016 4	5	6	7	8	9	10	11	12	1	2	3	Changes	Average of FY2016 (*2)	No.	coefficient of variation	Trends (*3)
		Location			Lake Sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																												
1	Tonegawa River	Lake Okutone (Yagisawa Dam)	Center	Minakami Town			1,010		940		910	790						1,050			1,150		1,290	1,080						1,143	1	0.34	Unchanged
2	Tonegawa River	Lake Naramata (Naramata Dam)	Center	Minakami Town			1,620		1,780		3,030	1,230						1,300			1,850		1,630	1,110						1,473	2	0.53	Fluctuations
3	Tonegawa River	Lake Dogen (Sudagai Dam)	Center	Minakami Town			620		630		431	630						441			745		740	555						620	3	0.35	Decreasing
4	Tonegawa River	Lake Marunuma (Marunuma Dam)	Center	Katashina Village			227		265		118	352						157			151		95	256						165	4	0.76	Fluctuations
5	Tonegawa River	Lake Fujiwara (Fujiwara Dam)	Center	Minakami Town			1,220		1,240		810		1,300					1,170			548		850		1,500					1,017	5	0.61	Decreasing
6	Tonegawa River	Lake Tanbara (Tanbara Dam)	Center	Numata City			1,430		1,270		660	550						245			710		329	171						364	6	0.62	Fluctuations
7	Tonegawa River	Lake Akaya (Aimata Dam)	Center	Minakami Town			750		980		1,350		1,850					1,030			2,230		1,710		1,740					1,678	7	0.43	Decreasing
8	Tonegawa River	Lake Sonohara (Sonohara Dam)	Center	Numata City			281		279		193		146					150			181		235		230					199	8	0.42	Decreasing
9	Tonegawa River	Lake Akagionuma	Center	Maebashi City			1,740			1,230	660	1,920						1,750			2,200		2,110	1,350						1,853	9	0.68	Fluctuations
10	Agatsuma River Area	Lake Okushima (Shimagawa Dam)	Center	Nakanojo Town			4,570		1,140		580		2,070					1,600			2,510		1,190		1,240					1,635	10	0.77	Fluctuations
11	Agatsuma River Area	Lake Shimako (Nakanojo Dam)	Center	Nakanojo Town			720		670		107		339					314			227		252		384					294	11	0.66	Decreasing
12	Agatsuma River Area	Lake Tashiro (Kazawa Dam)	Center	Tsumagoi Village			343		610		620	580						574			535		412	1,030						638	12	0.45	Unchanged
13	Karasu River	Lake Haruna	Center	Takasaki City/Higashi-Agatsuma Town			470		346		460	650						610			246		152	1,440						612	13	0.96	Increasing
14	Karasu River	Lake Kirizumi (Kirizumi Dam)	Center	Annaka City			570		600		680		670					386			405		489		429					427	14	0.99	Fluctuations
15	Karasu River	Lake Usui (Sakamoto Dam)	Center	Annaka City			990		1,130		830		740					628			840		763		700					733	15	0.70	Decreasing
16	Karasu River	Lake Arafune (Dodairagawa Dam)	Center	Shimonita Town			530		237		47		660					760			488		467		744					615	16	0.47	Unchanged
17	Karasu River	Lake Oshio (Oshio Dam)	Center	Tomioka City			468		610		640		600					616			544		634		670					616	17	0.38	Unchanged
18	Karasu River	Lake Kanna (Shimokubo Dam)	Center	Fujioka City/Kamikawa Town			226		175		118		272					26			120		281		218					161	18	0.47	Unchanged
19	Karasu River	Lake Hebikami (Shiozawa Dam)	Center	Kanna Town			530		521		548		476					292			439		329		207					317	19	0.57	Decreasing
20	Watarase River Area	Lake Kusaki (Kusaki Dam)	Center	Midori City			200		237		357		115					318			205		509		282					329	20	0.98	Decreasing
21	Watarase River Area	Lake Umeda (Kiryugawa Dam)	Center	Kiryu City			240		780		950		500					760			248		129		59					299	21	0.84	Fluctuations
22	Nakatsu River	Lake Nozori (Nozori Dam)	Center	Nakanojo Town			1,020		2,210		1,050	454						760			1,210		1,170	1,770						1,228	22	0.65	Fluctuations
23	Watarase River Area	Lake Jonuma	Center	Tatebayashi City			518		560		680		688					473			484		539		448					486	23	0.33	Unchanged
24	Watarase River Area	Lake Tataranuma	Center	Tatebayashi City			510		590		429		1,060					527			383		320		383					403	24	0.48	Decreasing
																								A	B	C	D	E		721	Average		

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

*2: Arithmetic Average; calculated by assuming ND=0; Color codes show categories (see the right).

*3: Results of the analysis of trends at respective locations using the method explained on 4.3(1) 2) Decreasing Increasing Unchanged Fluctuations

6) Chiba Prefecture

In Chiba Prefecture, surveys were conducted 22 times from November 2011 to February 2017 for lake sediment samples collected at eight locations.

Regarding the concentration levels of detected values, one location was categorized into Category C, one location into Category D, and six locations into Category E (see Table 4.3-33 and Table 4.3-34).

Concentration levels were generally decreasing at seven locations and were unchanged at one location.

Table 4.3-33 Categorizations of detected values at respective locations
(Chiba Prefecture: lake sediments)

Category	Percentile (percentile in all detected values)	Number of locations	Locations
A	Upper 5 percentile	0	(None)
B	Upper 5 to 10 percentile	0	(None)
C	Upper 10 to 25 percentile	1	No. 4
D	Upper 25 to 50 percentile	1	No. 3
E	Upper 50 to 100 percentile (lower 50%)	6	No. 1, No. 2, No. 5, No. 6, No. 7, No. 8

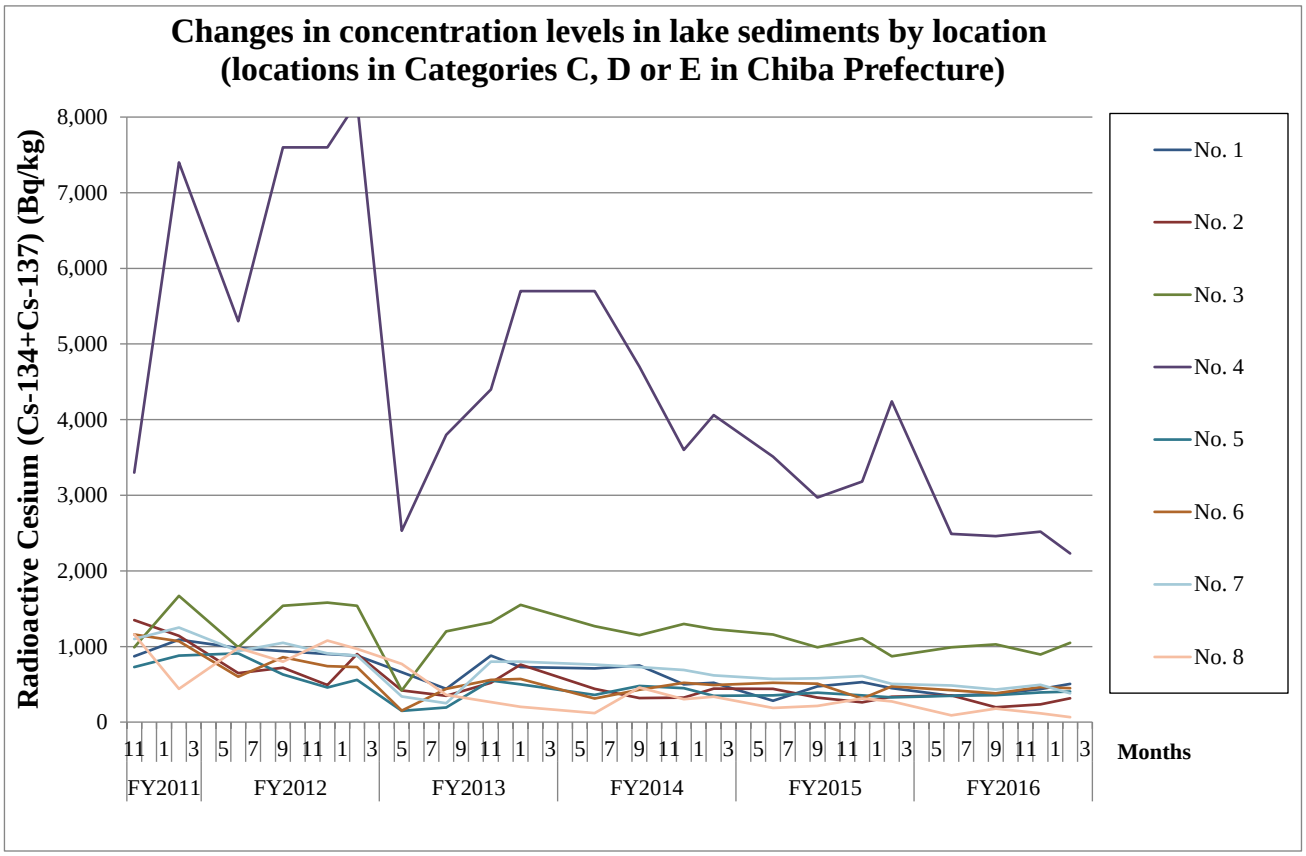


Figure 4.3-18 Changes in concentration levels over the years at respective locations
(Chiba Prefecture: lake sediments)

Table 4.3-34 Detection of radioactive cesium at respective locations (Chiba Prefecture: lake sediments)

No.	Location		Municipality	Lake Sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																			
				FY2011									FY2012										
				8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Lake Teganuma	Fusashita	Inzai City				870			1,090				980			940			900		880	
2		Shimoteganuma Chuo					1,350			1,140				650			720			490		900	
3		Teganuma Chuo	Abiko City/Kashiwa City				990			1,670				990			1,540			1,580		1,540	
4		Nedoshita					3,300			7,400				5,300			7,600			7,600		8,200	
5	Lake Inbanuma	Kita-Inbanuma Chuo	Inzai City/Narita City				730			880				910			630			460		560	
6		Ipponmatsushita	Inzai City				1,160			1,070				600			860			740		730	
7		Lower area of Josuido water intake	Sakura City				1,100			1,250				940			1,050			910		880	
8		Asobashi Bridge	Yachiyo City				1,160			440				980			800			1,080		970	

total number of samples	176	Detection times	176

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

No.	Location		Municipality	Lake Sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																					
				FY2013												FY2014										
				4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Lake Teganuma	Fusashita	Inzai City		660			440			880		730					710			750			500		520	
2		Shimoteganuma Chuo			420			349			520		760					440			320			325		443	
3		Teganuma Chuo	Abiko City/Kashiwa City		420			1,200			1,320		1,550					1,270			1,150			1,300		1,230	
4		Nedoshita			2,530			3,800			4,400		5,700					5,700			4,700			3,600		4,060	
5	Lake Inbanuma	Kita-Inbanuma Chuo	Inzai City/Narita City		151			195			550		500					360			480			450		350	
6		Ipponmatsushita	Inzai City		152			440			560		570					313			430			520		490	
7		Lower area of Josuido water intake	Sakura City		340			251			800		800					760			730			690		620	
8		Asobashi Bridge	Yachiyo City		770			360			266		202					121			460			304		338	

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

No.	Location		Municipality	Lake Sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																						Changes	Average of FY2016 (*2)	No.	coefficient of variation	Trends (*3)
				FY2015												FY2016															
				4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3					
1	Lake Teganuma	Fusashita	Inzai City			283			474			530		451				350			375			438		505			426	1	0.36	
2		Shimoteganuma Chuo				441			324			264		338				354			197			235		315			309	2	0.58	
3		Teganuma Chuo	Abiko City/Kashiwa City			1,160			990			1,110		870				990			1,030			894		1,050			1,012	3	0.25	
4		Nedoshita				3,510			2,970			3,180		4,240				2,490			2,460			2,520		2,230			2,950	4	0.42	
5	Lake Inbanuma	Kita-Inbanuma Chuo	Inzai City/Narita City			355			391			354		328				348			357			392		405			366	5	0.41	
6		Ipponmatsushita	Inzai City			520			509			313		473				424			380			465		451			442	6	0.43	
7		Lower area of Josuido water intake	Sakura City			570			580			610		505				486			433			495		382			508	7	0.38	
8		Asobashi Bridge	Yachiyo City			187			216			312		273				90			179			117		66			180	8	0.79	

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

*2: Arithmetic Average; calculated by assuming ND=0; Color codes show categories (see the right).

*3: Results of the analysis of trends at respective locations using the method explained on 4.3(1) 2)

A	B	C	D	E

774 Average

Decreasing　Increasing　Unchanged　Fluctuations

(2)-3 Coastal areas

1) Iwate Prefecture

In Iwate Prefecture, surveys were conducted 11 times from January 2012 to November 2016 for coastal area sediment samples collected at two locations.

Regarding the concentration levels of detected values, both locations were categorized into Category E (see Table 4.3-35 and Table 4.3-36).

Concentration levels were unchanged at one location and fluctuating at the other location.

Table 4.3-35 Categorizations of detected values at respective locations
(Iwate Prefecture: coastal area sediments)

Category	Percentile (percentile in all detected values)	Number of locations	Locations
A	Upper 5 percentile	0	(None)
B	Upper 5 to 10 percentile	0	(None)
C	Upper 10 to 25 percentile	0	(None)
D	Upper 25 to 50 percentile	0	(None)
E	Upper 50 to 100 percentile (lower 50%)	2	No. 1, No. 2

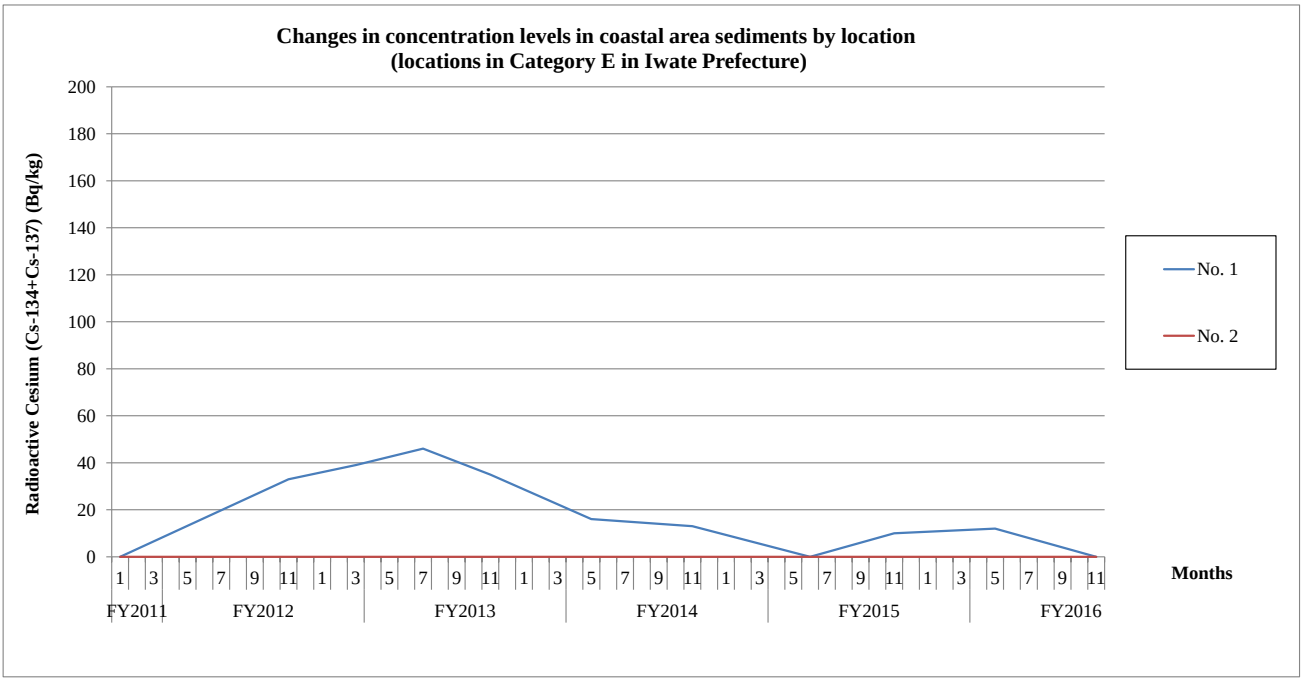


Figure 4.3-19 Changes in concentration levels over the years at respective locations
(Iwate Prefecture: coastal area sediments)

Table 4.3-36 Detection of radioactive cesium at respective locations

(Iwate Prefecture: coastal area sediments)

Location		Coastal area sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																		
No.	Location	FY2011								FY2012										
		8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Ofunato Bay (A)						0										33				39
2	Hirota Bay						0										0			0	

total number of samples	22	Detection times	8

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

Location		Coastal area sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																					
No.	Location	Fy2013												Fy2014											
		4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Ofunato Bay (A)				46				35						16						13				
2	Hirota Bay				0				0						0						0				

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

Location		Coastal area sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																									
No.	Location	FY2015												FY2016												Changes	Average of FY2016 (*2)	No.	coefficient of variation	Trends (*3)
		4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3					
1	Ofunato Bay (A)			0					10						12						0						6.0	1	0.91	
2	Hirota Bay			0					0						0						0						0	2	-	

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

A	B	C	D	E

3.0 Average

*2: Arithmetic Average; calculated by assuming ND=0; Color codes show categories (see the right).

*3: Results of the analysis of trends at respective locations using the method explained on 4.3(1) 2) Decreasing Increasing Unchanged Fluctuations

2) Miyagi Prefecture

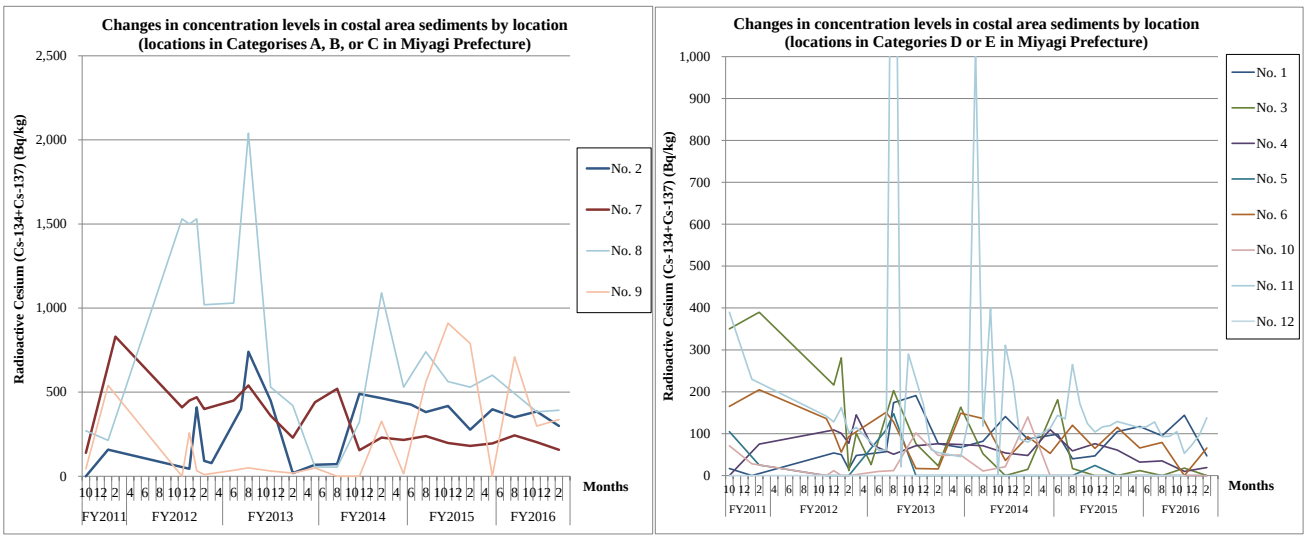
In Miyagi Prefecture, surveys were conducted 11 to 47 times from October 2011 to February 2017 for coastal area sediment samples collected at 12 locations (this analysis excludes the survey results from 28 locations where the survey was conducted only in 2011).

Regarding the concentration levels of detected values, one location was categorized into Category A, one location into Category B , two locations into Category C, three locations into Category D, and five locations into Category E (see Table 4.3-37 and Table 4.3-38).

Concentration levels were generally decreasing at three locations, unchanged at one location, fluctuating at seven locations, and increasing at one location.

Table 4.3-37 Categorizations of detected values at respective locations
(Miyagi Prefecture: coastal area sediments)

Category	Percentile (percentile in all detected values)	Number of locations	Locations
A	Upper 5 percentile	1	No. 8
B	Upper 5 to 10 percentile	1	No. 2
C	Upper 10 to 25 percentile	2	No. 7, No. 9
D	Upper 25 to 50 percentile	3	No. 1, No. 6, No. 11
E	Upper 50 to 100 percentile (lower 50%)	5	No. 3, No. 4, No. 5, No. 10, No. 12



Note: 1) For locations where surveys were conducted multiple times in one month, their average value is used in the figures.

2) Scales of the vertical axes differ in the left and right figures.

Figure 4.3-20 Changes in concentration levels over the years at respective locations
(Miyagi Prefecture: coastal area sediments)

Table 4.3-38 Detection of radioactive cesium at respective locations

(Miyagi Prefecture: coastal area sediments)

No.	Location		Coastal area sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																					
			FY2011								FY2012													
			8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Kesennuma Bay (B)	Offshore of Hachigasaki			17			0											54	50	16	48
2	Kesennuma Bay (C)	Offshore of Oshimakita			0			158											44	410	91	78
3	All other neighboring sea areas	Oppa Bay (Jyusanhama Beach)			350				390										216	281	12	101
4	Neighboring sea area of Ishinomaki (C)	Lake Mangokuura, M-6 (center)			0				75										109	101	77	145
5	Neighboring sea area of Ishinomaki (B-3)	Offshore of Kitakami River Estuary			105				25									0	0	0	0	
6	Neighboring sea area of Ishinomaki (C)	Offshore of Naruse			165				205									136	101	56	93	
7	Matsushima Bay (B)	Nishihama Beach			139				830									410	450	470	400	
8	Neighboring sea area of Sendai Port(A)	Naiko Inner Port, 4-Nai			270			213										1,530	1,500	1,530	1,020	
9	Neighboring sea area of Sendai Port (B)	Gamo-3			44			540										0	258	33	10	
10	All other neighboring sea areas	Ido-5			71			28										0	12	0	0	
11	Offshore of Abukuma River Estuary				390			230										142	128	193	131	103	115
12	Offshore of Tsuyagawa River Estuary				0													0				0	
			total number of samples		278	Detection times		225																

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

No.	Location		Coastal area sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																							
			FY2013												FY2014											
			4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Kesennuma Bay (B)	Offshore of Hachigasaki				57	174			191			76			67			82			141			87	
2	Kesennuma Bay (C)	Offshore of Oshimakita				400	740			450			19			68			72			490			464	
3	All other neighboring sea areas	Oppa Bay (Jyusanhama Beach)		26			203			76			23			163			52			0			15	
4	Neighboring sea area of Ishinomaki (C)	Lake Mangokuura, M-6 (center)		74			51			71			76			74			71			54			48	
5	Neighboring sea area of Ishinomaki (B-3)	Offshore of Kitakami River Estuary				109	148			0			0			0			0			0			0	
6	Neighboring sea area of Ishinomaki (C)	Offshore of Naruse				151	128			17			16			149			136			36			93	
7	Matsushima Bay (B)	Nishihama Beach			450		540			360			229			440			520			155			230	
8	Neighboring sea area of Sendai Port(A)	Naiko Inner Port, 4-Nai			1,030		2,040			530			420			55			54			322			1,090	
9	Neighboring sea area of Sendai Port (B)	Gamo-3			35		50			31			19			49			0			0			327	
10	All other neighboring sea areas	Ido-5			10		12			102			48			49			11			21			140	
11	Offshore of Abukuma River Estuary				61	13	108	2,030	21	290		170	62	55			45	126	1,020	118	400	0	311	226	86	80	
12	Offshore of Tsuyagawa River Estuary					0				0							0						0				

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

No.	Location		Coastal area sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																										Changes	Average of FY2016 (*2)	No.	coefficient of variation	Trends (*3)
			FY2015												FY2016																		
			4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3						
1	Kesennuma Bay (B)	Offshore of Hachigasaki			99		40			47			105			117			95			144			47			101	1	0.63	
2	Kesennuma Bay (C)	Offshore of Oshimakita			426		382			418			277			398			351			385			299			358	2	0.67	
3	All other neighboring sea areas	Oppa Bay (Jyusanhama Beach)			181		17			0			0			12			0			18			0			7.5	3	1.26	
4	Neighboring sea area of Ishinomaki (C)	Lake Mangokuura, M-6 (center)		110			59			76			61			32			35			10			19			24	4	0.53	
5	Neighboring sea area of Ishinomaki (B-3)	Offshore of Kitakami River Estuary		0			0			24			0			0			0			0			0			0	5	2.29	
6	Neighboring sea area of Ishinomaki (C)	Offshore of Naruse		53			120			65			115			66			79			0			66			53	6	0.57	
7	Matsushima Bay (B)	Nishihama Beach		216			239			198			180			195			243			203			157			200	7	0.52	
8	Neighboring sea area of Sendai Port(A)	Naiko Inner Port, 4-Nai		530			740			563			530			601			492			383			392			467	8	0.74	
9	Neighboring sea area of Sendai Port (B)	Gamo-3		15			560			910			790			0			710			298			337			336	9	1.29	
10	All other neighboring sea areas	Ido-5		0			0			0			0			0			0			0			0			0	10	1.65	
11	Offshore of Abukuma River Estuary			113	144	135	265	171	124	104	116	119	129			114	117	128	93	94	105	53	73	97	138			101	11	1.63	
12	Offshore of Tsuyagawa River Estuary				0					0						0						0						0	12	-	
																						A	B	C	D	E		137	Average		

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

*2: Arithmetic Average; calculated by assuming ND=0; Color codes show categories (see the right).

*3: Results of the analysis of trends at respective locations using the method explained on 4.3(1) 2) Decreasing Increasing Unchanged Fluctuations

3) Fukushima Prefecture

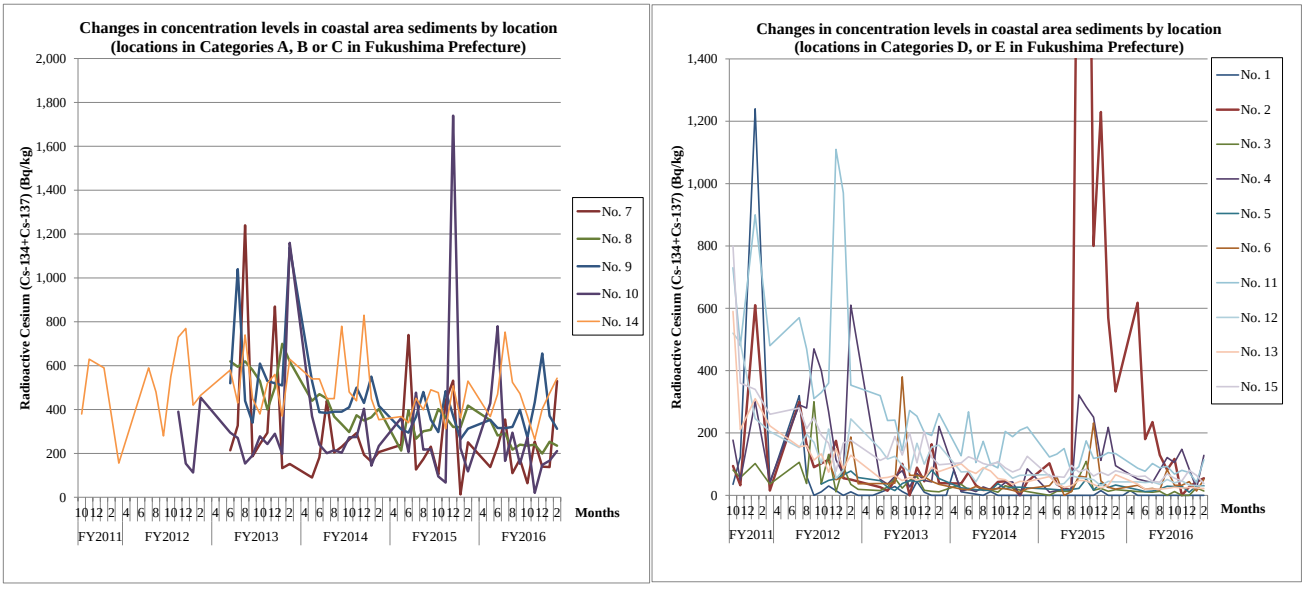
In Fukushima Prefecture, surveys were conducted 40 to 53 times from October 2011 to February 2017 for coastal area sediment samples collected at 15 locations (this analysis excludes the survey results from eight locations where the survey was conducted only once in 2011).

Regarding the concentration levels of detected values, one location was categorized into Category A, one location into Category B, three locations into Category C, five locations into Category D, and five locations into Category E (see Table 4.3-39 and Table 4.3-40).

Concentration levels were generally decreasing at 10 locations, unchanged at one location, and fluctuating at four locations.

Table 4.3-39 Categorizations of detected values at respective locations
(Fukushima Prefecture: coastal area sediments)

Category	Percentile (percentile in all detected values)	Number of locations	Locations
A	Upper 5 percentile	1	No. 14
B	Upper 5 to 10 percentile	1	No. 9
C	Upper 10 to 25 percentile	3	No. 7, No. 8, No. 10
D	Upper 25 to 50 percentile	5	No. 2, No. 4, No. 11, No. 12, No. 15
E	Upper 50 to 100 percentile (lower 50%)	5	No. 1, No. 3, No. 5, No. 6, No. 13



Note: 1) For locations where surveys were conducted multiple times in one month, their average value is used in the figures.

2) Scales of the vertical axes differ in the left and right figures.

Figure 4.3-21 Changes in concentration levels over the years at respective locations
(Fukushima Prefecture: coastal area sediments)

Table 4.3-40 Detection of radioactive cesium at respective locations (Fukushima Prefecture: coastal area sediments) (No.1)

No.	Location		Coastal area sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																						
			FY2011								FY2012														
			8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11		12	1	2		3
1	Neighboring sea area of Soso	Approx. 2,000 m offshore of Tsurushihama Fishing Port			35	123		1,240		38				320	62	0	11	30		0	11	0		0
2	Matsukawaura sea area	Around center of Fishing Right Area-1 in Matsukawaura sea area			94	32		610		15				300	164	90		105	123	175	55	53	48	
3	Neighboring sea area of Soso	Approx. 2,000 m offshore of Manogawa River			81	57		102		36				106	38	300	36	131		11	91	35		19
4	Neighboring sea area of Haramachi City	Approx. 1,000 m offshore of Niida River			177	49		300		44				290	280	470	400	268		114	67	610		
5		Approx. 1,000 m offshore of Ota River															36	48		53		78		57
6	Neighboring sea area of Soso District	Approx. 1,000 m offshore of Odaka River																88	127	50	59	187		37
7		Approx. 2,000 m offshore of Ukedo River																						
8		Approx. 1,000 m offshore of Kumagawa River																						
9		Approx. 1,000 m offshore of Tomioka River																						
10	Neighboring sea area of Naraha Town	Approx. 1,000 m offshore of Kidogawa River																400	380	154	113	380	530	
11	Approx. 1,000 m offshore of Asami River Estuary				730	480		900		480				570	470	310	330	360		1,110	970	277	430	
12	Approx. 1,000 m offshore of Ohisa River Estuary				520	490		246		205				153	196	170	102	213		54	80	290	200	
13	Neighboring sea area of Iwaki City	Approx. 1,500 m offshore of Natsui River			590	211		310		223				156	159	113	133	74		150	86	125	132	
14	Onahama Port	Approx. 400 m north of Nishibouhatei No. 2			380	630		590		156				590	480	280	550	730		770	420	470	460	
15	Joban coastal sea area	Approx. 1,000 m offshore of Binda River			800	360		340		260				280	214	249	193	167		77	168	169	184	
			total number of samples		733	Detection times		689																

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

No.	Location		Coastal area sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																								
			FY2013													FY2014											
			4	5	6	7		8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Neighboring sea area of Soso	Approx. 2,000 m offshore of Tsurushihama Fishing Port			28	12	0	44	10	0	0	0	81	11			0	12	0	0	0	0	0	0	0	0	
2	Matsukawaura sea area	Around center of Fishing Right Area-1 in Matsukawaura sea area			26	18	11	48	101	0	89	45	164	39			38	73	32	17	19	43	45	26	0	44	
3	Neighboring sea area of Soso	Approx. 2,000 m offshore of Manogawa River			15	36	17	55	23	48	61	16	13	11			35	18	17	20	17	10	31	24	17	12	
4	Neighboring sea area of Haramachi City	Approx. 1,000 m offshore of Niida River			51	33	38	61	79	27	70	48	43	221			13	20	12	27	18	22	41	43	0	85	
5		Approx. 1,000 m offshore of Ota River			47	14	38	15	38	47	44	51	81	54			24	22	18	17	15	38	21	26	26	24	
6	Neighboring sea area of Soso District	Approx. 1,000 m offshore of Odaka River			38	31	44	39	380	64	64	59	45	35			20	18	28	22	18	22	21	16	10	21	
7		Approx. 2,000 m offshore of Ukedo River			214	420	234	1,240	187	243	294	870	133	152			90	182	440	205	230	263	293	194	163	206	
8		Approx. 1,000 m offshore of Kumagawa River			620	570	620	620	580	530	400	500	700	620			440	470	450	368	333	297	374	350	365	403	
9		Approx. 1,000 m offshore of Tomioka River			520	480	1,600	440	340	610	530	520	510	1,140			530	388	385	390	390	410	500	430	550	417	
10	Neighboring sea area of Naraha Town	Approx. 1,000 m offshore of Kidogawa River			295	290	251	154	191	278	243	290	198	1,160			370	240	201	215	203	274	275	404	144	234	
11	Approx. 1,000 m offshore of Asami River Estuary				320	290	190	241	143	272	254	202	192	262			127	268	105	173	100	88	205	188	209	219	
12	Approx. 1,000 m offshore of Ohisa River Estuary				149	131	102	125	96	75	167	100	155	161			75	76	43	84	101	105	76	55	64	65	
13	Neighboring sea area of Iwaki City	Approx. 1,500 m offshore of Natsui River			55	60	55	63	47	57	49	53	90	76			101	80	70	89	78	54	50	35	45	44	
14	Onahama Port	Approx. 400 m north of Nishibouhatei No. 2			580	460	400	740	450	380	520	560	370	630			540	540	450	450	780	480	440	830	449	354	
15	Joban coastal sea area	Approx. 1,000 m offshore of Binda River			112	139	108	189	129	200	104	205	122	98			104	124	114	102	96	108	88	75	84	125	

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

Table 4.3-40 Detection of radioactive cesium at respective locations (Fukushima Prefecture: coastal area sediments) (No.2)

Location			Coastal area sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																								Average of FY2016 (*2)	No.	coefficient of variation	Trends (*3)
			FY2015												FY2016												Changes				
No.	Location		4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3					
1	Neighboring sea area of Soso	Approx. 2,000 m offshore of Tsurushihama Fishing Port		0	0	0	0	15	0	0	0	15	0			0	0	0	0	0	0	0	0	0	0			0	1	4.42	
2	Matsukawaura sea area	Around center of Fishing Right Area-1 in Matsukawaura sea area		103	35	23	16	2,460	2,950	800	1,230	570	333			618	180	235	129	82	117	0	27	43	55			149	2	2.27	
3	Neighboring sea area of Soso	Approx. 2,000 m offshore of Manogawa River		0	13	13	12	58	109	16	22	13	18			12	11	10	13	0	12	0	0	24	14			10	3	1.33	
4	Neighboring sea area of Haramachi City	Approx. 1,000 m offshore of Niida River		10	15	20	17	322	284	251	112	218	95			52	46	41	81	121	105	148	84	22	128			83	4	1.10	
5		Approx. 1,000 m offshore of Ota River		20	18	17	19	22	52	17	39	25	33			18	12	14	20	29	28	29	10	30	31			22	5	0.53	
6	Neighboring sea area of Soso District	Approx. 1,000 m offshore of Odaka River		31	59	0	12	62	58	232	46	26	20			32	20	22	17	83	32	32	44	14	51			35	6	1.23	
7		Approx. 2,000 m offshore of Ukedo River		239	740	127	174	231	104	440	532	13	251			138	231	355	110	174	64	254	140	138	530			213	7	0.83	
8		Approx. 1,000 m offshore of Kumagawa River		213	397	267	301	308	402	365	321	319	418			351	282	292	217	240	235	240	199	253	235			254	8	0.35	
9		Approx. 1,000 m offshore of Tomioka River		311	295	367	480	354	297	484	372	265	313			353	316	315	321	399	273	433	656	371	312			375	9	0.52	
10	Neighboring sea area of Naraha Town	Approx. 1,000 m offshore of Kidogawa River		361	206	477	217	219	95	67	1,740	224	118			429	780	166	295	153	272	20	148	167	211			264	10	0.92	
11	Approx. 1,000 m offshore of Asami River Estuary			123	132	150	72	92	175	118	124	137	134			87	77	102	88	93	68	80	73	41	114			82	11	0.91	
12	Approx. 1,000 m offshore of Ohisa River Estuary			66	33	38	63	56	55	50	31	45	43			43	41	43	35	51	40	46	33	31	28			39	12	0.92	
13	Neighboring sea area of Iwaki City	Approx. 1,500 m offshore of Natsui River		60	37	25	31	48	47	35	24	32	66			36	20	20	20	22	26	23	25	24	21			24	13	1.12	
14	Onahama Port	Approx. 400 m north of Nishibouhatei No. 2		368	340	452	399	490	477	312	508	361	530			368	470	753	524	473	371	264	403	474	543			464	14	0.28	
15	Joban coastal sea area	Approx. 1,000 m offshore of Binda River		62	60	58	96	75	84	62	74	64	79			60	62	45	42	69	55	46	80	64	38			56	15	0.88	

A	B	C	D	E	138	Average

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

*2: Arithmetic Average; calculated by assuming ND=0; Color codes show categories (see the right).

*3: Results of the analysis of trends at respective locations using the method explained on 4.3(1) 2) Decreasing Increasing Unchanged Fluctuations

4) Ibaraki Prefecture

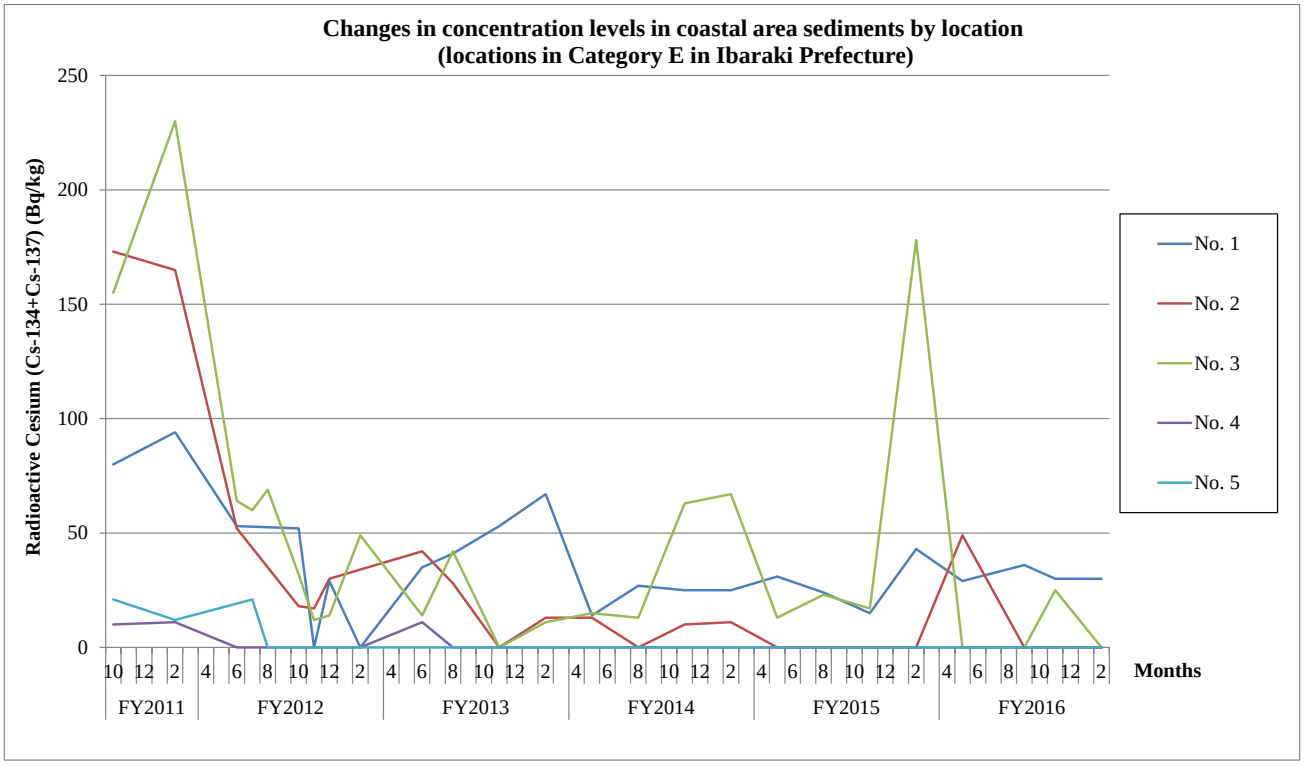
In Ibaraki Prefecture, surveys were conducted 23 to 25 times from October 2011 to February 2017 for coastal area sediment samples collected at five locations.

Regarding the concentration levels of detected values, all five locations were categorized into Category E (see Table 4.3-41 and Table 4.3-42).

Concentration levels were generally decreasing at three locations and fluctuating at two locations.

Table 4.3-41 Categorizations of detected values at respective locations
(Ibaraki Prefecture: coastal area sediments)

Category	Percentile (percentile in all detected values)	Number of locations	Locations
A	Upper 5 percentile	0	(None)
B	Upper 5 to 10 percentile	0	(None)
C	Upper 10 to 25 percentile	0	(None)
D	Upper 25 to 50 percentile	0	(None)
E	Upper 50 to 100 percentile (lower 50%)	5	No. 1, No. 2, No. 3, No. 4, No. 5



Note: 1) For locations where surveys were conducted multiple times in one month, their average value is used in the figures.

Figure 4.3-22 Changes in concentration levels over the years at respective locations
(Ibaraki Prefecture: coastal area sediments)

Table 4.3-42 Detection of radioactive cesium at respective locations (Ibaraki Prefecture: coastal area sediments)

No.	Location	Coastal area sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																				
		FY2011								FY2012												
		8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
1	Offshore of Satone River Estuary			80				94				53				52	0	29		0		
2	Offshore of Okita River Estuary			173				165				52				18	17	30		34		
3	Offshore of Momiya River/Kujigawa River Estuaries			155				230				64	60	69		32	12	14		49		
4	Neighboring water body of Ken-o Offshore of Nakagawa River			10				11				0	0	0		0	0	0		0		
5	Offshore of Tonegawa River Estuary			21				12					17	25	0		0	0	0			0
		total number of samples		121	Detection times		63															

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

No.	Location	Coastal area sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																					
		FY2013												FY2014										
		4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Offshore of Satone River Estuary			35		41			53			67			14			27			25			25	
2	Offshore of Okita River Estuary			42		28			0			13			13			0			10			11	
3	Offshore of Momiya River/Kujigawa River Estuaries			14		42			0			11			15			13			63			67	
4	Neighboring water body of Ken-o Offshore of Nakagawa River			11		0			0			0			0			0			0			0	
5	Offshore of Tonegawa River Estuary			0		0			0			0			0			0			0			0	

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

No.	Location	Coastal area sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																								Changes	Average of FY2016 (*2)	No.	coefficient of variation	Trends (*3)
		FY2015												FY2016																
		4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3					
1	Offshore of Satone River Estuary		31			24			15			43			29				36		30			30			31	1	0.63	
2	Offshore of Okita River Estuary		0			0			0			0			49				0		0			0			12	2	1.66	
3	Offshore of Momiya River/Kujigawa River Estuaries		13			23			17			178			0				0		25			0			6.3	3	1.26	
4	Neighboring water body of Ken-o Offshore of Nakagawa River		0			0			0			0			0				0		0			0			0	4	2.77	
5	Offshore of Tonegawa River Estuary			0			0		0			0				0			0			0		0			0	5	2.43	

*1: Blank cells are locations where samples were not collected. The result “Not detectable” is indicated as “0.”

*2: Arithmetic Average; calculated by assuming ND=0; Color codes show categories (see the right).

*3: Results of the analysis of trends at respective locations using the method explained on 4.3(1) 2)

A	B	C	D	E

10 Average

Decreasing Increasing Unchanged Fluctuations

5) Chiba Prefecture and Tokyo Metropolis

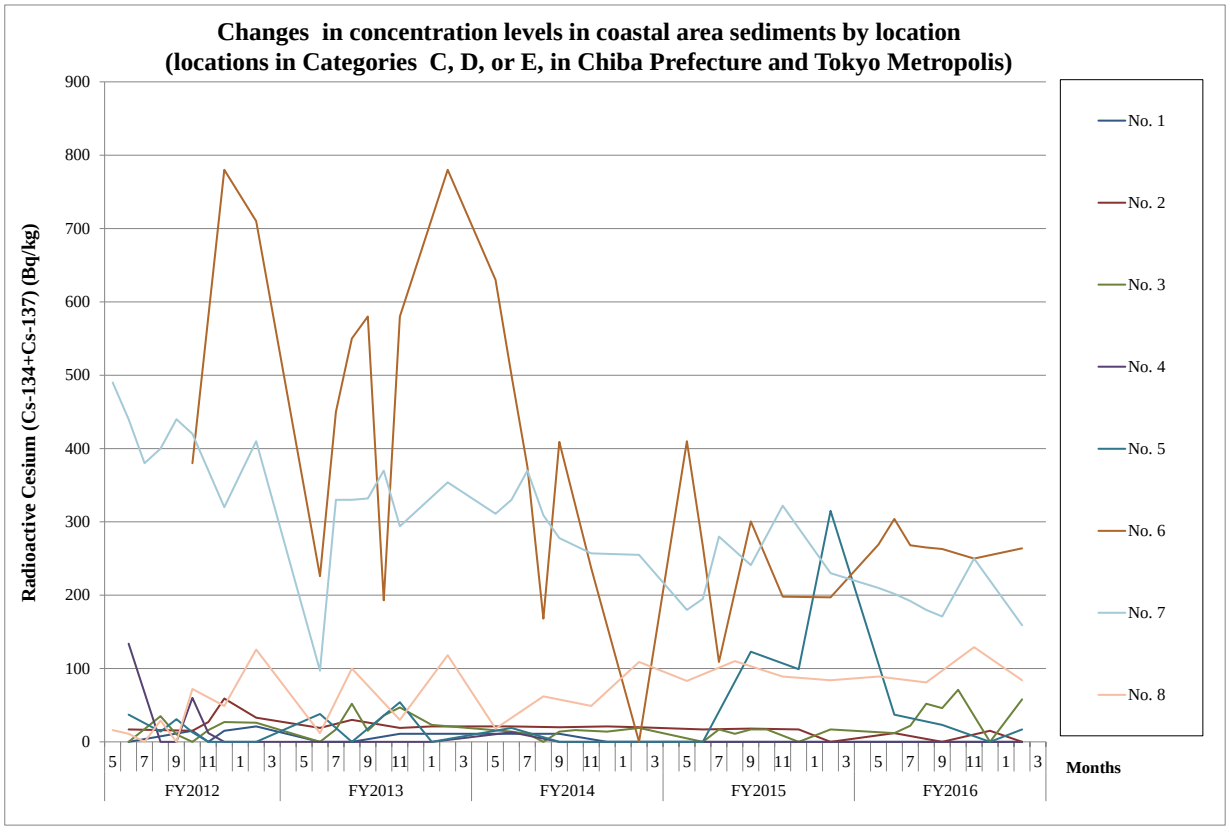
In Chiba Prefecture and Tokyo Metropolis, surveys were conducted 21 to 36 times from May 2012 to February 2017 for coastal area sediment samples collected at eight locations in total.

Regarding the concentration levels of detected values, one location was categorized into Category C, three locations were categorized into Category D and four locations were categorized into Category E (see Table 4.3-43 and Table 4.3-44).

Concentration levels were generally decreasing at five locations and fluctuating at three locations.

Table 4.3-43 Categorizations of detected values at respective locations
(Chiba Prefecture and Tokyo Metropolis: coastal area sediments)

Category	Percentile (percentile in all detected values)	Number of locations	Locations
A	Upper 5 percentile	0	(None)
B	Upper 5 to 10 percentile	0	(None)
C	Upper 10 to 25 percentile	1	No. 6
D	Upper 25 to 50 percentile	3	No. 3, No. 7, No. 8
E	Upper 50 to 100 percentile (lower 50%)	4	No. 1, No. 2, No. 4, No. 5



Note: 1) For locations where surveys were conducted multiple times in one month, their average value is used in the figures.

Figure 4.3-23 Changes in concentration levels over the years at respective locations
(Chiba Prefecture and Tokyo Metropolis: coastal area sediments)

Table 4.3-44 Detection of radioactive cesium at respective locations

(Chiba Prefecture and Tokyo Metropolis: coastal area sediments)

Location				Coastal area sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																				
No.	Prefecture	Location		FY2011									FY2012											
				8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Chiba Prefecture	Tokyo Bay 7	Offshore of Yorogawa River Estuary											0				15	0	15		21	
2		Tokyo Bay 5	Offshore of Miyako River Estuary											17				15	27	59		33	
3		Coastal sea area of Makuhari	Offshore of Inbanuma Discharge Channel											0		35	10	0	16	27		26	
4		Approx. 1 km offshore of Ebigawa River Estuary	Coastal area of Keiyo Port (Ebigawa River Estuary)											134		0	0	60	12	0		0	
5		Approx. 1 km offshore of Edogawa River Estuary												37		14	31	13	0	0		0	
6	Tokyo Metropolis	Approx. 1 km offshore of Kyu-Edogawa River Estuary	Offshore of Kyu-Edogawa River Estuary															380		780		710	
7		St-8	Offshore of Arakawa River/Kyu-Edogawa River Estuaries										490	440	380	400	440	420		320		410	
8		Southwestern area of Toyosu Wharf	Offshore of Sumida River Estuary										16	11	0	29	0	72		49		126	
				total number of samples		214	Detection times		158															

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

Location				Coastal area sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																				
No.	Prefecture	Location		FY2013									FY2014											
				4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Chiba Prefecture	Tokyo Bay 7	Offshore of Yorogawa River Estuary			0		0			11		11					11			11			0		0	
2		Tokyo Bay 5	Offshore of Miyako River Estuary			19		30			19		21					21			20			21		20	
3		Coastal sea area of Makuhari	Offshore of Inbanuma Discharge Channel			0	17	52	15	36	47		23					14	11	0	14	16		14		19	
4		Approx. 1 km offshore of Ebigawa River Estuary	Coastal area of Keiyo Port (Ebigawa River Estuary)			0		0			0		0					13			0			0		0	
5		Approx. 1 km offshore of Edogawa River Estuary				38		0			54		0					19			0			0		0	
6	Tokyo Metropolis	Approx. 1 km offshore of Kyu-Edogawa River Estuary	Offshore of Kyu-Edogawa River Estuary			226	450	550	580	193	580			780			630	500	375	168	409		237			0	
7		St-8	Offshore of Arakawa River/Kyu-Edogawa River Estuaries			97	330	330	332	370	294			354			311	330	370	309	278		257			255	
8		Southwestern area of Toyosu Wharf	Offshore of Sumida River Estuary			12		100			30			118			18			62			49			109	

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

Location				Coastal area sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																							Changes	Average of FY2016 (*2)	No.	coefficient of variation	Trends (*3)
No.	Prefecture	Location		FY2015												FY2016														
				4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3					
1	Chiba Prefecture	Tokyo Bay 7	Offshore of Yorogawa River Estuary			0			0			0		0				0			0			0		0			0	1	1.52	
2		Tokyo Bay 5	Offshore of Miyako River Estuary			17			18			17		0				12			0			15		0			6.8	2	0.66	
3		Coastal sea area of Makuhari	Offshore of Inbanuma Discharge Channel			0	17	11	17	17		0		17				12	22	52	46	71		0		58			37	3	0.87	
4		Approx. 1 km offshore of Ebigawa River Estuary	Coastal area of Keiyo Port (Ebigawa River Estuary)			0			0			0		0				0			0			0		0			0	4	3.15	
5		Approx. 1 km offshore of Edogawa River Estuary				0			123			99		315				37			23			0		17			19	5	1.93	
6	Tokyo Metropolis	Approx. 1 km offshore of Kyu-Edogawa River Estuary	Offshore of Kyu-Edogawa River Estuary		410	267	109		266	335		198		197				269	304	268	265	263		250			264			269	6	0.54	
7		St-8	Offshore of Arakawa River/Kyu-Edogawa River Estuaries		180	195	280		248	234		322		230				210	202	192	180	171		250			159			195	7	0.32	
8		Southwestern area of Toyosu Wharf	Offshore of Sumida River Estuary		83			110				89		84				89			81			129			84			96	8	0.65	

*1: Blank cells are locations where samples were not collected. The result "Not detectable" is indicated as "0."

A B C D E

78 Average

*2: Arithmetic Average; calculated by assuming ND=0; Color codes show categories (see the right).

*3: Results of the analysis of trends at respective locations using the method explained on 4.3(1) 2) Decreasing Increasing Unchanged Fluctuations

(3) Conclusion

The concentration levels of detected values for sediment samples from public water areas (rivers, lakes, and coastal areas) from FY2011 to FY2016 and their changes shown so far are summarized as follows (see Figure 4.3-24 and Table 4.3-45).

1) Concentration levels of detected values

・Rivers

Out of all surveyed locations (396 locations), the number categorized into Categories A and B, which fall under the upper 10%, was the largest in Hamadori in Fukushima Prefecture (18 locations). Other such locations were also found in Nakadori and Aizu in Fukushima Prefecture, Ibaraki Prefecture, Gunma Prefecture and Chiba Prefecture.

• Lakes

Out of all surveyed locations (164 locations), locations categorized into Category A or B were found in Hamadori in Fukushima Prefecture.

• Coastal areas

Out of all surveyed locations (42 locations), locations categorized into Category A or B were found in Miyagi and Fukushima Prefectures.

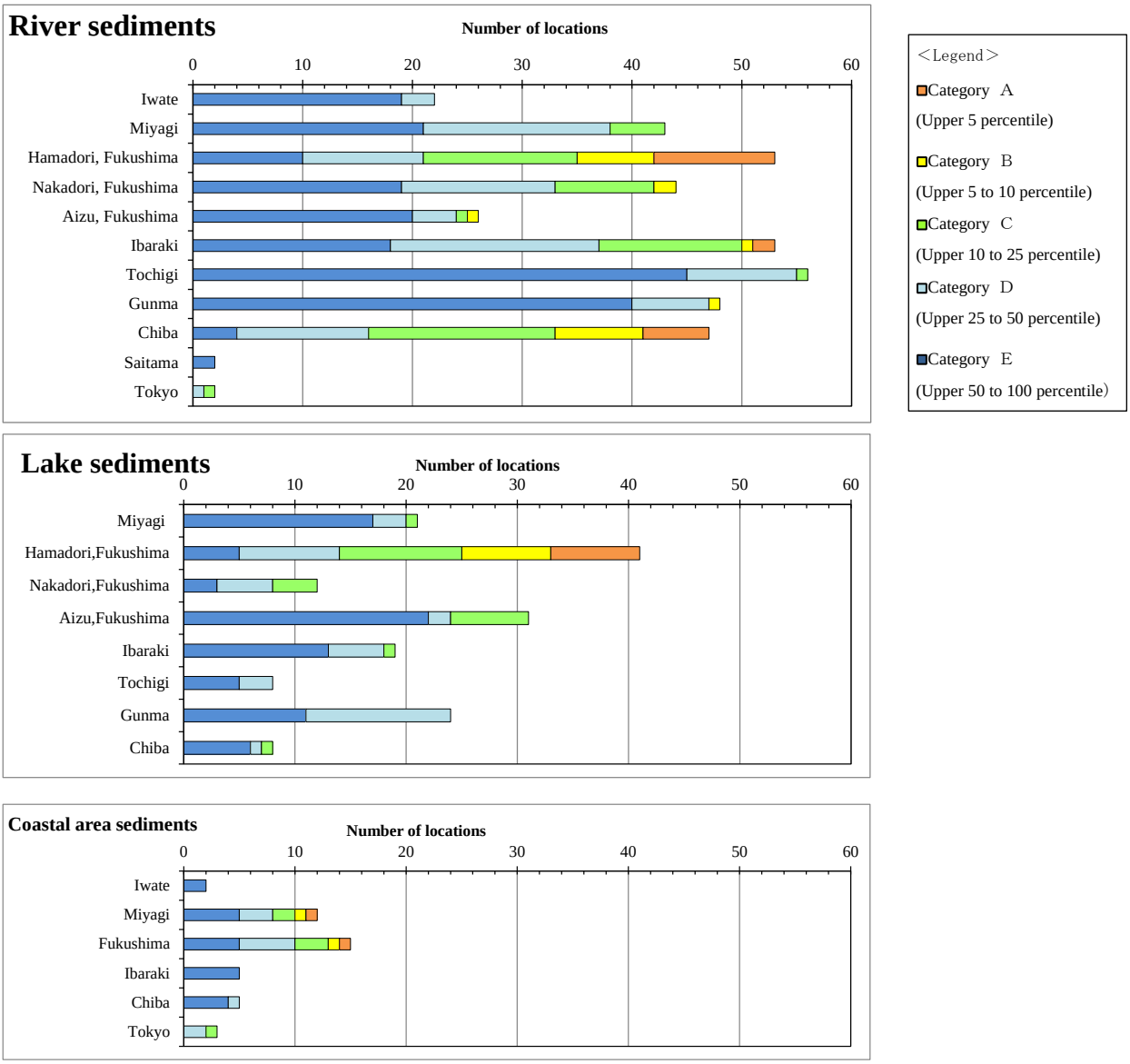


Figure 4.3-24 Categorizations by concentration levels of detected values for sediment samples (upper: rivers; middle: lakes; lower: coastal areas)

(* Figure 4.3-24 shows the aforementioned Table 3.1-1 graphically.)

2) Changes in detected values

・Rivers

A decreasing trend was observed at most locations.

・Lakes

Detected values were generally decreasing or unchanged at most locations but some locations showed fluctuations.

• Coastal areas

A decreasing trend was observed at most locations but some locations showing fluctuations.

Table 4.3-45 Changes in detected values for sediment samples from public water areas (rivers, lakes, and coastal areas)

<Rivers>

Trends	Number of locations												
	Iwate	Miyagi	Fukushima			Ibaraki	Tochigi	Gunma	Chiba	Saitama	Tokyo	Total	
			Hamadori	Nakadori	Aizu							Number of locations	Percentage
Decreasing	19	35	49	42	20	46	40	32	38	2	1	324	81.8
Unchanged	0	0	1	0	0	2	0	1	1	0	1	6	1.5
Fluctuations	3	8	3	2	6	5	16	15	8	0	0	66	16.7
Increasing	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Total	22	43	53	44	26	53	56	48	47	2	2	396	100.0

<Lakes>

Trends	Number of locations									
	Miyagi	Fukushima			Ibaraki	Tochigi	Gunma	Chiba	Total	
		Hamadori	Nakadori	Aizu					Number of locations	Percentage
Decreasing	12	21	5	8	9	2	10	7	74	45.1
Unchanged	3	4	2	4	6	0	6	1	26	15.9
Fluctuations	6	15	5	13	4	4	7	0	54	32.9
Increasing	0	1	0	6	0	2	1	0	10	6.1
Total	21	41	12	31	19	8	24	8	164	100.0

<Coastal areas>

Trends	Number of locations							
	Iwate	Miyagi	Fukushima	Ibaraki	Chiba	Tokyo	Total	
							Number of locations	Percentage
Decreasing	0	3	10	3	3	2	21	50.0
Unchanged	1	1	1	0	0	0	3	7.1
Fluctuations	1	7	4	2	2	1	17	40.5
Increasing	0	1	0	0	0	0	1	2.4
Total	2	12	15	5	5	3	42	100.0

3) Summary by prefecture

Concentration levels of detected values and their changes are summarized by prefecture as follows (see Figures 4.3-25 to 4.3-27).

(i) Iwate Prefecture

- For rivers, all the 22 surveyed locations were categorized into either Category D or E. A decreasing trend was observed at most locations.
- For coastal areas, the two surveyed locations were categorized into Category E. An unchanged trend was observed at most locations except for some locations that showed fluctuations.

(ii) Miyagi Prefecture

- For rivers, of the 43 surveyed locations, some locations in the lower reaches were categorized into Category C, but over 80% of the surveyed locations were categorized into Category D or E. A decreasing trend was observed at most locations.
- For lakes, of the 21 surveyed locations, most locations were categorized into Category D or E, while one location was categorized into Category C. Concentration levels were generally decreasing or unchanged except for some locations that showed fluctuations.
- For coastal areas, approximately 70% of the 12 surveyed locations were categorized into Category D or E, rest of them were categorized into Category A, B or C. There was a location categorized into Category A in the Sendai Port. Although concentration levels were fluctuating at some locations, most other locations showed decreasing or unchanged trends.

(iii) Hamadori, Fukushima Prefecture

- For rivers, approximately 60% of the 53 surveyed locations were categorized into Category A, B or C.

Many locations categorized into Category A or B were found near to or northwest of Fukushima Daiichi NPS, while locations categorized into Category C were seen in the northern and southern parts of the district. A decreasing trend was observed at most locations.

- For lakes, approximately 70% of the 41 surveyed locations were categorized into Category A, B or C.

Many locations categorized into Category A or B were found northwest of Fukushima Daiichi NPS. A decreasing or unchanged trend was observed generally except for some locations that showed fluctuations.

- For coastal areas, approximately 70% of the 15 surveyed locations were categorized into Category D or E, and the rest were categorized into Category A, B, or C. One location categorized into Category A was seen in Onahama port. A decreasing trend was generally observed except for some locations that showed fluctuations.

(iv) Nakadori, Fukushima Prefecture

- For rivers, more than 70% of the 44 surveyed locations were categorized into Category D or E, and the rest were categorized into Category B or C. The locations categorized into Category B or C were found between the center and the northern part of the Abukuma River system. A decreasing trend was observed at most locations.
- For lakes, eight of the 12 surveyed locations were categorized into Category D or E, and the remaining four locations were categorized into Category C. The locations categorized into Category C were seen in the

upper and lower reaches of the Abukuma River basin. A decreasing or unchanged trend was generally observed except for some locations that showed fluctuations.

(v) Aizu, Fukushima Prefecture

- For rivers, one of the 26 surveyed locations was categorized into Category B, one location was categorized into C, and all the remaining locations were categorized into Category D or E. A decreasing trend was observed at most locations.
- For lakes, seven of the 31 surveyed locations were categorized into Category C, and approximately 80% of the locations were categorized into Category D or E. Although concentration levels were fluctuating at some locations, decreasing or unchanged trends were observed at rest of the locations.

(vi) Ibaraki Prefecture

- For rivers, approximately 70% of the 53 surveyed locations were categorized into Category D or E, and the rest were categorized into Category A, B, or C. The locations categorized into Category A or B were found in rivers flowing into Lake Kasumigaura. A decreasing trend was observed at most locations.
- For lakes, out of the 19 surveyed locations, one in the northern part of the prefecture was categorized into Category C, and the remaining locations were categorized into Category D or E. A decreasing or unchanged trend was observed at most locations.
- For coastal areas, all the five surveyed locations were categorized into Category E. A decreasing trend was generally observed at most locations except for some locations that showed fluctuations.

(vii) Tochigi Prefecture

- For rivers, one of the 56 surveyed locations was categorized into Category C, and the remaining locations were categorized into Category D or E. A decreasing trend was generally observed except for some locations that showed fluctuations.
- For lakes, all eight locations were categorized into Category D or E. Concentration levels were fluctuating at many of the locations, and rest of the locations showed a variety of trends.

(viii) Gunma Prefecture

- For rivers, of the 48 surveyed locations, some locations in the lower reaches of the Watarase River basin were categorized into Category B, and all the remaining locations were categorized into Category D or E. A decreasing trend was generally observed except for some locations that showed fluctuations.
- For lakes, all the 24 surveyed locations were categorized into Category D or E. Although concentration levels were fluctuating at some locations, decreasing or unchanged trends were generally observed.

(ix) Chiba and Saitama Prefectures and Tokyo Metropolis

- For rivers, over 60% of the 51 surveyed locations were categorized into Category A, B, or C. The locations categorized into Category A or B were found in rivers flowing into Lake Teganuma or Lake Inbanuma, the Edogawa River system and a part of the Tonegawa River system. A decreasing trend was observed at most locations.
- For lakes, one of the eight surveyed locations, in Lake Teganuma, was categorized into Category C, and all the remaining locations were categorized into Category D or E. A decreasing trend was observed at most locations.

• For coastal areas, one of the eight surveyed locations, the mouth of the Kyuedogawa River, was categorized into Category C, and all remaining locations were categorized into Category D or E. A decreasing trend was observed at most locations except for some locations that showed fluctuations.

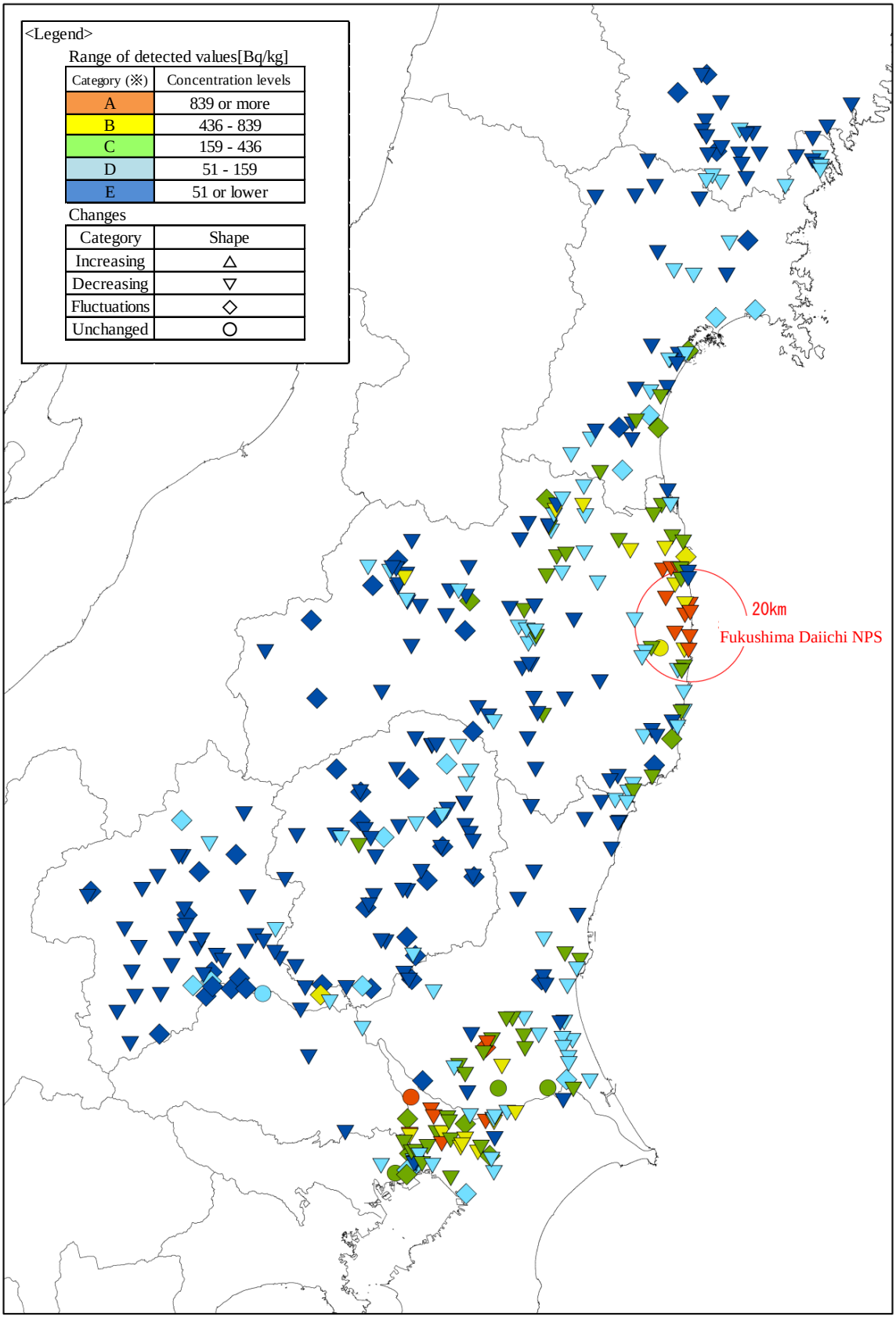


Figure 4.3-25 Categorization of and changes in concentration levels for river sediment samples from public water areas

(*) Categories A to E show relative concentration levels for river sediment samples and cannot be compared with those for lake sediment samples or coastal area sediment samples.

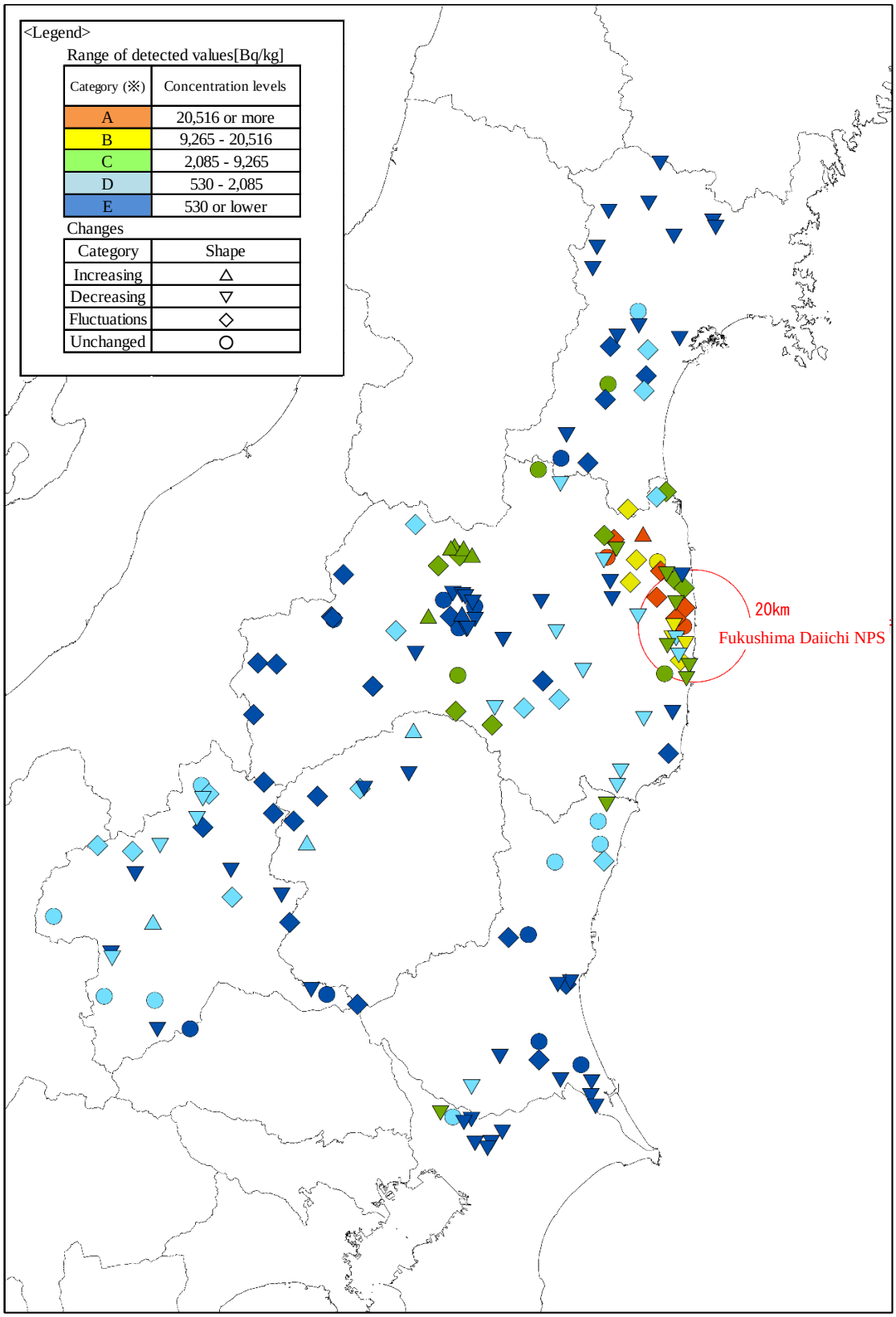


Figure 4.3-26 Categorization of and changes in concentration levels for lake sediment samples from public water areas

(*) Categories A to E show relative concentration levels for lake sediment samples and cannot be compared with those for river sediment samples or coastal area sediment samples.

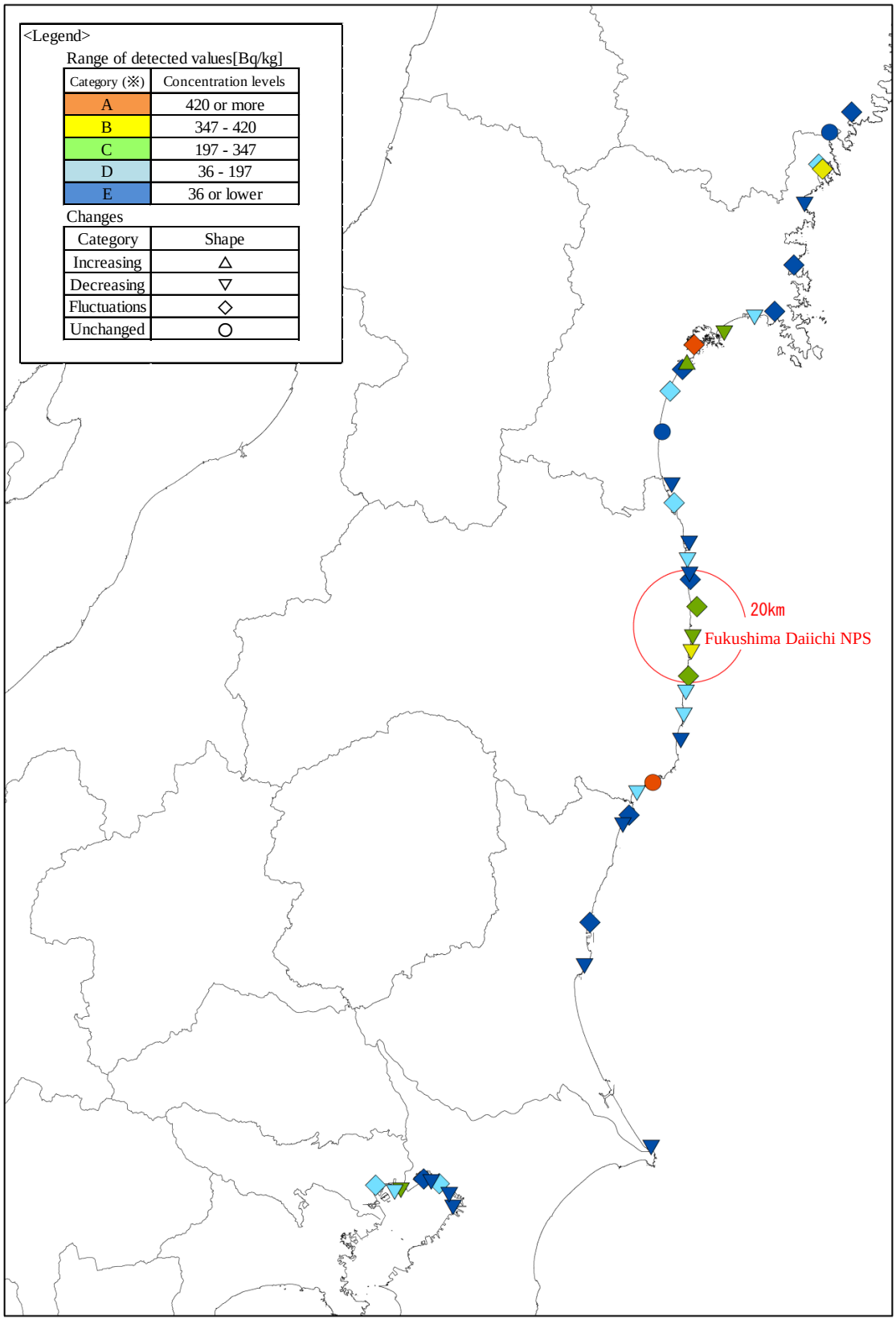


Figure 4.3-27 Categorization of and changes in concentration levels for coastal area sediment samples from public water areas

(*) Categories A to E show relative concentration levels for coastal area sediment samples and cannot be compared with those for river sediment samples or lake sediment samples.

5 Results (Radionuclides Other than Radioactive Cesium)

5.1 Radioactive strontium (Sr-90 and Sr-89)

(1) Public water areas

1) Outline

In principle, radioactive strontium was measured at locations where the radioactive cesium concentration in the sediments was high. Sediment samples from public water areas (rivers, lakes, and coastal areas) were surveyed for Sr-90 from FY2011 to FY2016, and those from public water areas (rivers and lakes) for Sr-89 in FY2011, respectively. The status of the survey and the summary of the survey results are as shown in Table 5.1-1 (detection limits: approx. 1 Bq/kg for Sr-90, and approx. 2 Bq/kg for Sr-89).

In addition, in FY2016, Sr-90 was surveyed (detection limit: approx. 1Bq/L for Sr-90 in water) for 45 water samples collected on the same day at the same locations (two locations in Miyagi, 32 locations in Fukushima, two locations in Ibaraki and eight locations in Gunma) where Sr-90 was detected at 1.0 Bq / kg or more in public water areas (lakes).

The detection status by medium for Sr-90 is as shown in 2) and 3).

Although a single survey was conducted for Sr-89 on 22 samples (13 river sediment samples and nine lake sediment samples) in FY2011, Sr-89 was not detectable in any of them.

2) Detection of Sr-90 in sediment samples

(i) River sediments

Sr-90 was detected in 12 out of 23 river sediments samples surveyed in FY2016 (detection rate: 52.2%). Detected values were less than 1 Bq/kg (see Table 5.1-1).

Sr-90 has been continuously detected since FY2011 at some locations in Ota River and Ukedo River in Fukushima Prefecture, but the detected values have gradually decreased to fall below 2 Bq/kg from FY2014 on (see Figure 5.1-1).

(ii) Lake sediments

In FY2016, 66 lake sediments samples were surveyed for Sr-90; Sr-90 was detected in 65 samples (detection rate: 98.5%) (see Table 5.1-1). Sr-90 has been continuously detected until FY2016 in each prefecture surveyed. When reviewed location by location, detected values have basically been at relatively low levels, and the range of measured values in FY2016 was from not detectable to 100 Bq/kg(see Figure 5.1-1).

(iii) Coastal area sediments

In FY2016, 32 coastal area sediment samples were surveyed; Sr-90 was detected in two samples collected in Fukushima Prefecture (detection rate: 6.3%) (see Table 5.1-1). Measured values ranged from not detectable to 0.38 Bq/kg, which were lower values than those obtained from rivers and lakes.

3) Detection of Sr-90 in water

Surveys on 45 water samples, which were collected on the same day from the same public water area (lakes)

sediments where Sr-90 was detected at 1.0 Bq/kg or more, were conducted. Sr-90 was not detectable at any surveyed locations even in measurements at the lower limit value (0.032 to 0.047 Bq/L) which was even lower than 1 Bq/L.

Table 5.1-1 Detection of Sr-90 and Sr-89 in sediment samples from public water areas (rivers, lakes, and coastal areas)

○ Sr-90

Property	Prefecture	FY2011				FY2012				FY2013				FY2014			
		Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)
Rivers	Miyagi	2	2	100.0	0.40 - 1.10	7	1	14.3	ND - 1.2	5	3	60.0	ND - 0.56	4	3	75.0	ND - 0.52
	Fukushima	7	7	100.0	1.2 - 4.1	25	15	60.0	ND - 12	16	10	62.5	ND - 2.9	14	9	64.3	ND - 1.5
	Ibaraki	1	1	100.0	1.6 - 1.6	4	1	25.0	ND - 1.8	6	4	66.7	ND - 1.8	6	2	33.3	ND - 0.89
	Tochigi	1	1	100.0	1.3 - 1.3	2	0	0.0	ND	2	1	50.0	ND - 0.23	2	1	50.0	ND - 0.53
	Gunma	1	1	100.0	0.70 - 0.70	2	0	0.0	ND	2	1	50.0	ND - 0.44	1	0	0.0	ND
	Chiba	1	1	100.0	1.1 - 1.1	4	0	0.0	ND	4	2	50.0	ND - 0.49	4	1	25.0	ND - 0.40
	Total	13	13	100.0	0.40 - 4.1	44	17	38.6	ND - 12	35	21	60.0	ND - 2.9	31	16	51.6	ND - 1.5
Lakes	Miyagi	1	1	100.0	1.6 - 1.6	3	2	66.7	ND - 2.1	5	5	100.0	0.30 - 2.2	6	5	83.3	ND - 0.96
	Fukushima	3	3	100.0	3.3 - 6.8	41	41	100.0	2.1 - 93	40	40	100.0	0.70 - 55	39	39	100.0	0.70 - 50
	Ibaraki	2	2	100.0	0.70 - 3.3	6	1	16.7	ND - 7.0	6	5	83.3	ND - 5.2	6	6	100.0	0.57 - 3.0
	Tochigi	1	1	100.0	1.3 - 1.3	2	1	50.0	ND - 1.6	2	2	100.0	0.74 - 0.93	2	2	100.0	1.0 - 1.1
	Gunma	1	1	100.0	2.0 - 2.0	2	2	100.0	1.9 - 2.2	2	1	50.0	ND - 1.7	2	2	100.0	1.5 - 1.7
	Chiba	1	1	100.0	1.4 - 1.4	4	1	25.0	ND - 4.4	2	1	50.0	ND - 1.8	4	3	75.0	ND - 2.5
	Total	9	9	100.0	0.70 - 6.8	58	48	82.8	ND - 93	57	54	94.7	ND - 55	59	57	96.6	ND - 50
Coastal areas	Miyagi	0	0	-	-	2	0	0.0	ND	4	0	0.0	ND	2	0	0.0	ND
	Fukushima	0	0	-	-	21	0	0.0	ND	30	1	3.3	ND - 0.33	30	2	6.7	ND - 0.58
	Tokyo	0	0	-	-	2	0	0.0	ND	0	0	-	-	0	0	-	-
	Total	0	0	-	-	25	0	0.0	ND	34	1	2.9	ND - 0.33	32	2	6.3	ND - 0.58

Property	Prefecture	FY2015				FY2016				Total		
		Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/kg)	Number of samples	Detection times	Range of measured values (Bq/kg)
Rivers	Miyagi	2	0	0.0	ND	2	1	50.0	ND - 0.43	22	10	ND - 1.2
	Fukushima	10	5	50.0	ND - 1.9	10	4	40.0	ND - 0.68	82	50	ND - 12
	Ibaraki	4	2	50.0	ND - 0.92	4	3	75.0	ND - 0.69	25	13	ND - 1.8
	Tochigi	1	0	0.0	ND	0	0	-	-	8	3	ND - 1.3
	Gunma	0	0	-	-	0	0	-	-	6	2	ND - 0.70
	Chiba	5	2	40.0	ND - 0.35	7	4	57.1	ND - 0.53	25	10	ND - 1.1
	Total	22	9	40.9	ND - 1.9	23	12	52.2	ND - 0.69	168	88	ND - 12
Lakes	Miyagi	8	7	87.5	ND - 1.4	8	7	87.5	ND - 1.3	31	27	ND - 2.2
	Fukushima	40	39	97.5	ND - 150	35	35	100.0	0.63 - 100	198	197	ND - 150
	Ibaraki	6	6	100.0	0.34 - 2.6	6	6	100.0	0.33 - 2.5	32	26	ND - 7.0
	Tochigi	2	2	100.0	0.47 - 2.2	2	2	100.0	0.92 - 2.0	11	10	ND - 2.2
	Gunma	8	8	100.0	0.67 - 2.4	11	11	100.0	0.71 - 2.6	26	25	ND - 2.6
	Chiba	4	4	100.0	0.36 - 0.61	4	4	100.0	0.43 - 0.75	19	14	ND - 4.4
	Total	68	66	97.1	ND - 150	66	65	98.5	ND - 100	317	299	ND - 150
Coastal areas	Miyagi	2	0	0.0	ND	2	0	0.0	ND	12	0	ND
	Fukushima	30	3	10.0	ND - 0.78	30	2	6.7	ND - 0.38	141	8	ND - 0.78
	Tokyo	0	0	-	-	0	0	-	-	2	0	ND
	Total	32	3	9.4	ND - 0.78	32	2	6.3	ND - 0.38	155	8	ND - 0.78

○ Sr-89

Prefecture	River		Lake	
	Number of samples	Detection times	Number of samples	Detection times
Miyagi	2	0	1	0
Fukushima	7	0	3	0
Ibaraki	1	0	2	0
Tochigi	1	0	1	0
Gunma	1	0	1	0
Chiba	1	0	1	0
Total	13	0	9	0

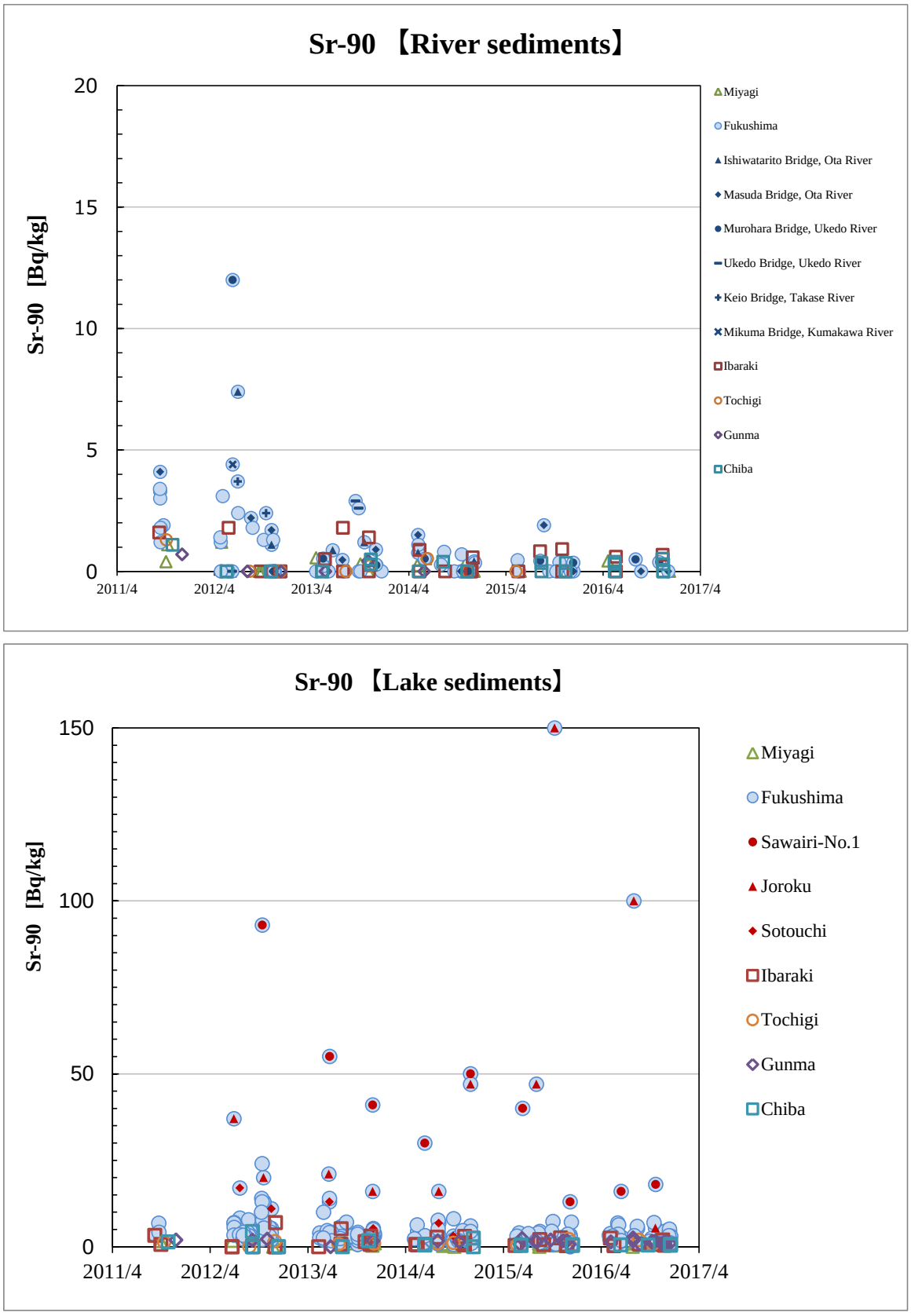


Figure 5.1-1 Detection of Sr-90 in sediment samples from public water areas (upper: rivers; lower: lakes)

(2) Groundwater

Surveys for Sr-89 and Sr-90 were conducted on approximately 240 groundwater samples collected in Fukushima Prefecture between January 2012 and February 2017.

An outline of these survey results is as shown in Table 5.1-2. Detected values of Sr-89 and Sr-90 were all below the detection limit (1 Bq/L).

Table 5.1-2 Detection of Sr-89 and Sr-90 in groundwater samples (all collected in Fukushima Prefecture)

Fiscal Year	Sr-90				Sr-89			
	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L) (*1)	Number of samples	Detection times	Detection rate (%)	Range of measured values (Bq/L) (*1)
FY2011	8	0	0.0	ND	8	0	0.0	ND
FY2012	60	0	0.0	ND	60	0	0.0	ND
FY2013	77	0	0.0	ND	77	0	0.0	ND
FY2014	48	0	0.0	ND	48	0	0.0	ND
FY2015	48	0	0.0	ND	48	0	0.0	ND
FY2016	48	0	0.0	ND	48	0	0.0	ND
Total	289	0	0.0	ND	289	0	0.0	ND

*1:Results were compiled by setting the detection limit at 1 Bq/L. Additionally, the detection limit of Sr-90 was 0.0002Bq/L in FY2011, and 1Bq/L thereafter, and similarly, the detection limit of Sr-89 was 0.001 Bq/L in FY2011, and 1 Bq/L thereafter.
In the FY2011 survey (calendar year 2012), Sr-90 was detected in all eight samples, with detected values ranging from 0.0004 to 0.0029 Bq/L. Similarly, while the detection limit for Sr-89 was 0.001 Bq/L in FY2011 (calendar year 2012), Sr-89 in all eight samples was below the detection limit.

5.2 Other γ-ray emitting radionuclides

Apart from the aforementioned radionuclides (Cs-134, Cs-137, Sr-89 and Sr-90), measurement results for water samples and sediment samples using a germanium semiconductor detector were analyzed from FY2011 to FY2016 to obtain activity concentrations of accident-derived radionuclides (Ag-110m, Te-129m, Nb-95, Sb-125 and Ce-144, etc.[10]) and major naturally occurring radionuclides such as K-40. The summary of the results is as shown in Table 5.2-1 and Table 5.2-2.

Among the detected radionuclides, no artificial radionuclides were detected in water samples, while two types of radionuclides, Ag-110m and Sb-125, were detected in sediment samples with detection rates of 1% or less. Since FY2013, neither radionuclide has been detected.

Although six naturally occurring radionuclides (K-40, Pb-212, Pb-214, Tl-208, Ac-228 and Bi-214) were detected, K-40 is a naturally occurring radionuclide entrained during the Earth's formation, while the other species are all either uranium series or thorium series radionuclides, which are widely distributed in nature including the Earth's crust.

Table 5.2-1 Detection of other radionuclides (Water)

Fiscal year	Number of samples	Major detected artificial radionuclide		Major detected naturally occurring radionuclide	
		Nuclide	Detection rate and detected values	Nuclide	Detection rate
FY2011	1,755	-	-	K-40	10%
FY2012	3,518	-	-	K-40	6%
FY2013	3,860	-	-	K-40	13%
FY2014	3,856	-	-	K-40	10%
FY2015	3,916	-	-	Pb-214	9%
				Pb-212	7%
				K-40	7%
FY2016	3,890	-	-	Pb-214	17%
				Pb-212	10%
				K-40	8%

[10] Among the accident-derived radionuclides, I-131 was investigated in water samples from public water areas (3,111 river water samples, 1,416 lake water samples, and 715 coastal area water samples) and sediment samples (3,073 river sediment sample, 877 lake sediment samples, and 393 coastal area sediment samples) from FY 2011 to FY 2012, and in groundwater samples (3,793 samples) from FY 2011 to FY 2014. In none of these samples was I-131 detected (detection limit values: 1 Bq/L for water and 10 Bq/kg for sediments).

Table 5.2-2 Detection of other radionuclides (Sediments)

Fiscal year	Number of samples	Major detected artificial radionuclide		Major detected naturally occurring radionuclide	
		Nuclide	Detection rate and detected values	Nuclide	Detection rate
FY2011	1,559	Ag-110m	4 samples (0.26%) 46 - 170 Bq/kg	K-40	79%
				Pb-212	41%
				Pb-214	16%
				Tl-208	14%
FY2012	2,885	Ag-110m	26 samples (0.90%) 7.9 - 350 Bq/kg	Ac-228	41%
				Bi-214	43%
				K-40	97%
		Sb-125	3 samples (0.10%) 140 - 420 Bq/kg	Pb-212	75%
				Pb-214	44%
				Tl-208	39%
FY2013	3,062	-	-	Ac-228	25%
				Bi-214	25%
				K-40	91%
				Pb-212	49%
				Pb-214	23%
				Tl-208	23%
FY2014	3,035	-	-	Ac-228	24%
				Bi-214	24%
				K-40	91%
				Pb-212	48%
				Pb-214	24%
				Tl-208	24%
FY2015	3,158	-	-	Ac-228	32%
				Bi-214	60%
				K-40	88%
				Pb-212	63%
				Pb-214	67%
				Tl-208	37%
FY2016	3,088	-	-	Ac-228	35%
				Bi-214	66%
				K-40	92%
				Pb-212	64%
				Pb-214	75%
				Tl-208	40%

Note: detection limits of artificial radionuclides: 7 - 180 Bq/kg for Ag-110m, and 130 - 330 Bq/kg for Sb-125