FY2014
Results of the Radioactive Material Monitoring in the Water Environment

March 2016
Ministry of the Environment

Contents

Outline

The following show the outline of the results of the FY2014 Monitoring of Radioactive Materials based on the Water Pollution Control Act.

Monitoring locations are as shown in Figure 1 and Figure 2.

1. National Radioactive Material Monitoring in the Water Environment in the Whole of Japan (FY2014)

○ Monitoring that was commenced in FY2014 at 110 locations for both public water areas and groundwater in 47 prefectures for the purpose of clarifying the distribution of radioactive materials in those areas nationwide (hereinafter referred to as the "Nationwide Monitoring")

○ The total β radioactivity and detected γ-ray emitting radionuclides were within the past measurement trends except for one location where a relatively higher value than past records was measured in the sediment. Detection limits vary by radioactive material and monitoring location but were around 0.001 to 0.1 Bq/L for water and around 1 to 100 Bq/kg for sediments[1].

○ There were locations where the value of K-40 was rather high in public water areas and groundwater, but this was considered to have been caused by the influence of seawater.

○ Naturally occurring radionuclides that have not been included in nationwide surveys so far or have not been detectable in past surveys were detected but they were considered to be all thorium series radionuclides or uranium series radionuclides that are generally contained in natural soils and rocks, etc.

○ At some monitoring locations for public water areas, artificial radionuclides, Cs-134 and Cs-137, exceeding their detection limits were detected, but their values were within the past measurement trends[2].

○ It is appropriate to continue this monitoring the following fiscal year onward in order to clarify the distribution of radioactive materials in the water environment.

2. Radioactive Material Monitoring in the Water Environment in and around Fukushima Prefecture (FY2011 to FY2014)

○ Monitoring that has been conducted continuously since August 2011 in response to the accident at the Tokyo Electric Power Company's Fukushima Daiichi NPS (hereinafter referred to as the "Fukushima NPS Accident"), at around 600 locations for public water areas and around 400 locations for groundwater in and around Fukushima Prefecture for the purpose of clarifying the distribution of the accident-derived radioactive materials in the water environment (hereinafter referred to as the "Post-Earthquake Monitoring")

○ The outline of the results of the measurement of radioactive cesium after the commencement of the FY2011 monitoring up to FY2014 is as follows.

---

[1] See Table 3-1-1, Table 3-1-2, and Table 3-1-3 of the report for the details of detection limits.

[2] "Within the past measurement trends" means that the results of the latest monitoring survey are evaluated from a technical perspective as not displaying extreme deviation from the results of past similar monitoring surveys (such as the Monitoring of Environmental Radioactivity Levels and the Monitoring of the Surrounding Environment conducted by the Nuclear Regulation Authority, and the Radioactive Material Monitoring in the Water Environment in and around Fukushima Prefecture).

< Public water areas >

1) Water (detection limit: 1 Bq/L)

・Detection rates (number of detections/number of samples) were generally decreasing for rivers and lakes in all surveyed prefectures, and radioactive materials have not been detected in prefectures other than Fukushima Prefecture since FY2013.

・Radioactive materials were not detectable at any surveyed locations in coastal areas.

2) Sediments (detection limit: 10 Bq/kg)

a) Concentration distribution

・Rivers: There were some locations in Hamadori and Aizu in Fukushima Prefecture and in Ibaraki and Chiba Prefectures where activity concentrations were at relatively high levels. In other prefectures, concentrations were mostly at relatively low levels, although some locations showed relatively high concentrations.

・Lakes: There were some locations in Hamadori in Fukushima Prefecture where activity concentrations were at relatively high levels. In other prefectures, concentrations were mostly at relatively low levels, although some locations showed relatively high concentrations.

・Coastal areas: There were some locations in Miyagi and Fukushima Prefectures where activity concentrations were at relatively high levels. In other prefectures, concentrations were mostly at relatively low levels.

b) Changes in activity concentrations

・Rivers: A decreasing trend was observed in concentration levels at most locations.

・Lakes: Activity concentrations were generally decreasing or unchanged at most locations with some locations showing fluctuations. There were also a few locations where an increasing trend was observed.

・Coastal areas: Activity concentrations were generally decreasing at most locations with some locations showing fluctuations.

< Groundwater >

・Radioactive materials were not detectable in groundwater at any surveyed locations except for the two locations where they were detected in FY2011 (detection limit: 1 Bq/L).

○ The results concerning radionuclides other than radioactive cesium were as follows.

・I-131: Not detectable at any surveyed locations for public water areas and groundwater

・Sr-89: Not detectable at any surveyed locations for groundwater

・Sr-90: Detectable in sediment collected at several locations for public water areas, but activity concentrations were generally decreasing; Not detectable at any surveyed locations for groundwater

○ As measured activity concentrations are considered to fluctuate at some locations due to slight changes in sampling locations and properties, it is appropriate to continue this monitoring in the following fiscal years on an ongoing basis.

3. Other Radioactive Material Monitoring Conducted Nationwide (FY2014)

○ The results of the Monitoring of Environmental Radioactivity Levels, which has been conducted by the

Nuclear Regulation Authority for the purpose of clarifying the existence or nonexistence of the influence of nuclear facilities, etc. nationwide, were all within the past measurement trends.

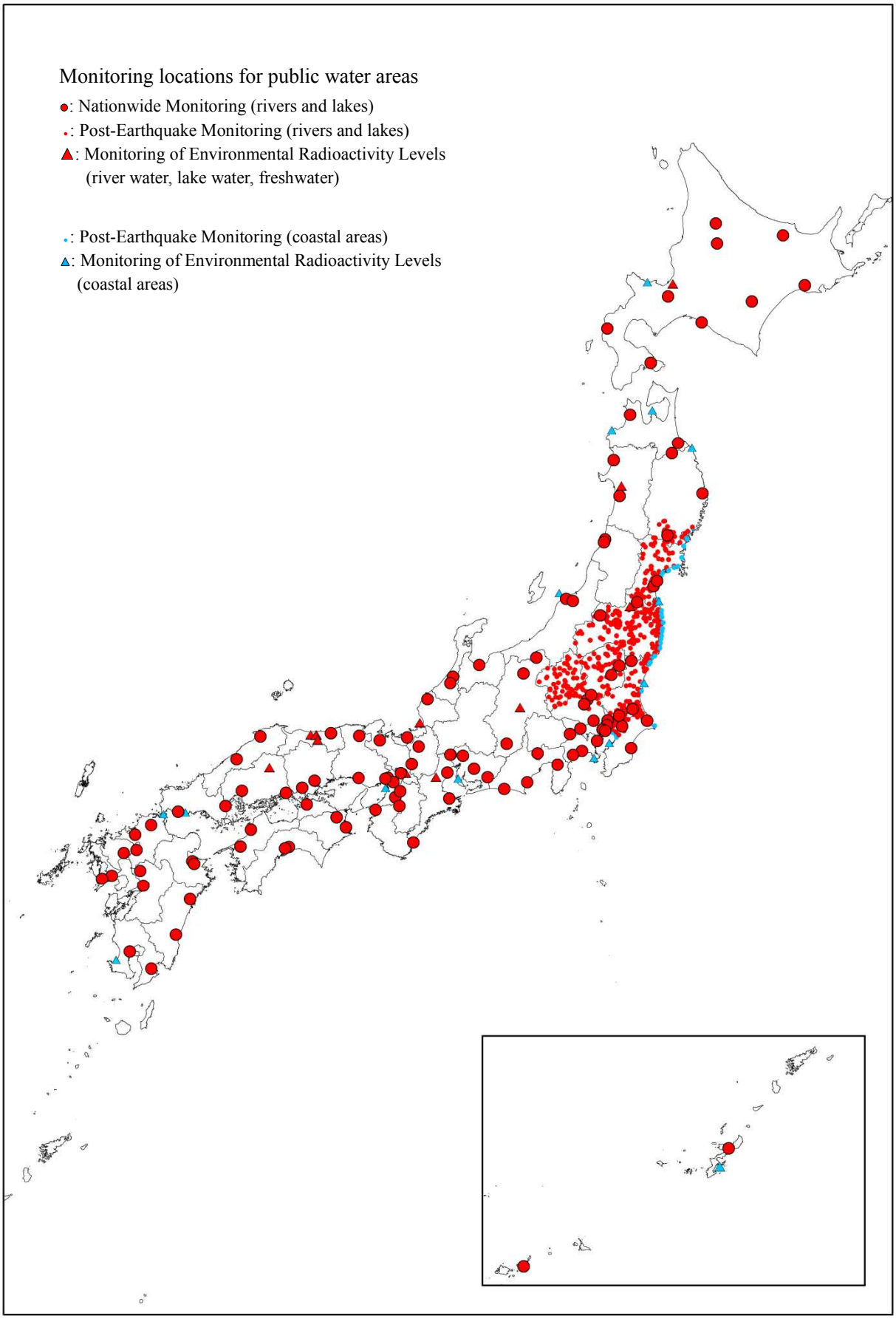


Figure 1 Locations for monitoring of radioactive materials based on the Water Pollution Control Act (public water areas)

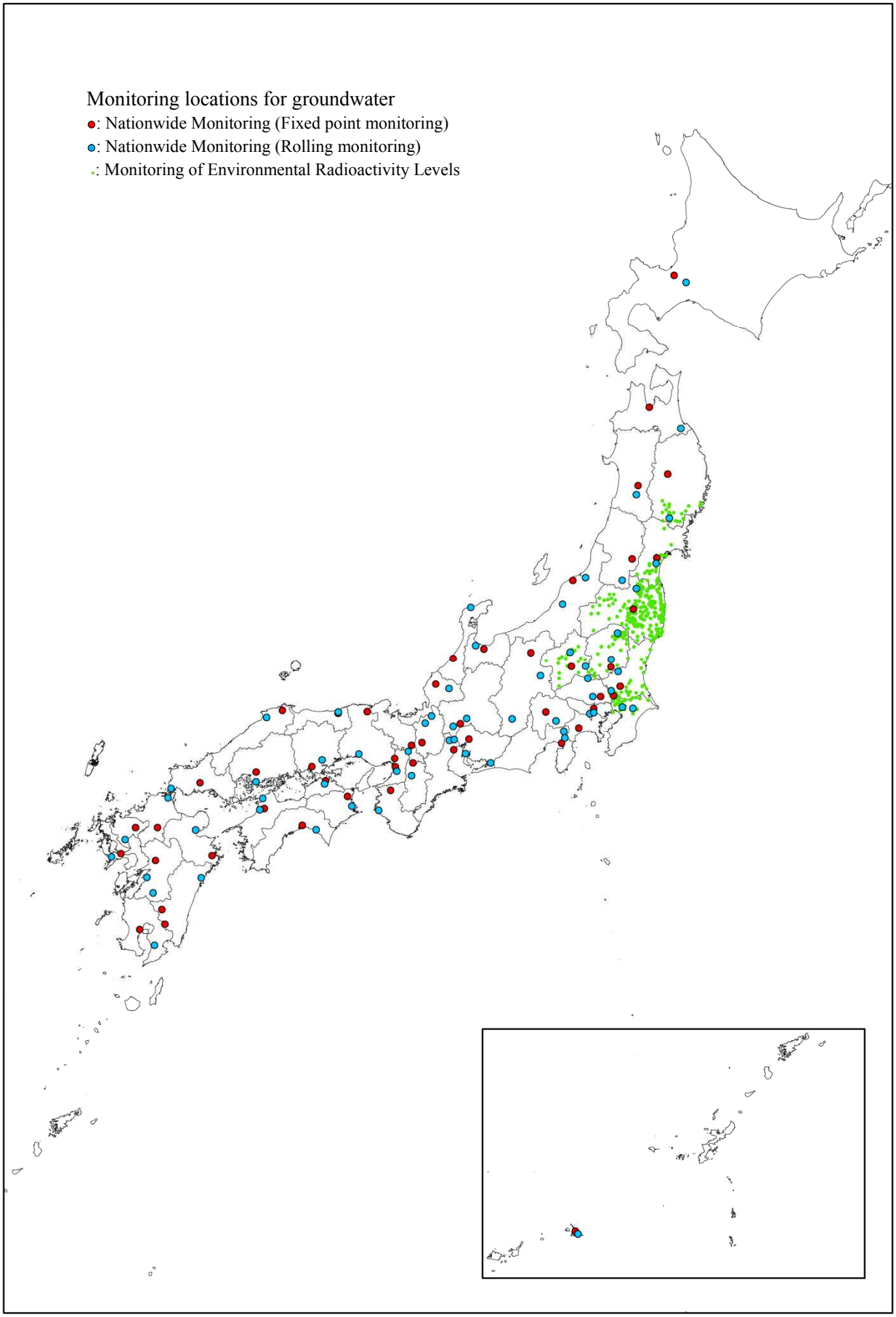


Figure 2 Locations for monitoring of radioactive materials based on the Water Pollution Control Act (groundwater)

Part 1: National Radioactive Material Monitoring in the Water Environment in the Whole of Japan (FY2014)

1. Objective and Details

1.1 Objective

The Fukushima NPS Accident discharged radioactive materials and caused environmental pollution. In response, the Water Pollution Control Act was amended and it was decided that the Minister of the Environment should monitor pollution caused by radioactive materials for public water areas and groundwater and release the results from the perspective of preserving the health and living environment of the people.

Under such circumstances, this monitoring aims to clarify the distribution of radioactive materials in public water areas and groundwater nationwide.

1.2 Details

(1) Monitoring locations

- Public water areas: 110 locations (rivers: 107 locations; lakes: 3 locations)
- Groundwater: 110 locations

Locations were selected based on the following thinking from the viewpoint of ensuring balanced nationwide monitoring (specific locations are as shown in Tables 1.2-2 and 1.2-3 and Figures 1.2-1 and 1.2-2).

(i) Public water areas

- The number of locations per prefecture was decided depending on the area and population, while securing at least one location in each prefecture, from the viewpoint of ensuring balanced nationwide monitoring.
- Locations within each prefecture were selected based on the following thinking:
  a) Select representative rivers (including lakes) within each prefecture in the same numbers as those of the aforementioned locations in consideration of the area and population in their basins.
  b) Regarding rivers selected as explained in a), select locations from among those for the monitoring of hazardous materials, etc. conducted under the Water Pollution Control Act, which are selected in consideration of water utilization points. For an individual river, prioritize locations in the lower sections (including lakes located downstream).
  c) As this monitoring does not aim to clarify the influence of a specific source, exclude locations close to those subject to the Environmental Monitoring around Nuclear Facilities, etc. (Radiation Monitoring Grants), in principle.

(ii) Groundwater

- Two locations were chosen for each prefecture from the viewpoint of ensuring balanced nationwide monitoring, and one more location was added for each prefecture where the amount of groundwater utilized had been large in past several years.
- Locations within each prefecture were selected mainly from those for monitoring of environmental standard items for groundwater, based on the following conditions:
  a) Select regional representative wells (such as wells built for monitoring or major wells with especially

high frequency of use) in consideration of the utilization amount of groundwater from respective groundwater basins and water veins (hereinafter referred to as "groundwater basins, etc.").

b) Prioritize wells owned or managed by local governments, etc. in consideration of the convenience of coordination in case an additional survey is required.

c) Select one location for continuous fixed point monitoring from among the locations selected in the manner above, while taking into account the utilization amount and representativeness in a broader area of the relevant groundwater basin, etc. Other locations are for rolling monitoring (for five years in principle).

d) As this monitoring does not aim to clarify the influence of a specific source, exclude locations close to those subject to the Environmental Monitoring around Nuclear Facilities, etc. (Radiation Monitoring Grants), in principle.

(2) Targets

・Public water areas: Water and sediments (for lakes, survey water both at the surface and bottom layers)

(Additionally, radioactive concentrations in soil and ambient dose rates are to be measured in the surrounding environment (river beds, etc.) near the sampling locations as reference.)

・Groundwater: Water

(Additionally, ambient dose rates are to be measured near the sampling locations as reference.)

(3) Frequencies and periods

・Public water areas: Once a year

However, monitoring was conducted four times a year at two locations (one location in eastern and western Japan, respectively) in order to check any annual variation.

・Groundwater: Fixed point monitoring was conducted once a year, and rolling monitoring was conducted once every five years in principle.

Periods for FY2014 monitoring are as shown in Table 1.2-4.

(4) Conducted analyses

The following analyses were conducted for collected samples.

・Measurement of total β radioactivity concentrations

・γ-ray spectrometry measurement using a germanium semiconductor detector (all detectable radionuclides, including naturally occurring radionuclides and artificial radionuclides, were surveyed in principle)

(5) Comparison with the past measurement trends

Obtained values were compared with the past measurement trends, and if any deviation was suspected, the validity of the measured values was rechecked (possibilities of transcription errors or insufficient adjustments of equipment, etc.).

This monitoring was just commenced and there are no accumulated data for the same locations. Therefore, the results of similar environmental monitoring conducted so far are to be used for comparison for the time being. Specifically, the results of the Monitoring of Environmental Radioactivity Levels and Monitoring of the Surrounding Environment conducted by the Nuclear Regulation Authority, as well as the results of the Radioactive Material Monitoring in the Water Environment in and around Fukushima Prefecture conducted by the Ministry of the Environment were utilized. When making comparisons, due consideration was given to the possibility that the values of Cs-137 and other accident-derived radionuclides would have increased after the Fukushima NPS Accident.

Basically, nationwide data for the last two decades, which have become relatively free from the influence of nuclear tests in the atmosphere, were used. Also, with regard to the influence of the Fukushima NPS Accident, considering the influence immediately after it and based on actual measurement, "one year after the accident" was assumed to be a steady state, and therefore, the period from March 11, 2011 to March 10, 2012 was excluded.

(6) Measures to be taken when a value deviating from the past measurement trends was detected

The following measures are to be taken when a value deviating from the past measurement trends was detected (see Figure 1.2-3).

(6)-1 Release of preliminary values

Any value that is suspected to deviate from the past measurement trends should be immediately evaluated professionally by the chair and the deputy chair, and if it is judged highly urgent (when it has been confirmed that the value is highly likely to deviate from the past measurement trends, and additional detailed analyses are considered to be necessary), a preliminary report should be released as promptly as possible.

In such a case, the following related data should be compiled as basic data for professional evaluation. Members of the Evaluation Committee other than the chair and the deputy chair should be informed of the relevant information together with the professional evaluation by the chair and the deputy chair (see Table 1.2-1 for the chair and other committee members).

(i) Results of the measurement concerning water, sediments and ambient dose rates (results of the measurement of total β radioactivity concentrations and γ-ray spectrometry measurement)

(ii) Sampling dates, sampling locations (maps, water depth, river width, etc.), sampling methods, and sampling circumstances (photos)

(iii) Weather data for about one week near the measuring date (the amount of precipitation, in particular)

(iv) Ambient dose rates measured for the last one month or so in neighboring points

(v) Changes in past detected values of the relevant radionuclide

(6)-2 Detailed analyses and release of the results

For data for which the preliminary report was released as explained in (6)-1 above, the following detailed analyses are to be conducted and the results should be released.

- Concrete analysis to identify radionuclides (including measurement of individual radionuclides through a radiochemical analysis)
- Additional measurement in the surrounding areas of the relevant surveyed location

Table 1.2-1 List of members of the Evaluation Committee on Radioactive Material Monitoring in the Water Environment

IIMOTO Takeshi (Deputy chair)	Associate professor, Division for Environment, Health and Safety, the University of Tokyo
ISHII Nobuyoshi	Senior Researcher, Research Center for Radiation Protection, National Institute of Radiological Sciences
TOKUNAGA Tomochika	Professor, Department of Environment Systems, Graduate School of Frontier Sciences, the University of Tokyo
HAYASHI Seiji	Head, Center for Regional Environmental Research (Soil Environment Section), National Institute for Environmental Studies
FUKUSHIMA Takehiko (Chair)	Professor, Doctoral Program in Integrative Environment and Biomass Sciences, Graduate School, University of Tsukuba

Table 1.2-2 List of locations for the FY2014 Nationwide Monitoring (public water areas) (No. 1)

No.	Prefecture	Property	Sampling location		
			Water area	Location	Municipality
1	Hokkaido Prefecture	River	Ishikari River	Clean water intake at Ishikari River in Asahikawa City	Asahikawa City
2		River	Ishikari River	Intake at the Shirakawa water purification plant in Sapporo City	Sapporo City
3		River	Teshio River	Nakashibetsu Bridge (Intake at the Higashiyama water purification plant in Shibetsu City)	Shibetsu City
4		River	Tokoro River	Tadashi Bridge	Kitami City
5		River	Kushiro River	Intake at the Aikoku water purification plant in Kushiro City	Kushiro City
6		River	Tokachi River	Nantai Bridge	Obihiro City
7		River	Sarugawa River	Sarugawa Bridge (Tomigawa)	Hidaka Town
8		River	Matsukura River	Mitsumori Bridge (Before the confluence with Torasawa River)	Hakodate City
9		River	Shiribeshi-toshibetsu River	Intake at the Kitahiyama simple water plant in Kitahiyama Town	Setana Town
10	Aomori Prefecture	River	Iwaki River	Tsugaru-ohashi Bridge	Nakadomari Town
11		River	Mabechi River	Shiriuchi Bridge	Hachinohe City
12	Iwate Prefecture	River	Mabechi River	Fugane Bridge	Ninohe City
13		River	Heigawa River	Miyako Bridge	Miyako City
14		River	Kitakami River	Chitose Bridge	Ichinoseki City
15	Miyagi Prefecture	River	Abukuma River	Iwanuma (Abukuma Bridge)	Iwanuma City
16		River	Natori River	Yuriage-ohashi Bridge	Natori City
17	Akita Prefecture	River	Yoneshiro River	Noshiro Bridge	Noshiro City
18		River	Omono River	Kurose Bridge	Akita City
19	Yamagata Prefecture	River	Mogami River	Ryou Bridge	Sakata City
20		River	Akagawa River	Shinkawa Bridge	Sakata City
21	Fukushima Prefecture	River	Agano River	Shingo Dam	Kitakata City
22		River	Abukuma River	Taisho Bridge (Fushiguro)	Date City
23		River	Kujigawa River	Takachihara Bridge	Yamatsuri Town
24	Ibaraki Prefecture	Lake	Lake Kasumigaura	Center of the lake	Miho Village
25		River	Kokai River	Fumimaki Bridge	Toride City
26	Tochigi Prefecture	River	Nakagawa River	Shinnaka Bridge	Nakagawa Town
27		River	Kinugawa River	Kinugawa Bridge (Hoshakuji Temple)	Utsunomiya City
28	Gunma Prefecture	River	Tonegawa River	Toneozeki Weir	Chiyoda Town
29		River	Watarase River	Watarase-ohashi Bridge	Tatebayashi City
30	Saitama Prefecture	River	Arakawa River	Kuge Bridge	Kumagaya City
31		River	Arakawa River	Akigase Intake Weir	Saitama City/ Shiki City
32		River	Edogawa River	Nagareyama Bridge	Nagareyama City (Chiba Prefecture) / Misato City
33	Chiba Prefecture	River	Tonegawa River	Kakozeki Weir	Tonosho Town
34		River	Ichinomiya River	Nakanobashi Bridge	Ichinomiya Town
35		Lake	Lake Inbanuma	Lower area of clean water intake	Sakura City
36	Tokyo Metoroporis	River	Edogawa River	Shinkatsushika Bridge	Katsushika City
37		River	Tamagawa River	Haijima raw water supply point	Akishima City
38		River	Sumida River	Ryogoku Bridge	Chuo City / Sumida City
39		River	Arakawa River	Kasai Bridge	Koto City / Edogawa City
40	Kanagawa Prefecture	River	Tsurumi River	Rinko Tsurumi Bridge	Yokohama City
41		River	Sagami River	Banyu Bridge	Hiratsuka City
42		River	Sakawa River	Sakawa Bridge	Odawara City
43	Niigata Prefecture	River	Shinano River	Heisei-ohashi Bridge	Niigata City
44		River	Agano River	Oun Bridge	Niigata City
45	Toyama Prefecture	River	Jinzu River	Hagiura Bridge	Toyama City
46	Ishikawa Prefecture	River	Saigawa River	Okuwa Bridge	Kanazawa City
47		River	Tedori River	Hakusangoguchi Dike	Hakusan City
48	Fukui Prefecture	River	Kuzuryu River	Fuseda Bridge	Fukui City
49		River	Kitagawa River	Takatsuka Bridge	Obama City
50	Yamanashi Prefecture	River	Sagami River	Katsuragawa Bridge	Uenohara City
51		River	Fujikawa River	Manbu Bridge	Nanbu Town
52	Nagano Prefecture	River	Shinano River	Ozeki Bridge	Iiyama City
53		River	Saigawa River	Koichi Bridge	Nagano City
54		River	Tenryu River	Tsutsuji Bridge	Iida City

Table 1.2-2 List of locations for the FY2014 Nationwide Monitoring (public water areas) (No. 2)

No.	Prefecture	Property	Sampling location		
			Water area	Location	Municipality
55	Gifu Prefecture	River	Kisogawa River	Tokai-ohashi Bridge (Naruto)	Kaizu City
56		River	Nagara River	Tokai-ohashi Bridge	Kaizu City
57	Shizuoka Prefecture	River	Kanogawa River	Kurose Bridge	Numazu City
58		River	Ooi River	Fujimi Bridge	Yaizu City / Yoshida Town
59		River	Tenryu River	Kaketsuka Bridge	Iwata City / Hamamatsu City
60	Aichi Prefecture	River	Shonai River	Miwakare Bridge	Nagoya City
61		River	Yahagi River	Iwazutenjin Bridge	Okazaki City / Toyota City
62		River	Toyogawa River	Eshima Bridge	Toyokawa City
63	Mie Prefecture	River	Suzuka River	Ogura Bridge	Yokkaichi City
64		River	Miyakawa River	Watarai Bridge	Ise City
65	Shiga Prefecture	River	Adogawa River	Joan Bridge	Takashima City
66		Lake	Lake Biwako	Karasakioki-Chuo	—
67	Kyoto Prefecture	River	Yuragawa River	Yuragawa Bridge	Maizuru City
68		River	Katsura River	Before the confluence of three tributaries of Katsura River	Oyamazaki Town
69	Osaka Prefecture	River	Inagawa River	Gunko Bridge	Itami City (Hyogo prefecture)
70		River	Yodogawa River	Sugaharashirokita-ohashi Bridge	Osaka City
71		River	Ishikawa River	Takahashi	Tondabayashi City
72	Hyogo Prefecture	River	Kakogawa River	Kakogawa Bridge	Kakogawa City
73		River	Mukogawa River	Hyakkenbi	Takarazuka City
74		River	Maruyama River	Kaminogo Bridge	Toyooka City
75	Nara Prefecture	River	Yamato River	Fujii	Oji Town
76		River	Kinokawa River	Okura Bridge	Gojo City
77	Wakayama Prefecture	River	Kinokawa River	Shinrokkaizeki Weir	Wakayama City
78		River	Kumano River	Kumano-ohashi Bridge	Shingu City
79	Tottori Prefecture	River	Sendai River	Gyotoku	Tottori City
80	Shimane Prefecture	River	Hiikawa River	Kandatsu Bridge	Izumo City
81		River	Gonokawa River	Sakurae-ohashi Bridge	Gotsu City
82	Okayama Prefecture	River	Asahikawa River	Otoite Weir	Okayama City
83		River	Takahashi River	Kasumi Bridge	Kurashiki City
84	Hiroshima Prefecture	River	Ota River	Clean water intake in Hesaka	Hiroshima City
85		River	Ashida River	Kominomi Bridge	Fukuyama City
86	Yamaguchi Prefecture	River	Nishiki River	Clean water intake for the city	Iwakuni City
87		River	Koto River	Suenobu Bridge	Ube City
88	Tokushima Prefecture	River	Yoshino River	Takase Bridge	Ishii Town
89		River	Nakagawa River	Nakagawa Bridge	Anan City
90	Kagawa Prefecture	River	Dokigawa River	Marugame Bridge	Marugame City
91	Ehime Prefecture	River	Shigenobu River	Deai Bridge	Matsuyama City
92		River	Hijikawa River	Hijikawa Bridge	Ozu City
93	Kochi Prefecture	River	Kagami River	Kachuzeki Weir	Kochi City
94		River	Niyodo River	Hatazeki Weir (1) Center of flow	Ino Town
95	Fukuoka Prefecture	River	Onga River	Hinode Bridge	Nogata City
96		River	Nakagawa River	Shiobara Bridge	Fukuoka City
97		River	Chikugo River	Senoshita	Kurume City
98	Saga Prefecture	River	Kasegawa River	Kase Bridge	Saga City
99	Nagasaki Prefecture	River	Honmyo River	In front of Tenma Park	Isahaya City
100		River	Uragami River	Ohashizeki Weir	Nagasaki City
101	Kumamoto Prefecture	River	Kikuchi River	Shiroishi	Nagomi Town
102		River	Midori River	Uesugizeki Weir	Kumamoto City
103	Oita Prefecture	River	Oita River	Funaichi-ohashi Bridge	Oita City
104		River	Oono River	Shirataki Bridge	Oita City
105	Miyazaki Prefecture	River	Gokase River	Miwa	Nobeoka City
106		River	Oyodo River	Aioi Bridge	Miyazaki City
107	Kagoshima Prefecture	River	Kotsuki River	Iwasaki Bridge	Kagoshima City
108		River	Kimotsuki River	Matase Bridge	Kanoya City
109	Okinawa Prefecture	River	Genka River	Water intake	Nago City
110		River	Miyara River	Omoto water intake	Ishigaki City

Table 1.2-3 List of locations for the FY2014 Nationwide Monitoring (groundwater) (No. 1)

No.	Prefecture	Property	Location		
			Municipality	District	Monitoring method
1	Hokkaido Prefecture	Groundwater	Sapporo City	Kita Sanjo-Nishi, Chuo Ward	Fixed point monitoring
2		Groundwater	Eniwa City	Izaributo	Rolling monitoring
3	Aomori Prefecture	Groundwater	Aomori City	Shin Town	Fixed point monitoring
4		Groundwater	Hachinohe City	Kushihiki Aza Toriageishi	Rolling monitoring
5	Iwate Prefecture	Groundwater	Morioka City	Motomiya	Fixed point monitoring
6		Groundwater	Ichinoseki City	Nakasato Aza Shinkawara	Rolling monitoring
7	Miyagi Prefecture	Groundwater	Sendai City	Hon Town, Aoba Ward	Fixed point monitoring
8		Groundwater	Natori City	Takadatekawakami Higashikongoji	Rolling monitoring
9	Akita Prefecture	Groundwater	Daisen City	Niiyachi Aza Shimokawara	Fixed point monitoring
10		Groundwater	Yokote City	Omori Town Aza Onakajima	Rolling monitoring
11	Yamagata Prefecture	Groundwater	Yamagata City	Hatago Town	Fixed point monitoring
12		Groundwater	Yonezawa City	Tori Town	Rolling monitoring
13	Fukushima Prefecture	Groundwater	Koriyama City	Asahi	Fixed point monitoring
14		Groundwater	Fukushima City	Niida	Rolling monitoring
15	Ibaraki Prefecture	Groundwater	Tsukuba City	Karima	Fixed point monitoring
16		Groundwater	Chikusei City	Isami	Rolling monitoring
17		Groundwater	Bando City	Oyama	Rolling monitoring
18	Tochigi Prefecture	Groundwater	Shimotsuke City	Machida	Fixed point monitoring
19		Groundwater	Utsunomiya City	Yanaze Town	Rolling monitoring
20		Groundwater	Nasushiobara City	Torinome	Rolling monitoring
21	Gunma Prefecture	Groundwater	Maeba City	Shikishima Town	Fixed point monitoring
22		Groundwater	Kiryu City	Tenjin Town	Rolling monitoring
23		Groundwater	Numata City	Idoue Town	Rolling monitoring
24	Saitama Prefecture	Groundwater	Saitama City	Mikura, Minuma Ward	Fixed point monitoring
25		Groundwater	Kumagaya City	Yatsukuchi	Rolling monitoring
26		Groundwater	Kawagoe City	Minamitajima	Rolling monitoring
27	Chiba Prefecture	Groundwater	Kashiwa City	Funato	Fixed point monitoring
28		Groundwater	Yachiyo City	Murakami	Rolling monitoring
29		Groundwater	Tomisato City	Tokura	Rolling monitoring
30	Tokyo Metoroporis	Groundwater	Koganei City	Kajino Town	Fixed point monitoring
31		Groundwater	Tama City	Nagayama	Rolling monitoring
32	Kanagawa Prefecture	Groundwater	Hadano City	Imaizumi	Fixed point monitoring
33		Groundwater	Kawasaki City	Suge, Tama City	Rolling monitoring
34	Niigata Prefecture	Groundwater	Niigata City	Nagata, Chuo Ward	Fixed point monitoring
35		Groundwater	Shibata City	Yukata Town	Rolling monitoring
36		Groundwater	Joetsu City	Minato Town	Rolling monitoring
37	Toyama Prefecture	Groundwater	Toyama City	Hunahashikita Town	Fixed point monitoring
38		Groundwater	Takaoka City	Nakagawasono Town	Rolling monitoring
39	Ishikawa Prefecture	Groundwater	Hakusan City	Kuramitsu	Fixed point monitoring
40		Groundwater	Wajima City	Kawai Town, 2-bu	Rolling monitoring
41	Fukui Prefecture	Groundwater	Fukui City	Ote	Fixed point monitoring
42		Groundwater	Ono City	Tomoe	Rolling monitoring
43	Yamanashi Prefecture	Groundwater	Showa Town	Nishijo Shinden	Fixed point monitoring
44		Groundwater	Fujikawaguchiko Town	Odachi	Rolling monitoring
45	Nagano Prefecture	Groundwater	Nagano City	Tsurugamidori Town	Fixed point monitoring
46		Groundwater	Saku City	Ko aza Kamisairenji	Rolling monitoring
47		Groundwater	Iida City	Ote Town	Rolling monitoring
48	Gifu Prefecture	Groundwater	Gifu City	Kanoshimizu Town	Fixed point monitoring
49		Groundwater	Ogaki City	Marunouchi	Rolling monitoring
50		Groundwater	Seki City	Kose	Rolling monitoring
51	Shizuoka Prefecture	Groundwater	Numazu City	Izumi Town	Fixed point monitoring
52		Groundwater	Gotenba City	Higashitanaka	Rolling monitoring
53		Groundwater	Susono City	Mishuku	Rolling monitoring
54	Aichi Prefecture	Groundwater	Nagoya City	Kawaharatori, Showa Ward	Fixed point monitoring
55		Groundwater	Toyoha City	Mukaiyamaoike Town	Rolling monitoring
56		Groundwater	Handa City	Ikeda Town	Rolling monitoring

Table 1.2-3 List of locations for the FY2014 Nationwide Monitoring (groundwater) (No. 2)

No.	Prefecture	Property	Location		
			Municipality	District	Monitoring method
57	Mie Prefecture	Groundwater	Yokkaichi City	Daikyo Town	Fixed point monitoring
58		Groundwater	Inabe City	Inabe Town Kamikasada	Rolling monitoring
59		Groundwater	Kuwana City	Tado Town Yui	Rolling monitoring
60	Shiga Prefecture	Groundwater	Moriyama City	Miyake Town	Fixed point monitoring
61		Groundwater	Nagahama City	Nishiazai Town Yanokuma	Rolling monitoring
62		Groundwater	Takashima City	Imazu Town	Rolling monitoring
63	Kyoto Prefecture	Groundwater	Kyoto City	Kamihonnojimae Town, Nakagyo Ward	Fixed point monitoring
64		Groundwater	Oyamazaki Town	Shimoueno	Rolling monitoring
65	Osaka Prefecture	Groundwater	Osaka City	Tsuru Town, Taisho Ward	Fixed point monitoring
66		Groundwater	Sakai City	Daisennaka Town, Sakai Ward	Rolling monitoring
67	Hyogo Prefecture	Groundwater	Itami City	Kuchisakai	Fixed point monitoring
68		Groundwater	Toyooka City	Saiwai Town	Fixed point monitoring
69		Groundwater	Himeji City	Hojo	Rolling monitoring
70	Nara Prefecture	Groundwater	Nara City	Sakyo	Fixed point monitoring
71		Groundwater	Kashihara City	Okubo Town	Rolling monitoring
72	Wakayama Prefecture	Groundwater	Kinokawa City	Takano	Fixed point monitoring
73		Groundwater	Gobo City	Sono	Rolling monitoring
74	Tottori Prefecture	Groundwater	Tottori City	Saiwai Town	Fixed point monitoring
75		Groundwater	Tottori City	Denen Town	Rolling monitoring
76	Shimane Prefecture	Groundwater	Matsue City	Nishikawatsu Town	Fixed point monitoring
77		Groundwater	Izumo City	Enya Town	Rolling monitoring
78	Okayama Prefecture	Groundwater	Kurashiki City	Fukui	Fixed point monitoring
79		Groundwater	Okayama City	Imazaike, Naka Ward	Rolling monitoring
80	Hiroshima Prefecture	Groundwater	Hiroshima City	Ushiroyamako, Kamiseno Town, Aki Ward	Fixed point monitoring
81		Groundwater	Kure City	Hirobentenbashi Town	Rolling monitoring
82	Yamaguchi Prefecture	Groundwater	Yamaguchi City	Ouchimihori	Fixed point monitoring
83		Groundwater	Shimonoseki City	Tomito Town	Rolling monitoring
84	Tokushima Prefecture	Groundwater	Tokushima City	Fudohoncho Town	Fixed point monitoring
85		Groundwater	Anan City		Rolling monitoring
86	Kagawa Prefecture	Groundwater	Takamatsu City	Bancho Town	Fixed point monitoring
87		Groundwater	Takamatsu City	Ichinomiya Town	Rolling monitoring
88	Ehime Prefecture	Groundwater	Matsuyama City	Hirai Town	Fixed point monitoring
89		Groundwater	Matsuyama City	Nakanishiuchi	Rolling monitoring
90		Groundwater	Iyo City	Ueno	Rolling monitoring
91	Kochi Prefecture	Groundwater	Kochi City	Kerako	Fixed point monitoring
92		Groundwater	Aki City	Yanomaru	Rolling monitoring
93	Fukuoka Prefecture	Groundwater	Kurume City	Tanushimaru Town Akinari	Fixed point monitoring
94		Groundwater	Kitakyushu City	Fujimi, Kokuraminami Ward	Rolling monitoring
95	Saga Prefecture	Groundwater	Saga City	Yamato Town Niji	Fixed point monitoring
96		Groundwater	Kashima City	Nodomibunbaba	Rolling monitoring
97	Nagasaki Prefecture	Groundwater	Isahaya City	Sakaeda Town	Fixed point monitoring
98		Groundwater	Nagasaki City	Ohashi	Rolling monitoring
99	Kumamoto Prefecture	Groundwater	Kumamoto City	Suizenji, Chuo Ward	Fixed point monitoring
100		Groundwater	Yatsushiro City	Furujo Town	Rolling monitoring
101		Groundwater	Hitoyoshi City	Inoguchinoso	Rolling monitoring
102	Oita Prefecture	Groundwater	Saiki City	Kamioka	Fixed point monitoring
103		Groundwater	Hiji Town	Toyoka	Rolling monitoring
104	Miyazaki Prefecture	Groundwater	Miyakonojo City	Minamiyokoichi Town	Fixed point monitoring
105		Groundwater	Kobayashi City	Minaminishikata	Fixed point monitoring
106		Groundwater	Nobeoka City	Byumachi Town	Rolling monitoring
107	Kagoshima Prefecture	Groundwater	Kagoshima City	Tamazato Town	Fixed point monitoring
108		Groundwater	Kanoya City	Tasaki Town	Rolling monitoring
109	Okinawa Prefecture	Groundwater	Miyakojima City	Hirahigashinakasonezoe	Fixed point monitoring
110		Groundwater	Miyakojima City	Gusukube	Rolling monitoring

(*) For Location 65 in Osaka City, Osaka, measurement was not conducted as a sufficient amount of water could not be collected due to water shortage. The location will be changed for FY2015 onward.

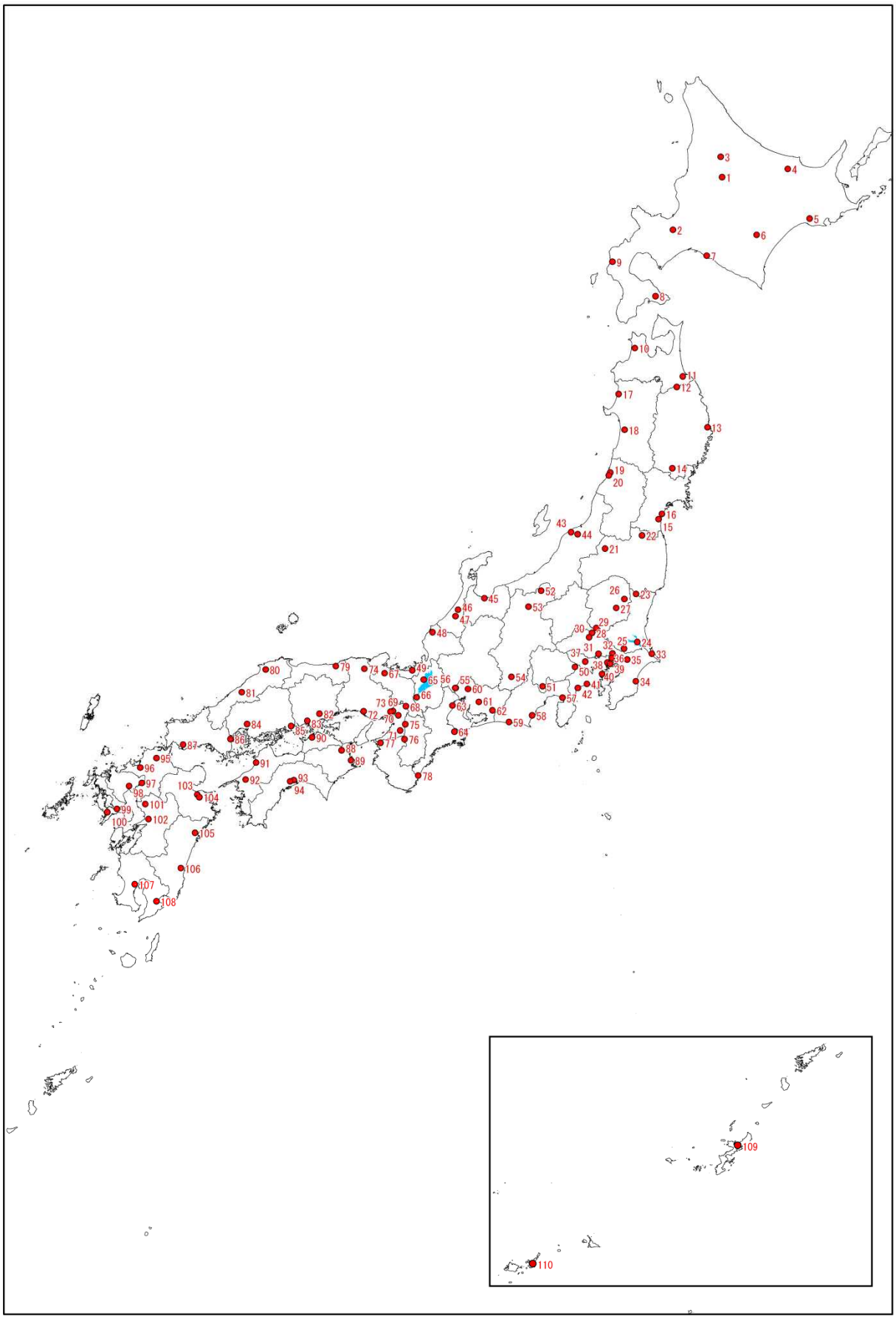


Figure 1.2-1 Map showing locations for the FY2014 Nationwide Monitoring (public water areas)

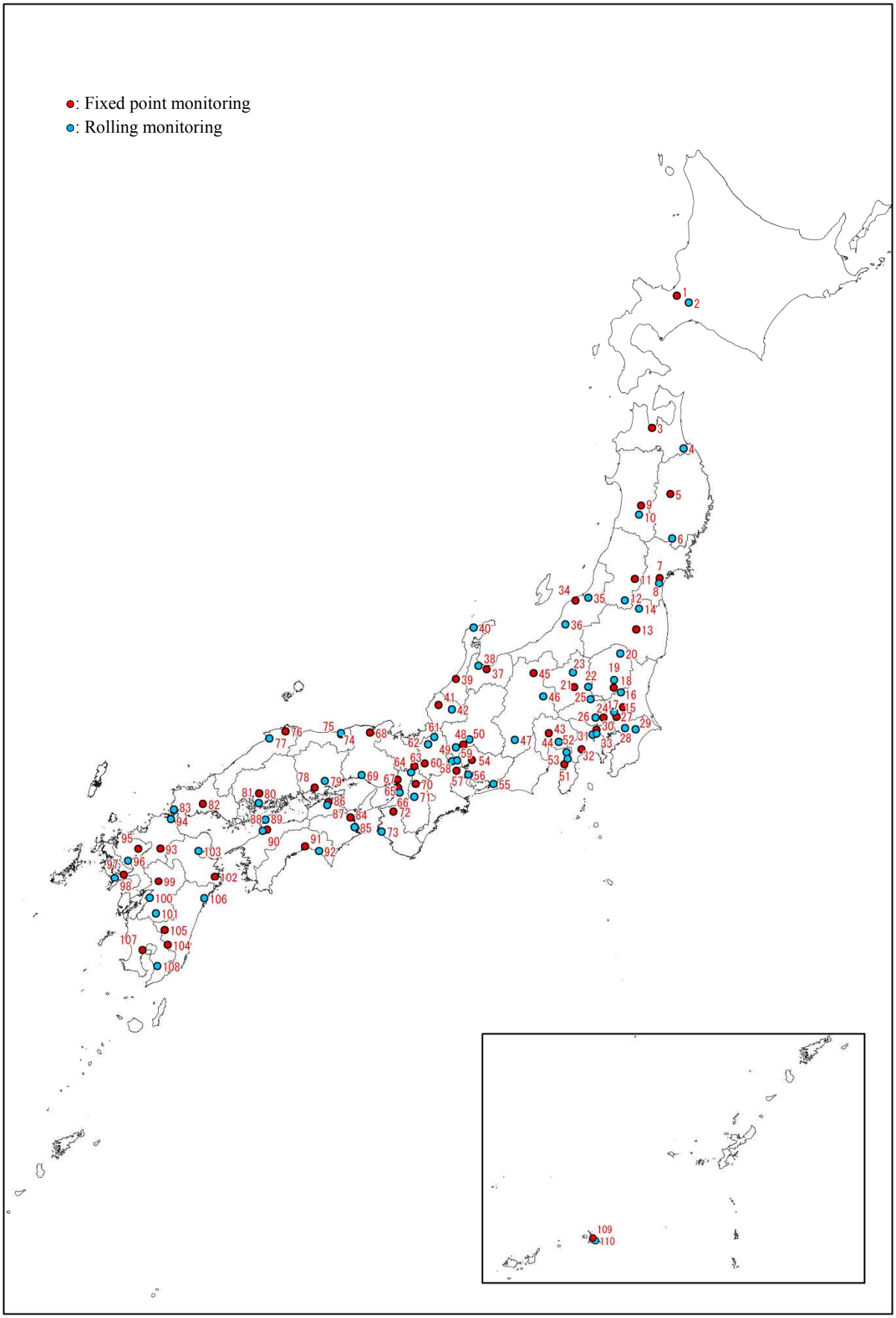


Figure 1.2-2 Map showing locations for the FY2014 Nationwide Monitoring (groundwater)

Table 1.2-4 Monitoring points and period by block (FY2014)

Block	Prefectures	Public water areas		Groundwater	
		Number of locations (*1)	Period	Number of locations	Period
Hokkaido block	Hokkaido	9	Aug. 26 to Oct. 24	2	Aug. 25 to Aug. 27
Tohoku block	Aomori, Iwate, Miyagi, Akita, Yamagata, and Fukushima	14	Sept. 1 to Sept. 18	12	Aug. 26 to Sept. 11
Kanto block	Ibaraki, Tochigi, Gunma, Saitama, Chiba, Tokyo, Kanagawa, Niigata, Yamanashi, and Shizuoka	26 (2)	Aug. 25 to Sept. 18	27	Aug. 25 to Oct. 21
Chubu block	Toyama, Ishikawa, Fukui, Nagano, Gifu, Aichi, and Mie	15	Sept. 3 to Sept. 19	18	Sept. 1 to Sept. 19
Kinki block	Shiga, Kyoto, Osaka, Hyogo, Nara, and Wakayama	14 (1)	Sept. 3 to Sept. 18	13	Sept. 3 to Sept. 19
Chugoku-Shikoku block	Tottori, Shimane, Okayama, Hiroshima, Yamaguchi, Tokushima, Kagawa, Ehime, and Kochi	16	Aug. 28 to Sept. 17	19	Aug. 25 to Sept. 18
Kyushu and Okinawa block	Fukuoka, Saga, Nagasaki, Kumamoto, Oita, Miyazaki, Kagoshima, and Okinawa	16	Aug. 25 to Sept. 17	18	Aug. 25 to Sept. 16
Survey to check annual variation	Gunma and Okayama	2	Aug. 25 to Jan. 26	-	-

(*1) Numbers in parentheses are those of monitoring locations for lakes and other numbers are those of monitoring locations for rivers.

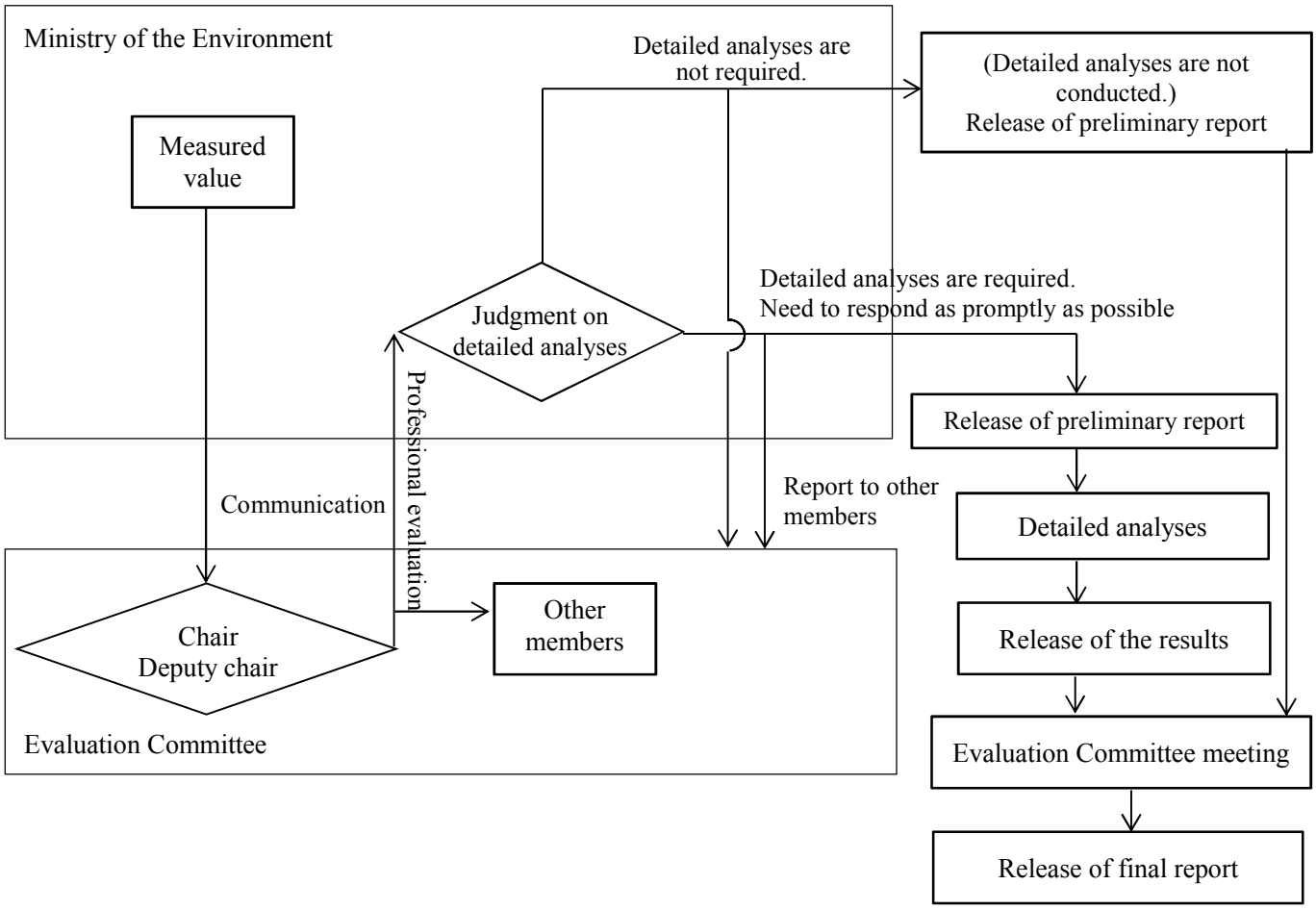


Figure 1.2-3 Procedures for professional evaluation of the results of the Nationwide Monitoring

2. Survey Methods and Analysis Methods

2.1 Survey methods

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 of the Water Quality Preservation Bureau, Ministry of the Environment)
- Sediment Survey Method (August 8, 2012; Notice Kansuitaisuihatsu No. 120725002 issued by the Director of the Environmental Management Bureau, Ministry of the Environment)
- Groundwater Quality Survey Method (September 14, 1989; Notice Kansuikan No. 189 issued by the Director 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)

(1) Public water areas

・Water:

Water samples of around 160 L (hydrochloric acid added) and around 2 L (nitric acid added) were collected at the predetermined points. Out of the 160 L (hydrochloric acid added), 80 L was used for the γ-ray spectrometry measurement and the remaining 80 L was preserved for possible detailed analyses. Out of the 2 L (nitric acid added), 1 L was used for the measurement of total β radioactivity concentrations. Additionally, the transparency (or Secchi disk depth) was measured upon collecting water samples, and if any influence of rainwater was suspected as a result of a comparison with past data or when there seems to be an influence of rainwater in light of the circumstances at locations without any past data where the transparency (or Secchi disk depth) was 50 cm or less, sampling at such locations was judged to be inappropriate.

・Sediments:

Bottom sediment samples of around 6L were collected at the predetermined points at a depth of around 10 cm from the surface layer by using an Ekman-Birge grab sampler, and 3L out of the 6 L was used for the γ-ray spectrometry measurement.

・Soil:

Soil samples (around 5 cm in diameter) were collected at a depth of around 5cm at five points within a 3 to 5 meter square (four vertexes and the diagonal intersection point), or when it is difficult to find an appropriate square to determine such five sampling points, at five points with 3 to 5 meter intervals along a river, and were brought back separately. Samples thus collected at the five points were mixed in equal amounts respectively and were used for analyses.

・Ambient dose rates (soil sampling locations):

Ambient dose rates were measured by installing NaI (Tl) scintillation survey meters at a height of 1m from the ground surface on both banks of a river (or in the case of a lake, installing a NaI (Tl) scintillation survey meter at one point on lake side) in a manner to face the sampling point of river water

(or lake water).

(2) Groundwater

・Water:

Groundwater samples of around 160 L (hydrochloric acid added) and around 2 L (nitric acid added) were collected at the predetermined wells, etc. 80 L of the 160 L (hydrochloric acid added) was used for the γ-ray spectrometry measurement and the remaining 80 L was preserved for possible detailed analyses. 1 L of the 2 L (nitric acid added) was used for the measurement of total β radioactivity concentrations.

When collecting water samples, it was confirmed that water temperature, transparency, pH, and electrical conductivity remained constant by letting the water pass for several minutes, and changes in the transparency, etc. thereafter were recorded as notes.

・Ambient dose rates (soil sampling locations):

Ambient dose rates were measured by installing NaI (Tl) scintillation survey meters at a height of 1 m from the ground surface near the relevant wells, etc. in a manner to face the sampling point of groundwater (or the groundwater layer).

2.2 Analysis methods

The measurement of total β radioactivity concentrations and γ-ray spectrometry measurement using a germanium semiconductor detector were conducted by the following methods for public water areas (water, sediments and soil) and groundwater (water). The γ-ray spectrometry measurement covered all detectable radionuclides (including naturally occurring radionuclides and artificial radionuclides) in principle. 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 (dry)" in the case of sediment samples from public water areas.

Adopted analysis methods were basically in line with the MEXT's Radioactivity Measurement Method Series, and detection limits were set at around 0.001 to 0.01 Bq/L for water samples and around 1 to 30 Bq/kg (dry) for sediment samples (however, these detection limits do not apply for I-131 or other radionuclides volatilized in pretreatment process for measurement analyses).

・Measurement of total β radioactivity concentrations: Concentrate and dry up samples, and then conduct measurement using a low-background gas-flow proportional counter.

・γ-ray spectrometry measurement: After proper pretreatment, put samples in a U-8 container or a 2L-Marinelli beaker and conduct measurement using a germanium semiconductor detector; The following 62 types of γ-ray emitting radionuclides (18 naturally occurring radionuclides and 44 artificial radionuclides) were surveyed. The measurement results of γ-ray emitting radionuclides were corrected for attenuation, and reported figures were activity concentrations as of the time of completing sampling.

Table 2.2-1 Surveyed γ-ray emitting radionuclides

Naturally occurring radionuclides (18 radionuclides)		Artificial radionuclides (44 radionuclides)				
Ac-228	Ra-224	Ag-108m	Co-58	I-131	Np-239	Te-129m
Be-7	Ra-226	Ag-110m	Co-60	I-132	Ru-103	Te-132
Bi-212	Th-227	Am-241	Cr-51	La-140	Ru-106	Y-91
Bi-214	Th-228	As-74	Cs-134	Mn-54	Sb-124	Y-93
K-40	Th-231	Ba-140	Cs-136	Mn-56	Sb-125	Zn-63
Pa-234m	Th-234	Bi-207	Cs-137	Mo-99	Sb-127	Zn-65
Pb-210	Tl-206	Ce-141	Fe-59	Nb-95	Sr-91	Zr-95
Pb-212	Tl-208	Ce-143	Ga-74	Nb-97	Tc-99m	Zr-97
Pb-214	U-235	Ce-144	Ge-75	Nd-147	Te-129	

3. Results

The outline of detectable radioactive materials at each monitoring location is as follows.

3.1 Detection of total β radioactivity and γ-ray emitting radionuclides

(1) Public water areas

1) Water

The results of the measurement of total β radioactivity and γ-ray emitting radionuclides are as shown in Table 3.1-1 and Figure 3.1-1.

a) Total β radioactivity

The detection rate for total β radioactivity was approximately 73%, with detected values ranging from not detectable to 1.1 Bq/L: all of which were within the past measurement trends.

b) γ-ray emitting radionuclides

Nine types of γ-ray emitting radionuclides (seven naturally occurring radionuclides and two artificial radionuclides) as shown in Table 3.1-1 and Figure 3.1-1 were detected, while other types of γ-ray emitting radionuclides were not detectable at any of the locations surveyed.

The detection rates of naturally occurring radionuclides were approximately 5% or less except for K-40, for which the detection rate was approximately 90%. K-40 was detected at some locations with the highest concentrations being, at the maximum, three times higher than the range of past measurement records but such high concentrations were considered to have been caused by the influence of seawater (explained later). Measured values of other naturally occurring radionuclides were within the past measurement trends except for those which had not been surveyed in the past.

Bi-212, Pb-210, and Pb-214 have not been included in nationwide surveys so far, but they are all thorium or uranium series naturally occurring radionuclides that are generally contained in natural soils and rocks, etc.

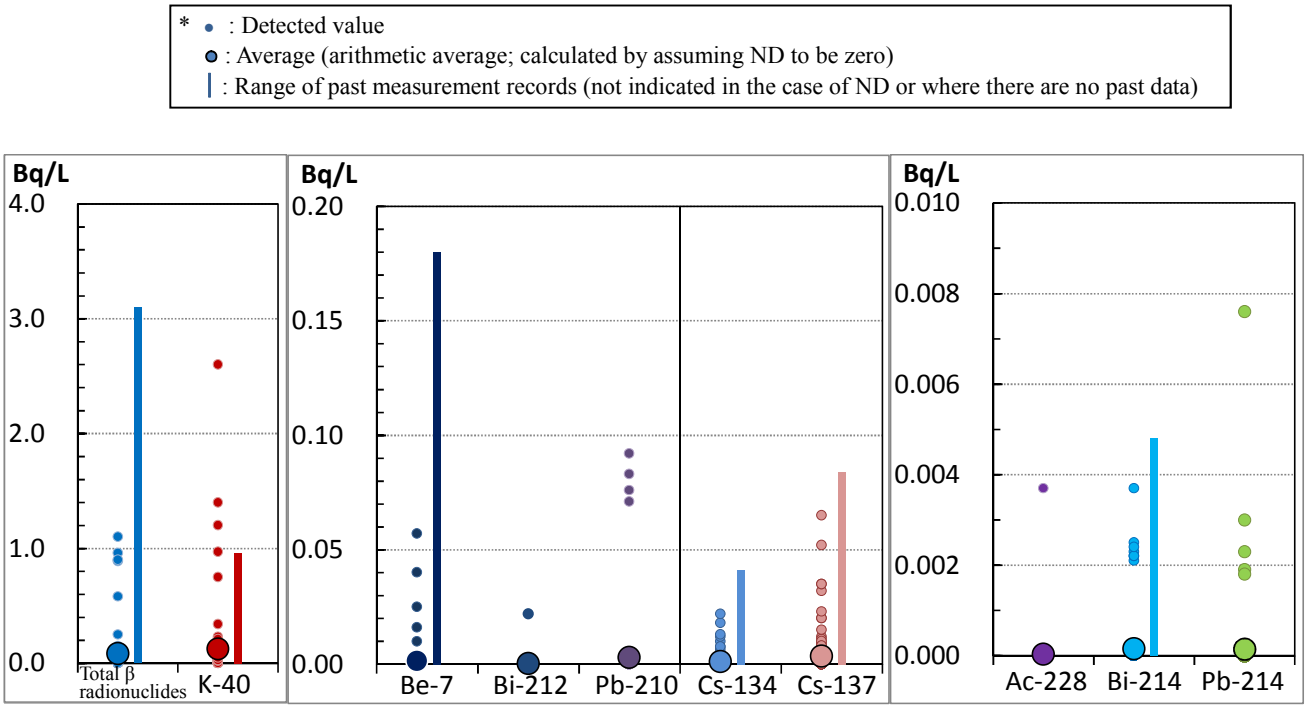
Regarding artificial radionuclides, the detection rates of Cs-134 and Cs-137 were around 16 to 23%, but detected values were 0.022 Bq/L or lower for Cs-134 and 0.065 Bq/L or lower for Cs-137: all of which were within the past measurement trends.

Table 3.1-1 Detection of total β radioactivity and γ-ray emitting radionuclides in water samples from public water areas

Radionuclides			Number of samples [A]	Number of detections [B]	Detection rate (B/A) [%]	Measured value [Bq/L]		Range of past measurement records(*1) [Bq/L]
						Range	Detection limit	
Total β radioactivity			113	82	72.6	ND - 1.1	0.019 - 0.46	ND - 3.1
γ-ray emitting radionuclides	Naturally-occurring	Ac-228	113	1	0.9	ND - 0.0037	0.0029 - 0.021	ND
		Be-7	113	5	4.4	ND - 0.057	0.0084 - 0.052	ND - 0.18
		Bi-212	113	1	0.9	ND - 0.022	0.0094 - 0.061	No data
		Bi-214	113	7	6.2	ND - 0.0037	0.0012 - 0.011	ND - 0.0048
		K-40	113	101	89.4	ND - 2.6	0.015 - 0.092	ND - 0.96
		Pb-210	113	4	3.5	ND - 0.092	0.043 - 1.2	No data
		Pb-214	113	5	4.4	ND - 0.0076	0.0017 - 0.0091	No data
	Artificial	Cs-134	113	18	15.9	ND - 0.022	0.00071 - 0.0043	ND - 0.041
		Cs-137	113	26	23.0	ND - 0.065	0.0007 - 0.0044	ND - 0.084

ND: Not detectable

(*1) Results of the Monitoring of Environmental Radioactivity Levels and the Monitoring of the Surrounding Environment conducted in Japan nationwide from FY1995 to FY2014 (excluding data for March 11, 2011 to March 10, 2012)



(*) Vertical scales are different in the respective figures because detected values vary by radionuclide.

Figure 3.1-1 Detection of total β radioactivity and γ-ray emitting radionuclides in water samples from public water areas

2) Sediments

The results of the measurement of total β radioactivity and γ-ray emitting radionuclides in sediment samples from public water areas are as shown in Table 3.1-2 and Figure 3.1-2.

a) Total β radioactivity

Total β radioactivity was detected at all locations surveyed, with detected values ranging from 160 to 1,300 Bq/kg (dry): all of which were within the past measurement trends.

b) γ-ray emitting radionuclides

12 types of γ-ray emitting radionuclides (ten naturally occurring radionuclides and two artificial radionuclides) as shown in Table 3.1-2 and Figure 3.1-2 were detected, while no other types of γ-ray emitting radionuclides were detectable.

The detection rates of naturally occurring radionuclides exceeded 50% except for Be-7 and Th-234.

Measured values of Be-7, Bi-214, K-40, and Ra-226 exceeded the range of past measurement records.

Bi-214 was detected at Location No. 53 (Koichi Bridge, Saigawa River, Nagano City, Nagano) at a relatively higher level than past measurement records, but other radionuclides such as Pb-214, Ra-226, and Th-234, which are radionuclides of the same uranium series as Bi-214, were also detected at the same location at relatively higher levels compared with other locations, which suggests that the relevant sampling point is located in an area where concentrations of naturally occurring radionuclides derived from natural soils and rocks, etc. are relatively high (explained later).

K-40 and Be-7, which are radionuclides commonly found in the environment (K-40 was first incorporated at the time of the formation of the earth and Be-7 is generated by cosmic rays in the atmosphere), were detected but their measured values were considered to be within the past measurement trends.

Ra-226 is a uranium series naturally occurring radionuclide existing widely within the earth's crust. In light of the fact that the past data were based on the survey results for limited areas (Bi-214 was detected only in Aomori Prefecture and Ra-226 in Okayama Prefecture in the past), measured values of Bi-214 and Ra-226 in the latest monitoring were considered to be within the past measurement trends.

Ac-228, Bi-212, Pb-212, Pb-214, Th-234, and Tl-208 are radionuclides that have not been included in nationwide surveys so far or have not been detectable in past surveys. They are all thorium or uranium series naturally occurring radionuclides that are generally contained in natural soils and rocks, etc.

As shown in the margin of Table 3.1-2 and Figure 3.1-2, internationally detected concentration levels have been reported as 0 to 1,800 Bq/kg for K-40 and 0 to 900 Bq/kg for Ra-226 (both for soil).[3] In comparison with such levels, measured values were all within these levels.

Values of Cs-134 and Cs-137, which are artificial radionuclides, contained in sediment samples collected at the following locations exceeded the range of past measurement records.

[3] Radiation Sources and Effects: 2000 Report of the United Nations Scientific Committee on the Effects of Atomic Radiation to the General Assembly; ANNEX B; Exposures from natural radiation sources

- No.13: Heigawa River, Iwate
- No.15: Abukuma River, Miyagi
- No.16: Natori River, Miyagi
- No.21: Agano River, Fukushima
- No.22: Abukuma River, Fukushima
- No.24: Lake Kasumigaura, Ibaraki
- No.25: Kokai River, Ibaraki
- No.28: Tonegawa River, Gunma
- No.32: Edogawa River, Saitama
- No.33: Tonegawa River, Chiba
- No.35: Lake Inbanuma, Chiba
- No.36: Edogawa River, Tokyo
- No.38: Sumida River, Tokyo
- No.39: Arakawa River, Tokyo
- No.40: Tsurumi River, Kanagawa

These locations were all in the Tohoku and Kanto blocks. Therefore, it was considered appropriate to compare detected values for samples collected at these locations with the results of the monitoring that the Ministry of the Environment has been conducting in and around Fukushima Prefecture after the Fukushima NPS Accident (hereinafter referred to as the "Post-Earthquake Monitoring"), separately with the results of the monitoring surveys conducted in the whole of Japan (Monitoring of Environmental Radioactivity Levels, etc.). Detailed comparison results, which are explained later, showed that detected values of Cs-134 and Cs-137 were also within the past measurement trends.

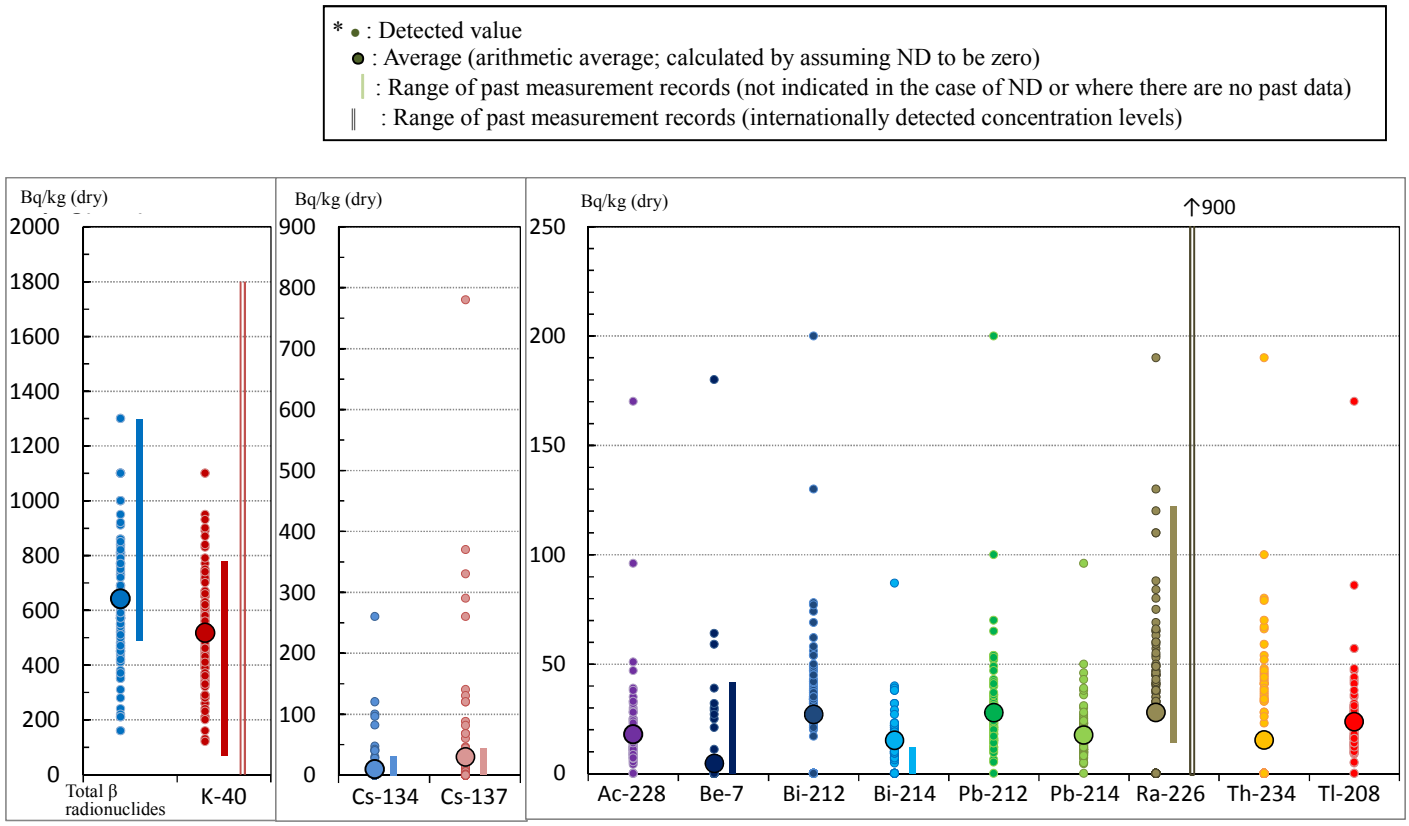
Table 3.1-2 Detection of total β radioactivity and γ-ray emitting radionuclides in sediment samples from public water areas

Radionuclides			Number of samples [A]	Number of detections [B]	Detection rate (B/A) [%]	Measured value [Bq/kg (dry)] Range	Measured value [Bq/kg (dry)] Detection limit	Range of past measurement records(*1) [Bq/kg (dry)]
Total β radioactivity			110	110	100.0	160 - 1,300	16 - 44	490 - 1,300
γ-ray emitting radionuclides	Naturally occurring	Ac-228	110	106	96.4	ND - 170	3.6 - 12	ND
		Be-7	110	11	10.0	ND - 180	8.5 - 69	ND - 42
		Bi-212	110	75	68.2	ND - 200	14 - 49	No data
		Bi-214	110	99	90.0	ND - 87	1.8 - 27	ND - 12
		K-40	110	110	100.0	120 - 1,100	13 - 82	69 - 780
		Pb-212	110	109	99.1	ND - 200	1.9 - 8.5	No data
		Pb-214	110	109	99.1	ND - 96	2.1 - 12	No data
		Ra-226	110	55	50.0	ND - 190	21 - 98	14 - 122
		Th-234	110	33	30.0	ND - 190	17 - 83	No data
		Tl-208	110	108	98.2	ND - 170	2.8 - 16	No data
	Artificial	Cs-134	110	27	24.5	ND - 260	1.0 - 5.3	ND - 31
		Cs-137	110	43	39.1	ND - 780	1.0 - 5.1	ND - 44

ND: Not detectable

(*1) Results of the Monitoring of Environmental Radioactivity Levels and the Monitoring of the Surrounding Environment conducted in Japan nationwide from FY1995 to FY2014 (excluding data for March 11, 2011 to March 10, 2012)

(Note) Internationally detected concentration levels have been reported as 0 to 1,800 Bq/kg for K-40 and 0 to 900 Bq/kg for Ra-226 (both for soil) (see the main text).



(*) Details of the detection of Cs-134 and Cs-137 are explained later.
(*) Vertical scales are different in the respective figures because detected values vary by radionuclide.
(*) See the note in the margin of Table 3.1-2 and the main text for internationally detected concentration levels.

Figure 3.1-2 Detection of total β radioactivity and γ-ray emitting radionuclides in sediment samples from public water areas

(2) Groundwater

The results of the measurement of total β radioactivity and γ-ray emitting radionuclides in groundwater samples are as shown in Table 3.1-3 and Figure 3.1-3.

a) Total β radioactivity

The detection rate for total β radioactivity was approximately 80%, with detected values ranging from not detectable to 0.44 Bq/L: all of which were within the past measurement trends.

b) γ-ray emitting radionuclides

Ten types of γ-ray emitting radionuclides (all naturally occurring radionuclides) as shown in Table 3.1-3 and Figure 3.1-3 were detected, while no other types of γ-ray emitting radionuclides were detectable. Out of these detected γ-ray emitting radionuclides, K-40 was detected at concentration levels slightly exceeding the range of past measurement records but this is a radionuclide generally contained in natural soils and rocks, etc. (explained later). The measured value of Ra-226 also exceeded the range of past measurement records but could be considered to be within the past measurement trends, in light of the fact that Ra-226 was only detected in a limited area (only in Okayama Prefecture) in the past, that this is a uranium series radionuclide existing widely within the earth's crust, and that the value was much lower than the range of the internationally detected concentration levels.

Ac-228, Bi-212, Pb-212, Pb-214, Th-234, and U-235 are radionuclides that have not been included in nationwide surveys so far or have not been detectable in past surveys. They are all thorium or uranium series naturally occurring radionuclides that are generally contained in natural soils and rocks, etc.

Table 3.1-3 Detection of total β radioactivity and γ-ray emitting radionuclides in groundwater samples

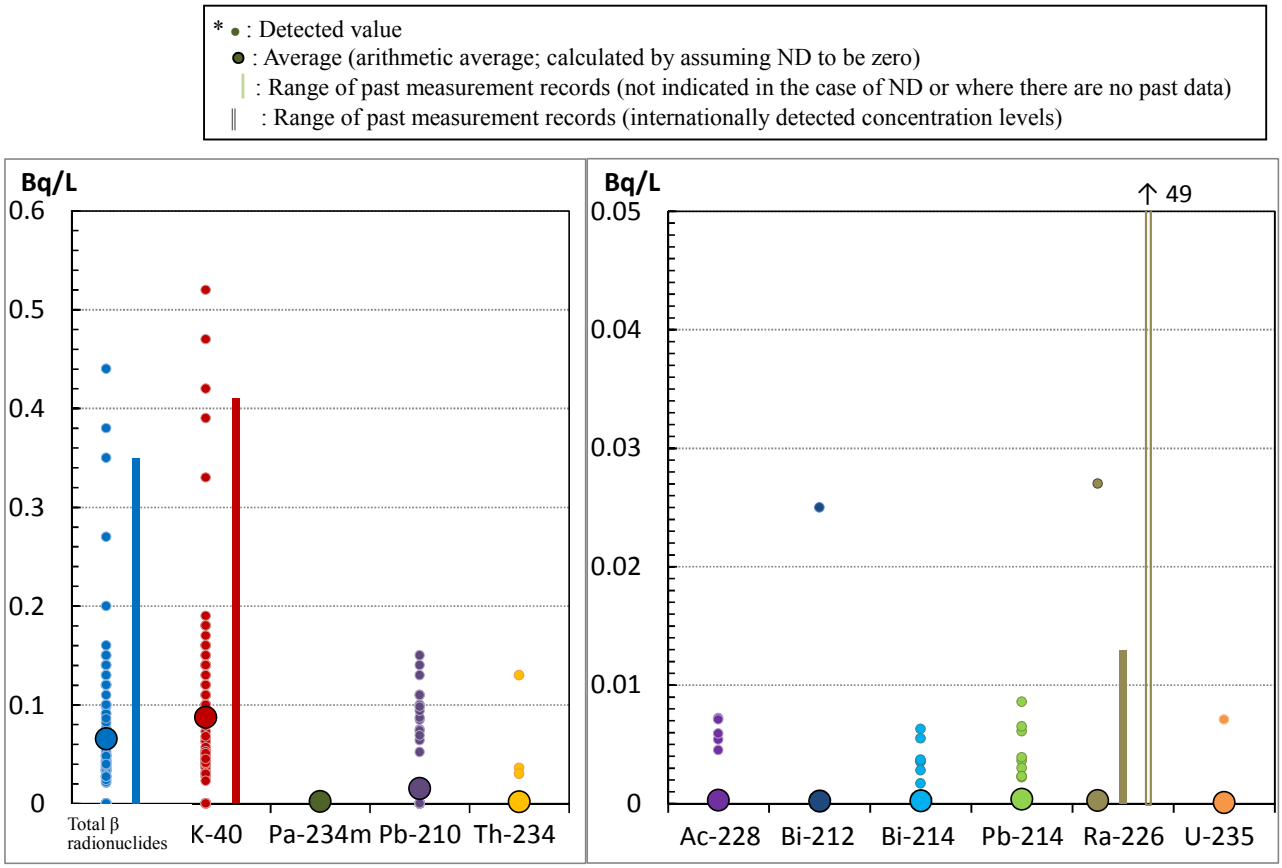
Radionuclides			Number of samples [A]	Number of detections [B]	Detection rate (B/A) [%]	Measured value [Bq/L]		Range of past measurement records(*1) [Bq/L]
						Range	Detection limit	
Total β radioactivity			109	87	79.8	ND - 0.44	0.019 - 0.040	ND - 0.35
γ-ray emitting radionuclides	Naturally occurring	Ac-228	109	5	4.6	ND - 0.0072	0.0028 - 0.0095	No data
		Bi-212	109	1	0.9	ND - 0.025	0.010 - 0.036	No data
		Bi-214	109	7	6.4	ND - 0.0063	0.0017 - 0.0054	No data
		K-40	109	88	80.7	ND - 0.52	0.017 - 0.061	ND - 0.41
		Pa-234m	109	1	0.9	ND - 0.22	0.12 - 0.45	No data
		Pb-210	109	17	15.6	ND - 0.15	0.044 - 0.30	No data
		Pb-214	109	9	8.3	ND - 0.0086	0.0018 - 0.0055	No data
		Ra-226	109	1	0.9	ND - 0.027	0.019 - 0.13	ND - 0.013
		Th-234	109	3	2.8	ND - 0.13	0.013 - 0.034	No data
		U-235	109	1	0.9	ND - 0.0071	0.0030 - 0.027	No data

ND: Not detectable

(*1) Results of the Monitoring of Environmental Radioactivity Levels and the Monitoring of the Surrounding Environment conducted in Japan nationwide from FY1995 to FY2014 (excluding data for March 11, 2011 to March 10, 2012)

(*2) Internationally detected concentration levels have been reported as 0 to 49 Bq/L for Ra-226 (for drinking water).[4]

[4] Radiation Sources and Effects: 2000 Report of the United Nations Scientific Committee on the Effects of Atomic Radiation to the General Assembly; ANNEX B; Exposures from natural radiation sources



(*) Vertical scales are different in the respective figures because detected values vary by radionuclide.
(*) See the note in the margin of Table 3.1-3 for internationally detected concentration levels.

Figure 3.1-3 Detection of total β radioactivity and γ-ray emitting radionuclides in groundwater samples

3.2 Consideration regarding detected radionuclides

(1) Detection of naturally occurring radionuclides

1) Correlation between activity concentrations of K-40 and salinity

As explained in 3.1 above, activity concentrations of K-40 were at levels exceeding the range of past measurement records (0.96 Bq/L at the maximum) in water samples collected at some locations in public water areas.

Locations where activity concentrations of K-40 were at high levels showed high electrical conductivity (EC) (1,360 mS/m at the maximum) and this suggests the influence of the intrusion of seawater. Therefore, a comparison was made using all available data to clarify the correlation between activity concentrations of K-40 and EC (see Figure 3.2-1).

As shown in Figure 3.2-1, a positive correlation was found between them.

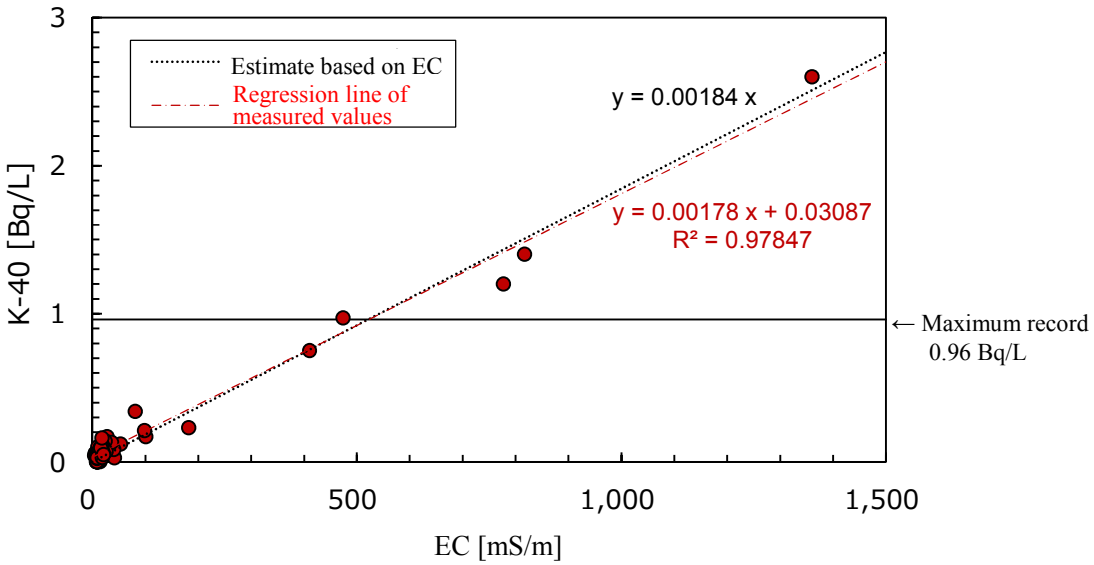


Figure 3.2-1 Correlation between the K-40 concentration and electrical conductivity in water samples from public water areas

In the meantime, according to the results of the Monitoring of Environmental Radioactivity Levels, conducted for the 20 years from FY1995 to FY2014 (monitoring of 465 samples collected from 18 prefectures), the average concentration (average) of K-40 was approximately 8.3 Bq/L and the maximum concentration was 14 Bq/L (see Table 3.2-1).

Table 3.2-1 Results of the Monitoring of Environmental Radioactivity Levels, etc. concerning K-40 in seawater(*1)

Number of surveys	Number of detections	Detection rate [%]	Average [Bq/L]	Maximum [Bq/L]
465	439	94.40%	8.3	14

(*1) Results of the Monitoring of Environmental Radioactivity Levels and the Monitoring of the Surrounding Environment conducted in Japan nationwide from FY1995 to FY2014

EC in seawater is generally around 4,500 mS/m, and the estimated activity concentrations of K-40 with

possible influence of seawater were obtained by using the following formula based on the measurement results of EC for the relevant river water.

$$\text{(Activity concentration of K-40in river water)} = \text{(Average activity concentration of K-40 in seawater)} \times \frac{\text{(Measured EC for the river water)}}{\text{(Ordinary values of EC in seawater)}}$$

The estimated activity concentrations of K-40 in the river water are indicated with a dashed line in Figure 3.2-1, and the estimate values were very close to the measured activity concentrations of K-40. Therefore, relatively high activity levels of K-40 measured in the latest monitoring are considered to have been caused by the intrusion of seawater and fall within the past measurement trends.

In the same manner, the correlation between the K-40 concentration and EC was also checked with regard to groundwater samples (see Figure 3.2-2; scales of the vertical and horizontal axes differ from those for Figure 3.2-1). However, no clear correlation was found for groundwater samples. The measured values slightly exceeded the range of past measurement records (0.41 Bq/L at the maximum) for samples collected at Location No. 66 (Daisennaka Town, Sakai Ward, Sakai City, Osaka; 0.47 Bq/L), Location No. 68 (Saiwai Town, Toyooka City, Hyogo; 0.52 Bq/L), and Location No. 75 (Fukui, Kurashiki City, Okayama; 0.42 Bq/L). These locations are within areas where the potassium concentration in soil is relatively high (Figure 3.2-3), and relatively high activity levels of K-40 are considered to reflect the geological property of respective areas. Accordingly, the K-40 concentration for groundwater samples in the latest monitoring is considered to fall within the past measurement trends.

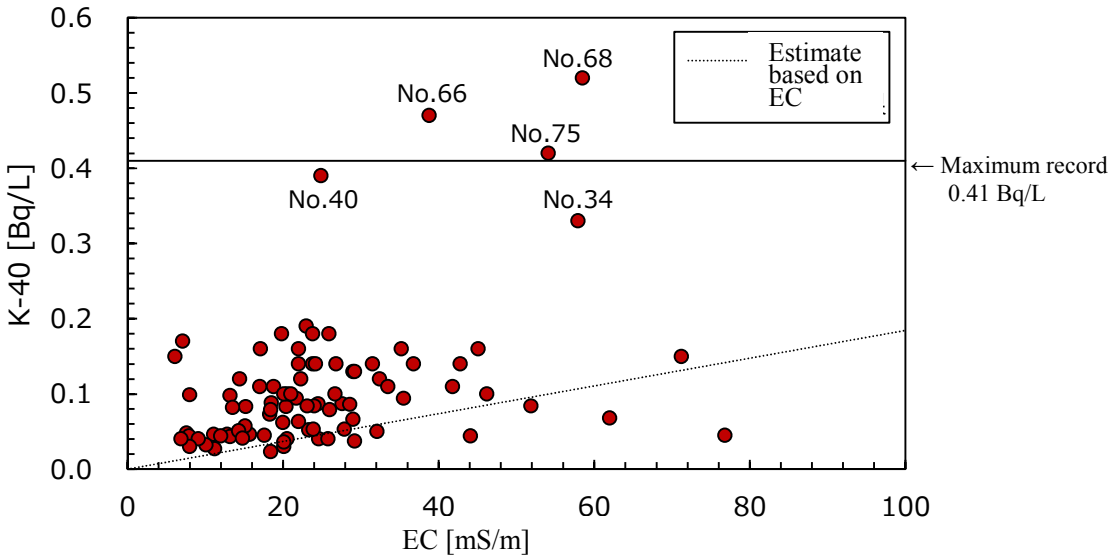


Figure 3.2-2 Correlation between the K-40 concentration and electrical conductivity in groundwater samples

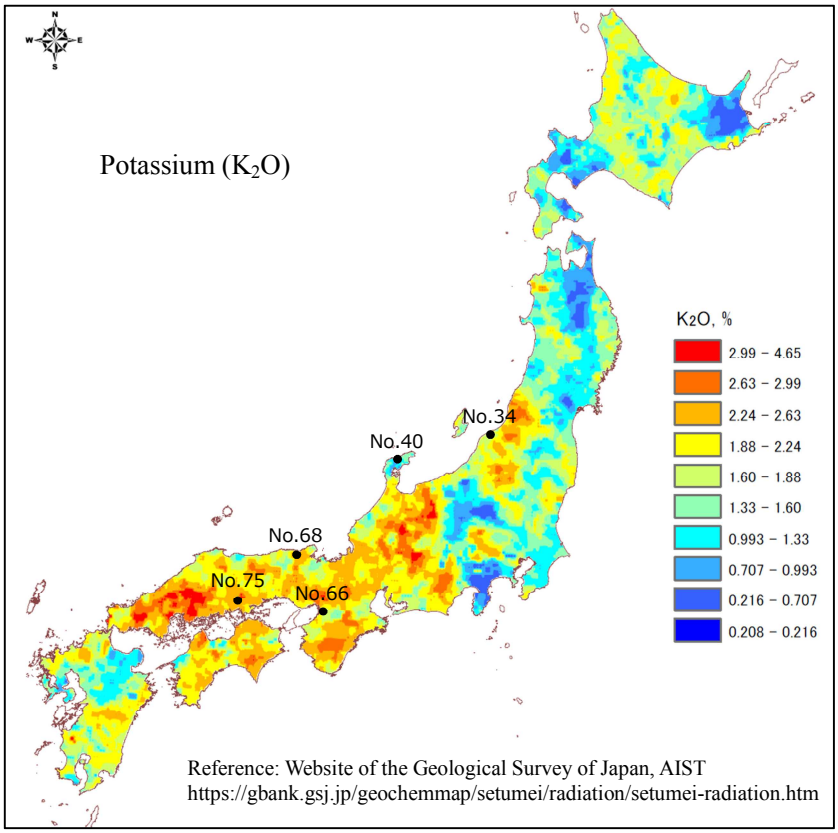


Figure 3.2-3 Distribution of potassium (K_2O) in soil in Japan

2) Uranium and thorium series radionuclides

As explained in 3.1 above, uranium and thorium series radionuclides were detected at relatively high concentration levels in sediment samples from public water areas.

Such radionuclides were detected as shown in Table 3.2-2.

These naturally occurring radionuclides exist widely within the earth's crust and belong to the same decay series, which implies the existence of some correlations among detected values.

Table 3.2-2 Detection of uranium and thorium series naturally occurring radionuclides

Radionuclides			Number of samples [A]	Number of detections [B]	Detection rate (B/A) [%]	Measured value [Bq/kg (dry)]	
						Range	Detection limit
γ-ray emitting radionuclides	Uranium series	Th-234	110	33	30.0	ND - 190	17 - 83
		Ra-226	110	55	50.0	ND - 190	21 - 98
		Pb-214	110	109	99.1	ND - 96	2.1 - 12
		Bi-214	110	99	90.0	ND - 87	1.8 - 27
	Thorium series	Ac-228	110	106	96.4	ND - 170	3.6 - 12
		Pb-212	110	109	99.1	ND - 200	1.9 - 8.5
		Bi-212	110	75	68.2	ND - 200	14 - 49
		Tl-208	110	108	98.2	ND - 170	2.8 - 16

ND: Not detectable

Figure 3.2-4 and Figure 3.2-5 show correlations among detected values of radionuclides belonging to respective series (excluding data for radionuclides not detectable).

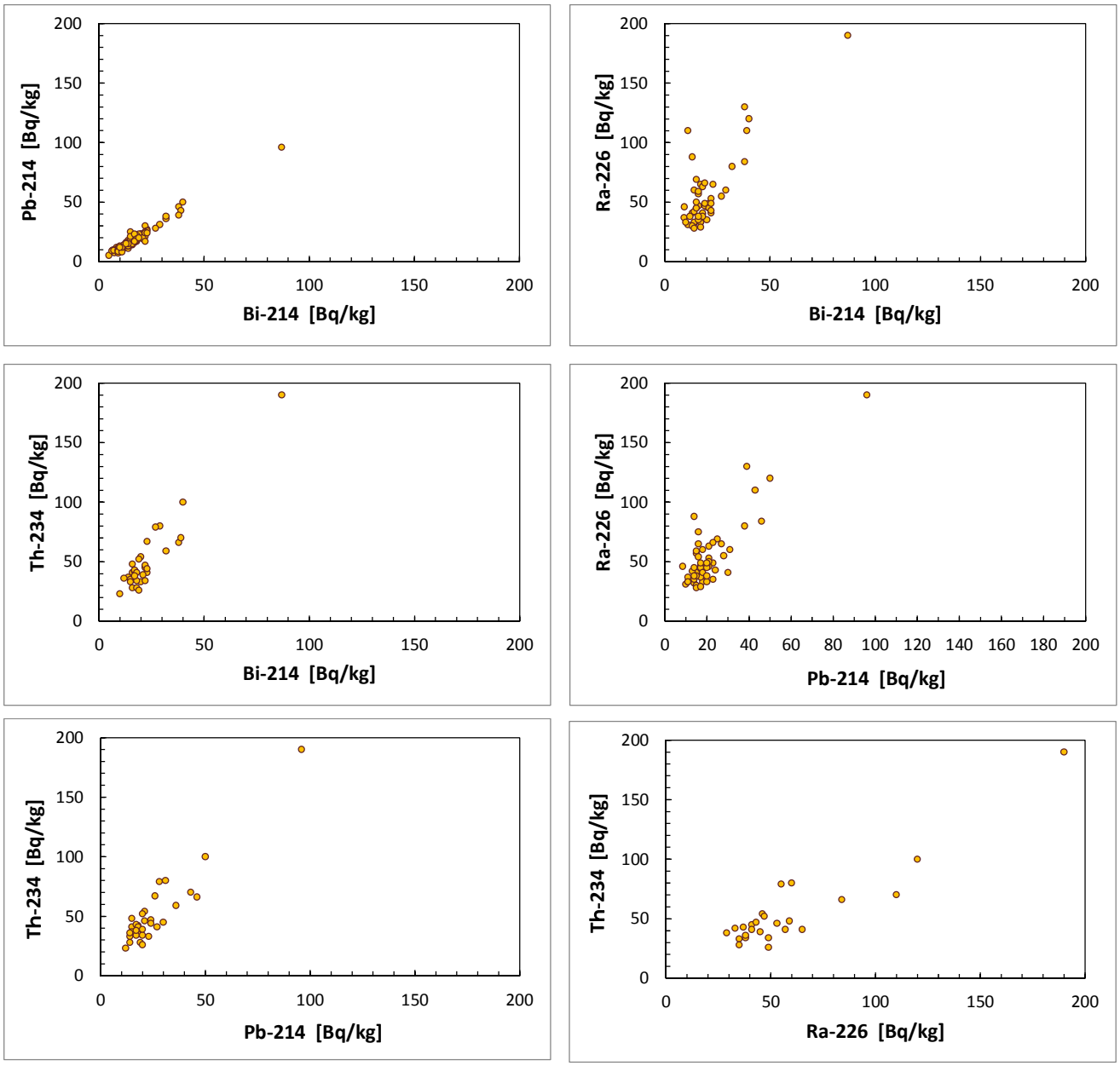
As is clear from these figures, high correlations were observed among uranium series radionuclides or thorium series radionuclides, respectively.

Given these facts, radionuclides belonging to these two series are considered to show geological characteristics of their respective sampling locations.

Locations where detected values of uranium and thorium series naturally occurring radionuclides were high include Location No. 45 (Hagiura Bridge, Jinzu River, Toyama City, Toyama), Location No. 53 (Koichi Bridge, Saigawa River, Nagano City, Nagano), Location No. 66 (Karasakioki-Chuo, Lake Biwako, Shiga), Location No. 84 (Intake for water supply in Hesaka, Ota River, Hiroshima City, Hiroshima), and Location No. 87 (Suenobu Bridge, Kotogawa River, Ube City, Yamaguchi), all of which are in areas where granite is widely distributed in neighboring areas or in upstream parts (see Figure 3.2-6). Generally, "granite contains naturally occurring radionuclides in relatively larger amounts than other types of rocks" (Geological Society of Japan, etc.), and measured values for these locations are considered to reflect such geological property of respective areas.

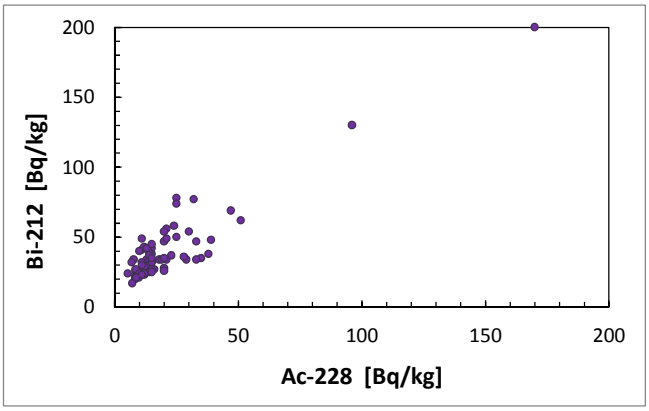
According to the Geological Society of Japan, etc.,[5] "natural radiation doses have certain correlation with uranium and thorium series radionuclides." Natural radiation doses in Japan are as shown in Figure 3.2-7.

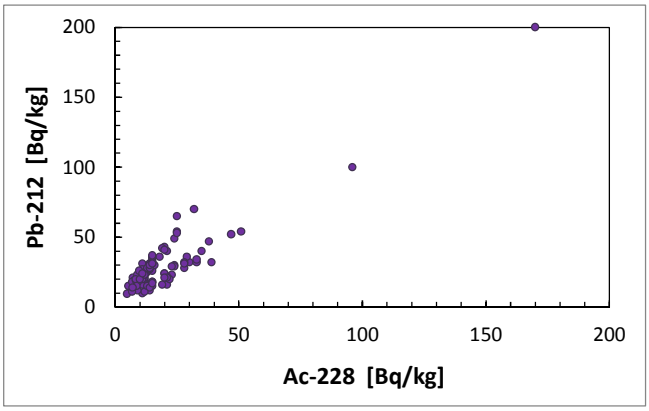
5 http://www.geosociety.jp/hazard/content0058.html

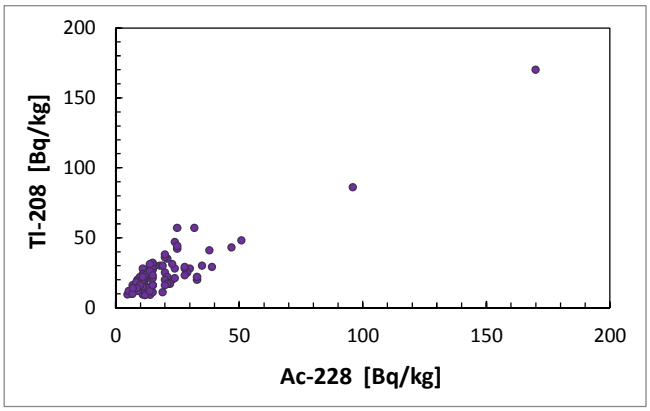


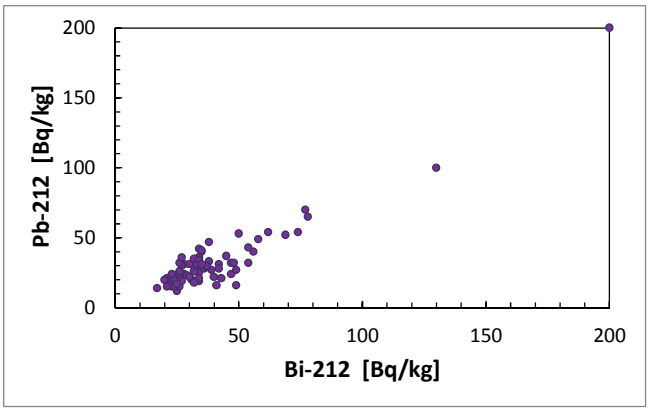
Correlation coefficient	Bi-214	Pb-214	Ra-226	Th-234
Bi-214		0.979	0.809	0.943
Pb-214			0.863	0.933
Ra-226				0.913

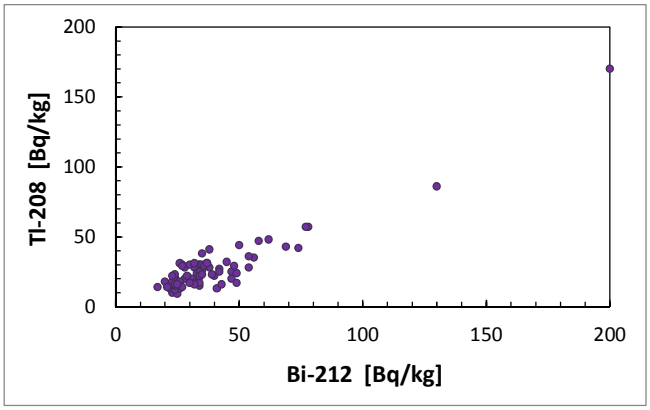
Figure 3.2-4 Correlations among uranium series radionuclides

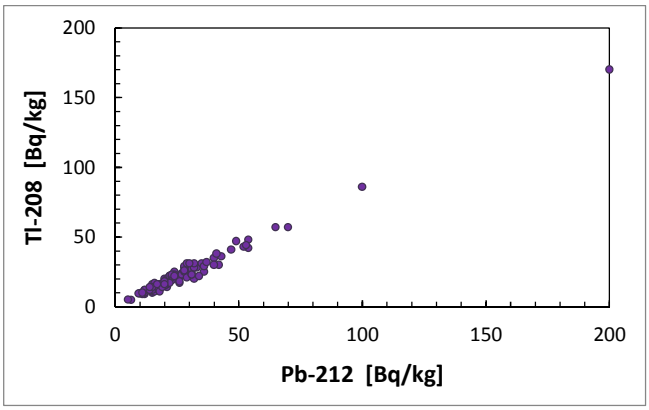






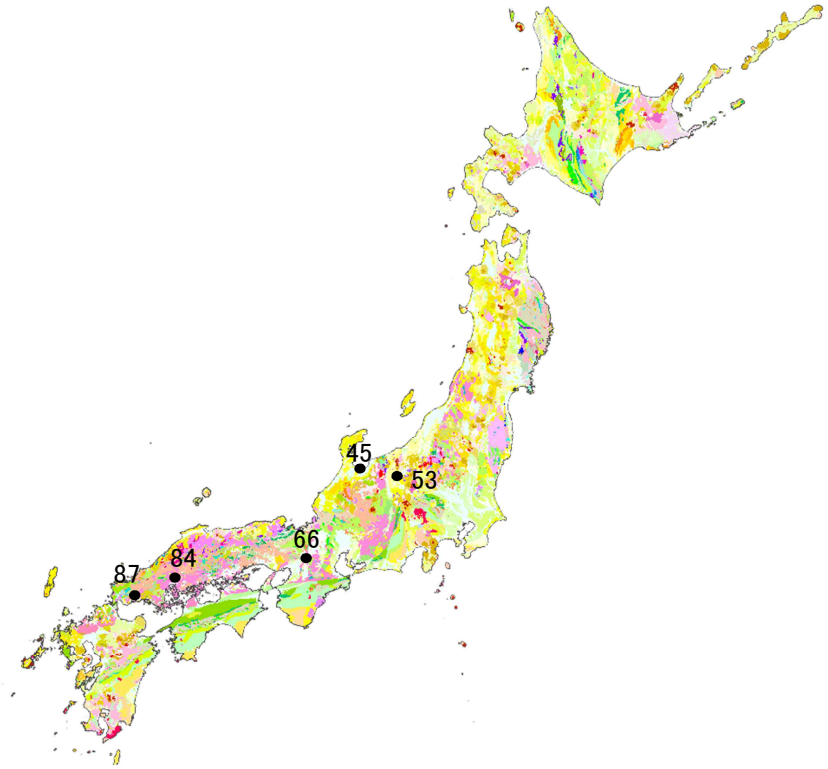






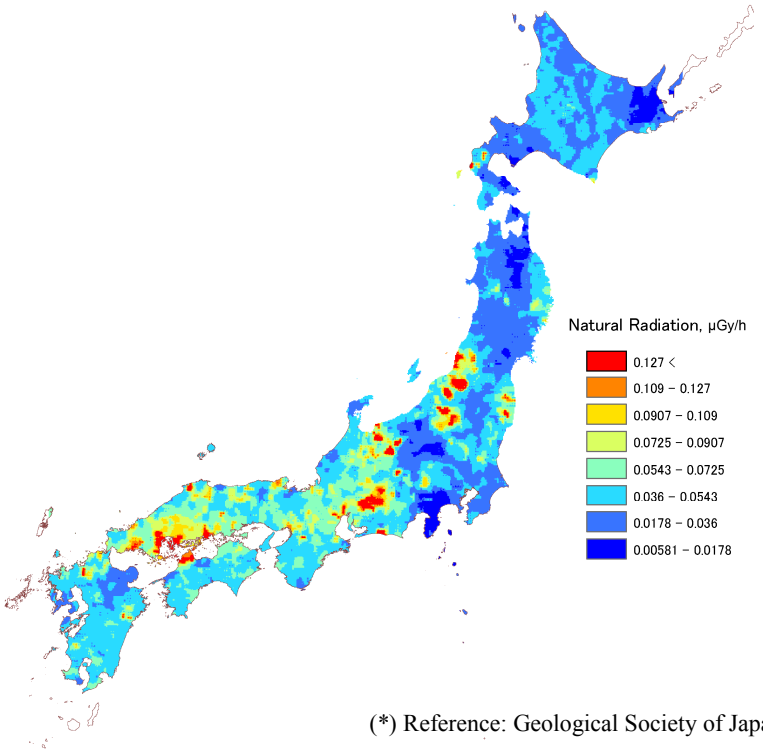
Correlation coefficient	Ac−228	Bi−212	Pb−212	Tl−208
Ac−228		0.914	0.918	0.907
Bi−212			0.938	0.934
Pb−212				0.984

Figure 3.2-5 Correlations among thorium series radionuclides



(*) Reference: Seamless Digital Geological Map of Japan (1:200,000) ® ; AIST website[6]
(*) Numbers in the figure indicate monitoring locations.

Figure 3.2-6 Distribution of granite in Japan
(parts highlighted in pink in the Figure are locations where granite exists)



(*) Reference: Geological Society of Japan website[7]

Figure 3.2-7 Natural radiation doses in Japan (Gy = Sv for γ-rays and β-rays)

[6] https://gbank.gsj.jp/seamless/
[7] http://www.geosociety.jp/hazard/content0058.html

(2) Detection of artificial radionuclides

1) Cs-134 and Cs-137 in sediments

As explained in 3.1 above, radioactive cesium was detected in sediment samples from public water areas in the Hokkaido, Tohoku, Kanto, Chubu, Kinki, and Kyushu blocks (43 locations in total; both Cs-134 and Cs-137 were detected at 27 locations (all in the Tohoku and Kanto blocks), and only Cs-137 was detected at 16 locations). At some of these locations, Cs-134 and Cs-137 were detected at concentration levels exceeding the range of past measurement records.

As locations where detected values exceeded the range of past measurement records were all in the Tohoku and Kanto blocks, the influence of the Fukushima NPS Accident was suspected. Therefore, a comparison was made as follows by using available data, including the results of the Post-Earthquake Monitoring being conducted at present.

(i) Regarding locations also surveyed in the Post-Earthquake Monitoring, a direct comparison with the data for the relevant locations obtained through said monitoring

(ii) Regarding locations that do not fall under the category of (i) above but are in Tokyo Metropolis or other prefectures where the Post-Earthquake Monitoring is conducted, a comparison with data for other locations in said prefectures

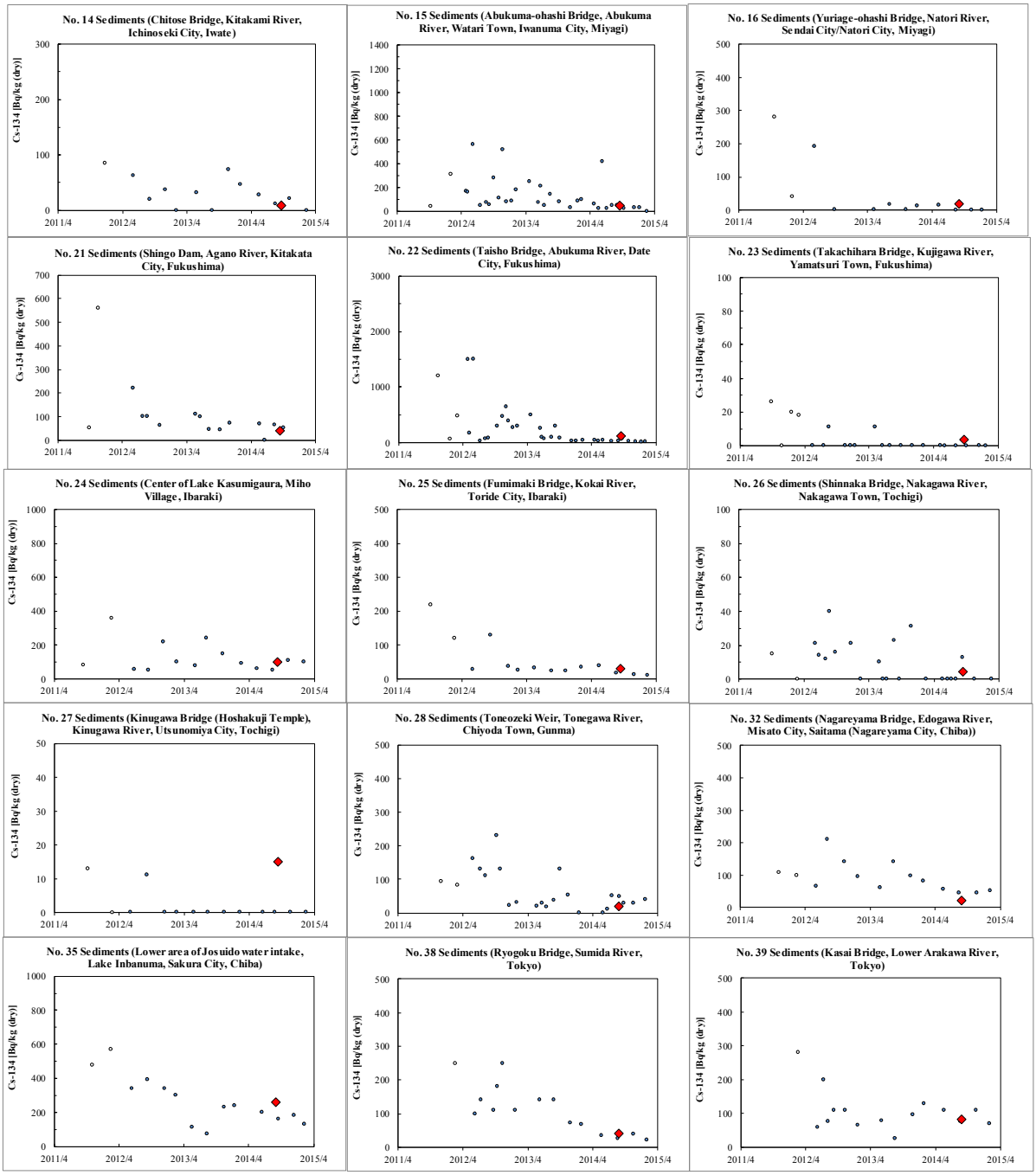
(iii) Regarding locations that do not fall under the categories of (i) and (ii) above, a comparison with the data for areas around the relevant locations obtained through the Post-Earthquake Monitoring

(iv) Regarding locations where measured values did not exceed the range of past measurement records, a comparison with data obtained through the Monitoring of Environmental Radioactivity Levels, etc.

(i) Comparison with the past Post-Earthquake Monitoring results for the same locations

Regarding locations also surveyed in the Post-Earthquake Monitoring, the measured values in the latest monitoring were compared with the past measurement records for the same locations (see Figure 3.2-8).

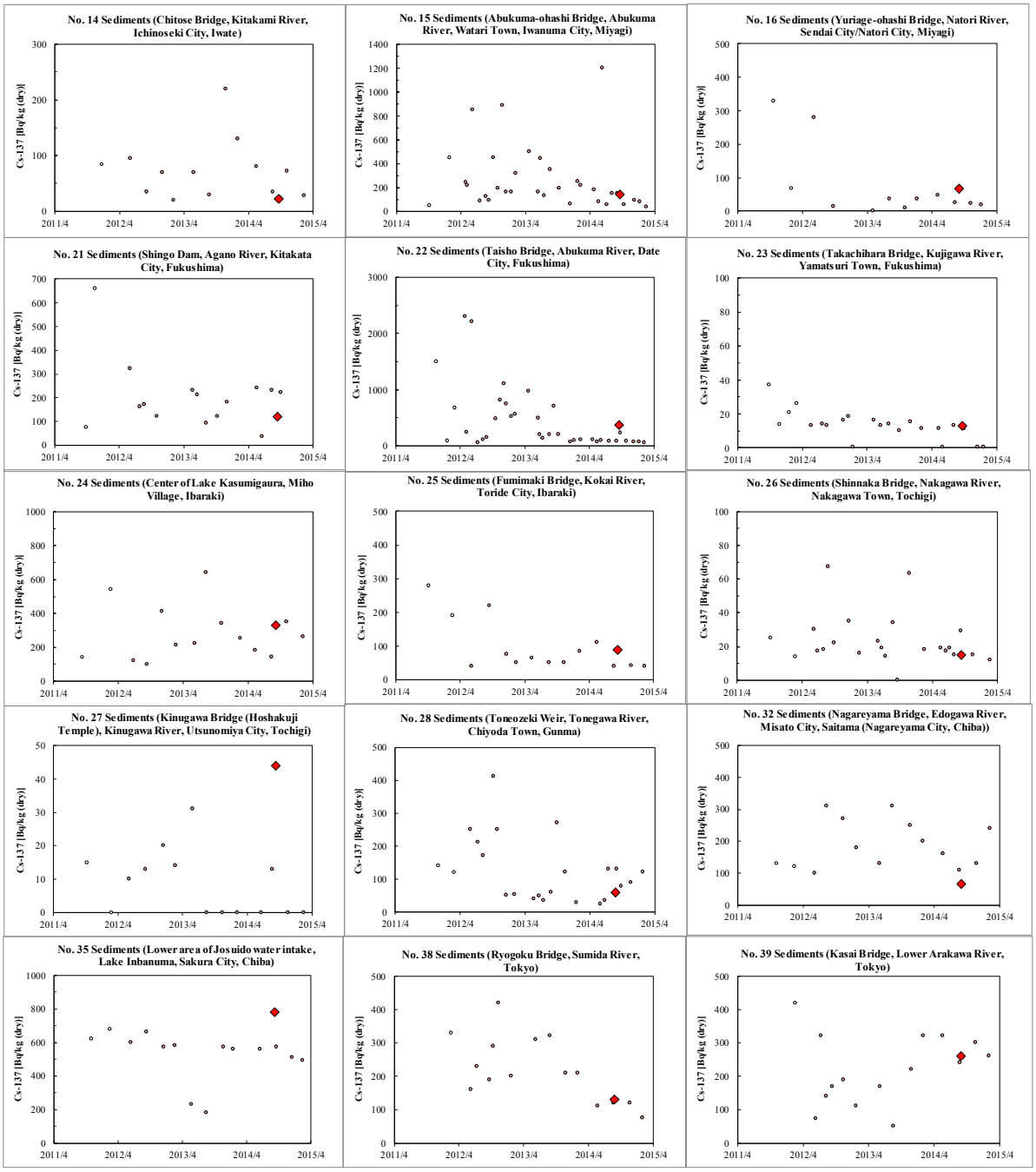
At Locations No. 27 and No. 35, measured values were larger than the range of past measurement records, but such deviations were considered to be within minor fluctuations in light of the past similar monitoring results, and the results of the latest monitoring were found to be within the past measurement trends.



(*) ◆ in figures shows the latest monitoring results.

(*) White small circles show the measurement results for March 11, 2011 to March 10, 2012, which were excluded from the past measurement records used as reference.

Figure 3.2-8(1) (i) Comparison with the past Post-Earthquake Monitoring results for the same locations [Cs-134]



(*) ◆ in figures shows the latest monitoring results.

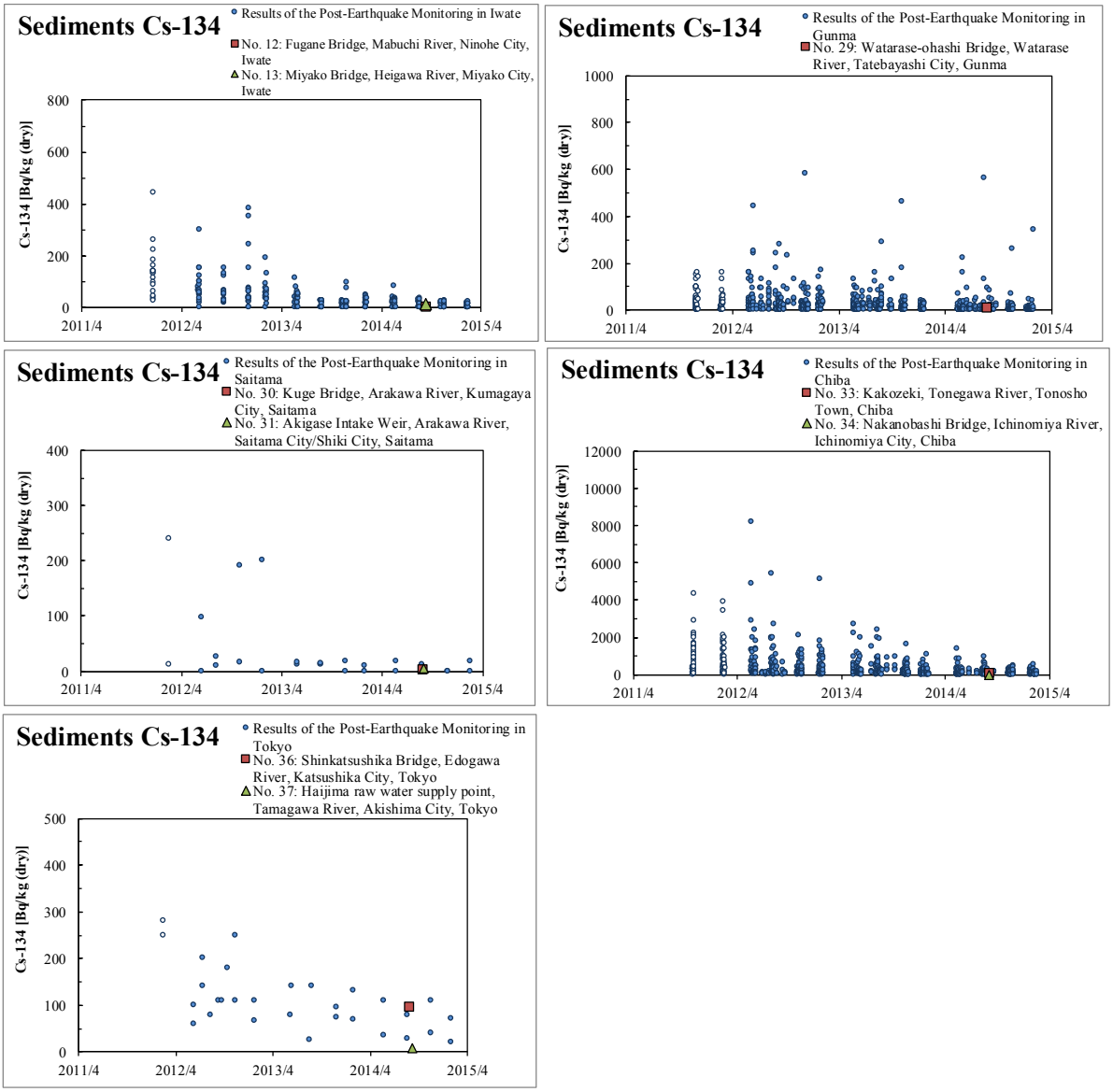
(*) White small circles show the measurement results for March 11, 2011 to March 10, 2012, which were excluded from the past measurement records used as reference.

Figure 3.2-8(2) (i) Comparison with the past Post-Earthquake Monitoring results for the same locations [Cs-137]

(ii) Comparison with the past Post-Earthquake Monitoring results in the same prefectures

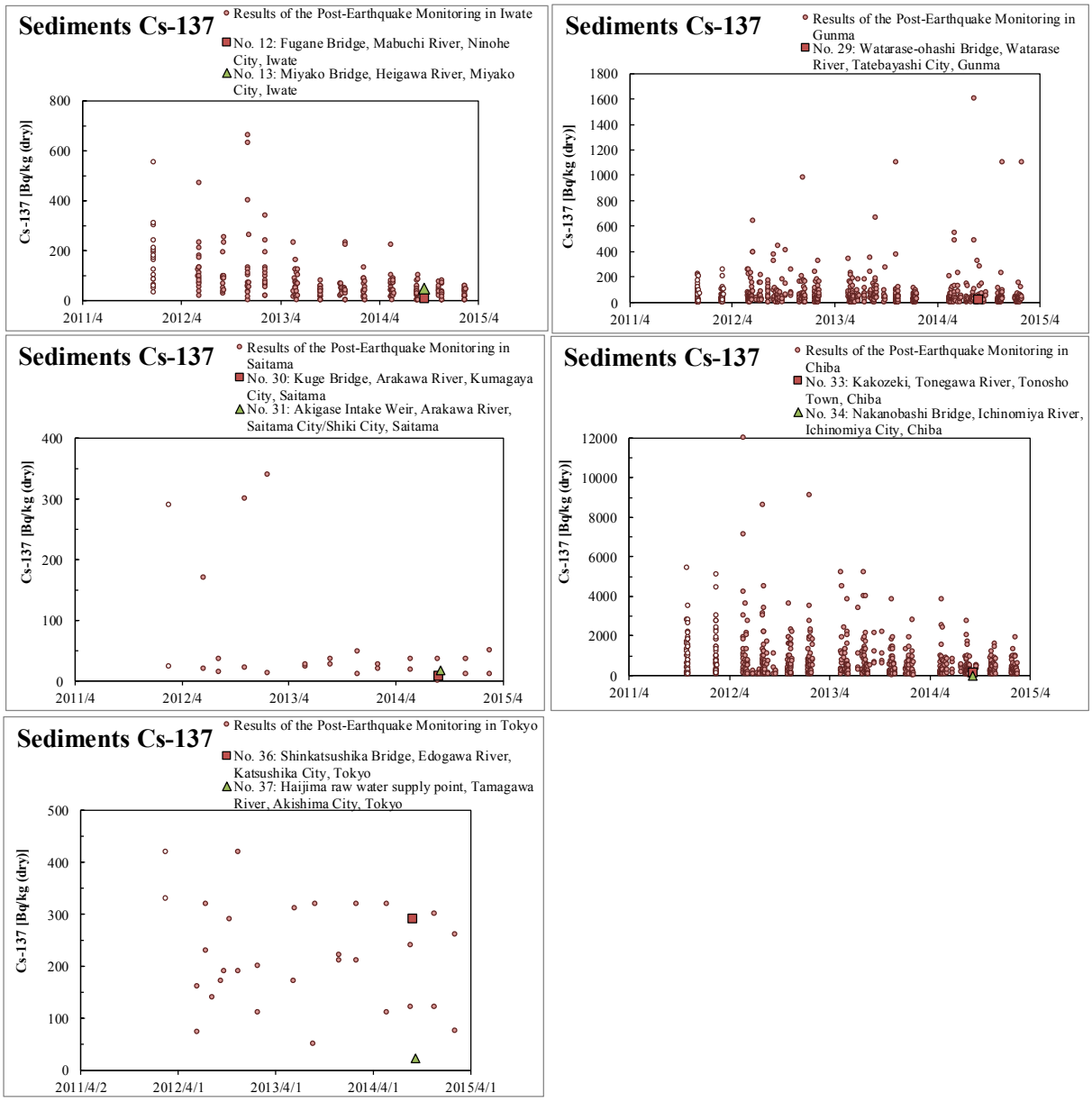
Regarding locations that have not been surveyed in the Post-Earthquake Monitoring, the measured values in the latest monitoring were compared with the past Post-Earthquake Monitoring results for locations in the same prefectures (see Figure 3.2-9).

The measured values in the latest monitoring were found to be all within the past measurement trends.



(*) White small circles show the measurement results for March 11, 2011 to March 10, 2012, which were excluded from the past measurement records used as reference.

Figure 3.2-9(1) (ii) Comparison with the past Post-Earthquake Monitoring results in the same prefectures [Cs-134]

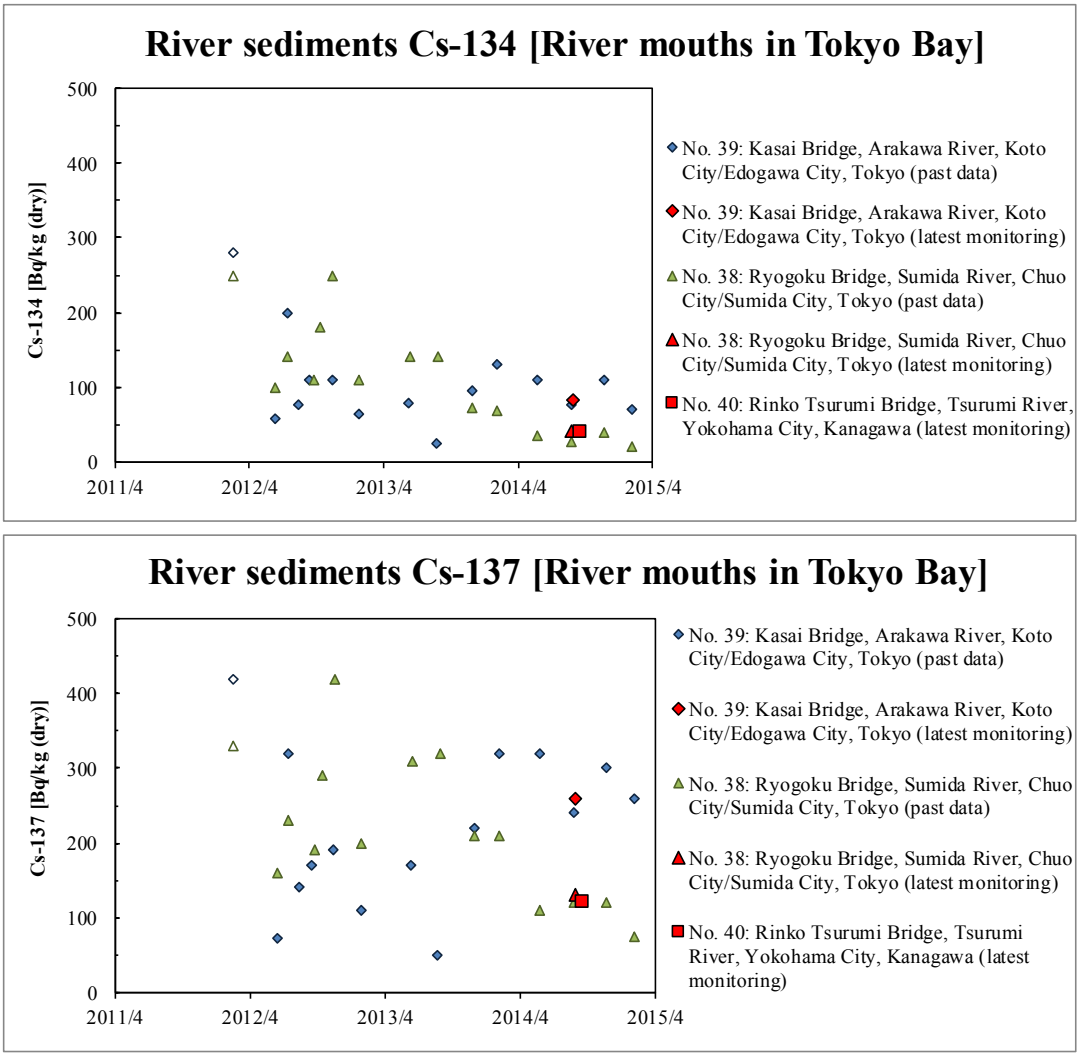


(*) White small circles show the measurement results for March 11, 2011 to March 10, 2012, which were excluded from the past measurement records used as reference.

Figure 3.2-9(2) (ii) Comparison with the past Post-Earthquake Monitoring results in the same prefectures [Cs-137]

(iii) Comparison with the past Post-Earthquake Monitoring results for nearby locations

Regarding Location No. 40 (Rinko Tsurumi Bridge, Tsurumi River, Yokohama City, Kanagawa Prefecture), it was considered to be appropriate to make a comparison with the past data for nearby locations although the Post-Earthquake Monitoring had not been conducted in Kanagawa Prefecture. Therefore, a comparison was made with the past data for Location No. 38 (Ryogoku Bridge, Sumida River, Chuo City/Sumida City, Tokyo Metropolis) and Location No. 39 (Kasai Bridge, Arakawa River, Koto City/Edogawa City, Tokyo Metropolis), both of which are located at the mouths of the Sumida River and the Arakawa River to Tokyo Bay (see Figure 3.2-10). As a result, it was found that the measured values for Location No. 40 were within the past measurement trends.



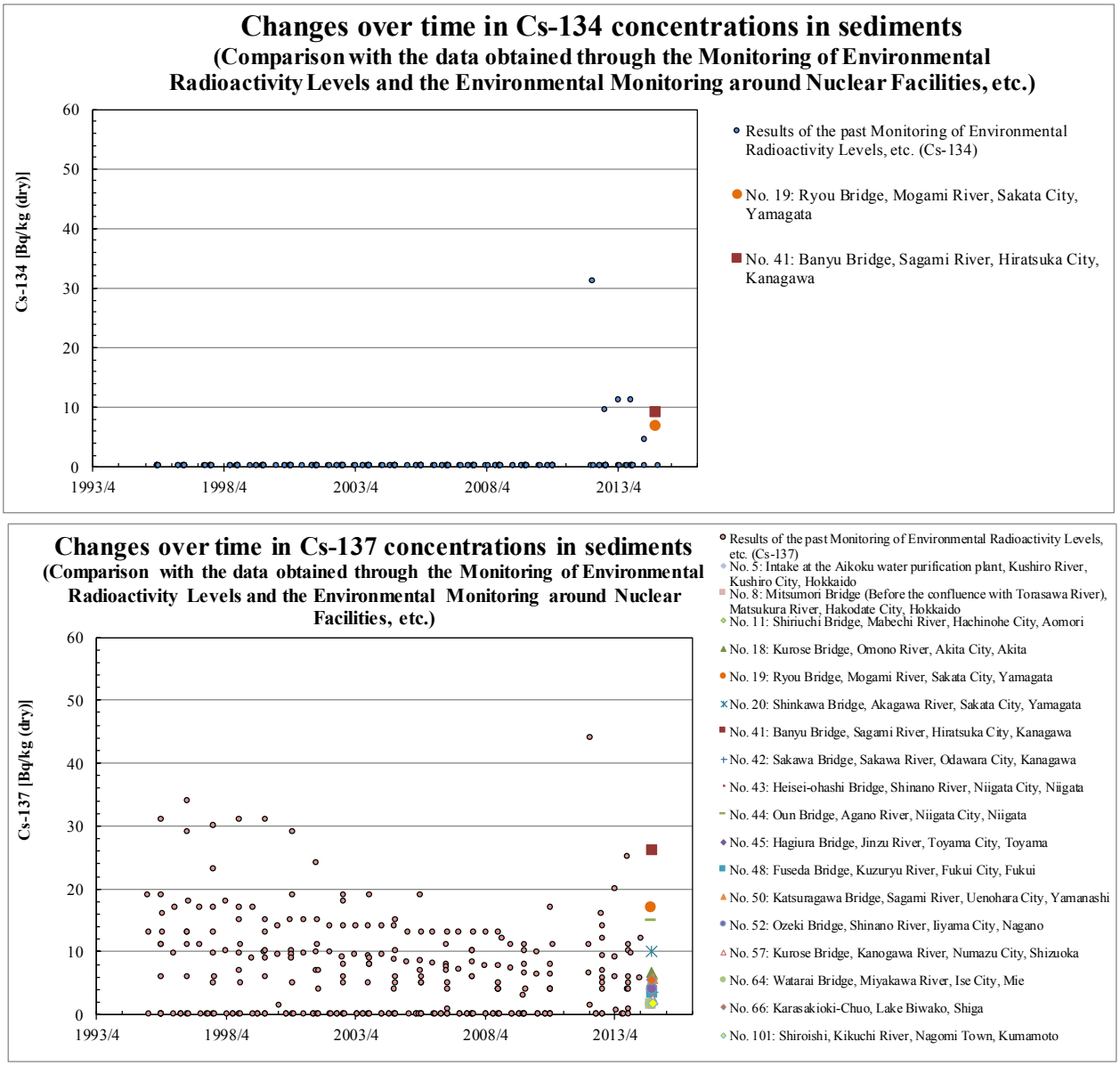
(*) White small circles show the measurement results for March 11, 2011 to March 10, 2012, which were excluded from the past measurement records used as reference.

Figure 3.2-10 (iii) Comparison with the past Post-Earthquake Monitoring results for nearby locations

(iv) Comparison with the data obtained through the Monitoring of Environmental Radioactivity Levels, etc.

Regarding locations where measured values did not exceed the range of past measurement records, the measured values in the latest monitoring were compared with the data obtained through the Monitoring of Environmental Radioactivity Levels, etc. to check the concentration levels (see Figure 3.2-11).

Cs-134 and Cs-137 were detected at Location No.19 (Ryou Bridge, Mogami River, Sakata City, Yamagata Prefecture) and Location No. 41 (Banyu Bridge, Sagami River, Hiratsuka City, Kanagawa Prefecture), but measured values were all within the measurement trends after the Fukushima NPS Accident. In Hokkaido, Chubu, Kinki, and Kyushu blocks, only Cs-137 was detected at concentration levels within the measurement trends after the Fukushima NPS Accident.

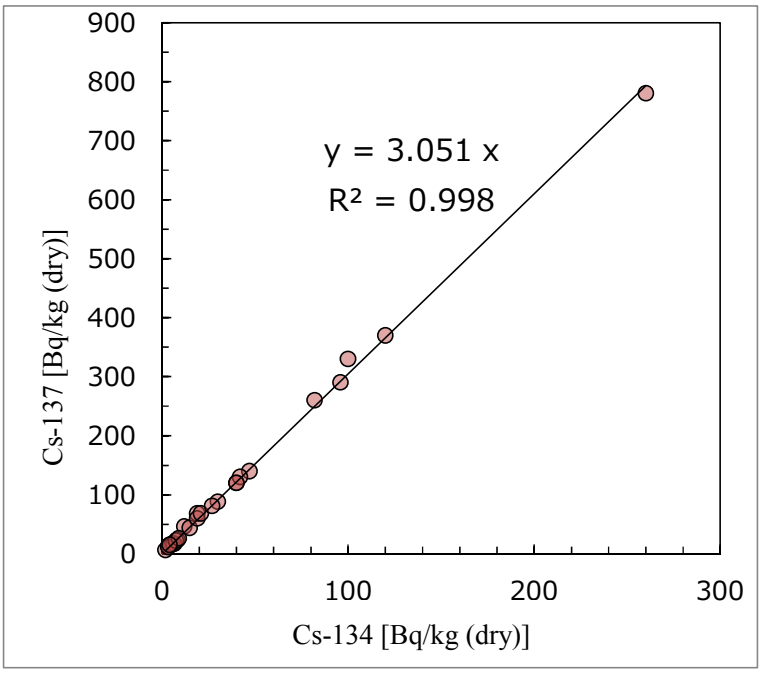


(*) Upper: Cs-134; Lower: Cs-137

(*) The measurement results for March 11, 2011 to March 10, 2012, which were excluded from the past measurement records used as reference, are not indicated.

Figure 3.2-11 (iv) Comparison with the data obtained through the Monitoring of Environmental Radioactivity Levels, etc.

Regarding locations where both Cs-134 and Cs-137 were detected (all in the Tohoku and Kanto blocks), a good correlation was observed in the activity concentration ratios of Cs-137 and Cs-134. The calculated activity concentration ratio was 3.1. When assuming that detected Cs-134 and Cs-137 are those discharged due to the Fukushima NPS Accident, this ratio could be found to be close to the theoretical ratio (approx. 3) as of September 2014 after the discharge in March 2011 (see Figure 3.2-12). This suggests that Cs-134 and Cs-137 detected in sediment samples collected in the Tohoku and Kanto blocks were derived from the Fukushima NPS Accident.



Radionuclide	Half-life (year)	Mar. 2011	Sep. 2011	Mar. 2012	Sept. 2012	Mar. 2013	Sept. 2013	Mar. 2014	Sept. 2014
Cs-134 (relative concentration)	2.062	1	0.85	0.71	0.60	0.51	0.43	0.36	0.31
Cs-137 (relative concentration)	30.07	1	0.99	0.98	0.97	0.95	0.94	0.93	0.92
Cs-137/Cs-134		1	1.17	1.37	1.60	1.87	2.19	2.56	2.99

Figure 3.2-12 Concentration ratio (Cs-137/Cs-134) [Sediments (public water areas)]

(Note: Changes over the years in concentration ratios (Cs-137/Cs-134) in consideration of half-life periods)

(*) The concentration ratio at the time of the latest monitoring (around September 2014) is estimated to be approximately 3 (highlighted in yellow in the table above).

Given these facts, Cs-134 and Cs-137 detected in sediment samples from public water areas were mostly derived from the Fukushima NPS Accident, except for some locations for which causal relations were unclear, but detected values were all within the measurement trends of the Post-Earthquake Monitoring being conducted at present.

2) Cs-134 and Cs-137 in water

Cs-134 or Cs-137 were detected at 26 out of the 110 locations where water samples from public water areas were collected (a total of 26 locations: both Cs-134 and Cs-137 were detected at 18 locations (all in the Tohoku and Kanto blocks) and only Cs-137 was detected at eight locations). However, the maximum values were 0.022 Bq/L for Cs-134 and 0.065 Bq/L for Cs-137, both of which were smaller by one digit or more than the lower detection limit (1 Bq/L) applied for the Post-Earthquake Monitoring and were below the range of past measurement records obtained through the Monitoring of Environmental Radioactivity Levels, which were used for comparison, (0.041 Bq/L for Cs-134 and 0.084 Bq/L for Cs-137).

Regarding the 18 locations (all in the Tohoku and Kanto blocks) where both Cs-134 and Cs-137 were detected, the concentration ratio (Cs-137/Cs-134) calculated in the same manner as in the case of sediment samples also showed a good correlation. The obtained concentration ratio was 2.9. When assuming that detected Cs-134 and Cs-137 were those discharged due to the Fukushima NPS Accident, this ratio was found to be close to the theoretical ratio (approx. 3) as of September 2014 after the discharge in March 2011 (see Figure 3.2-13). This suggests that Cs-134 and Cs-137 detected in water samples collected in the Tohoku and Kanto blocks were derived from the Fukushima NPS Accident.

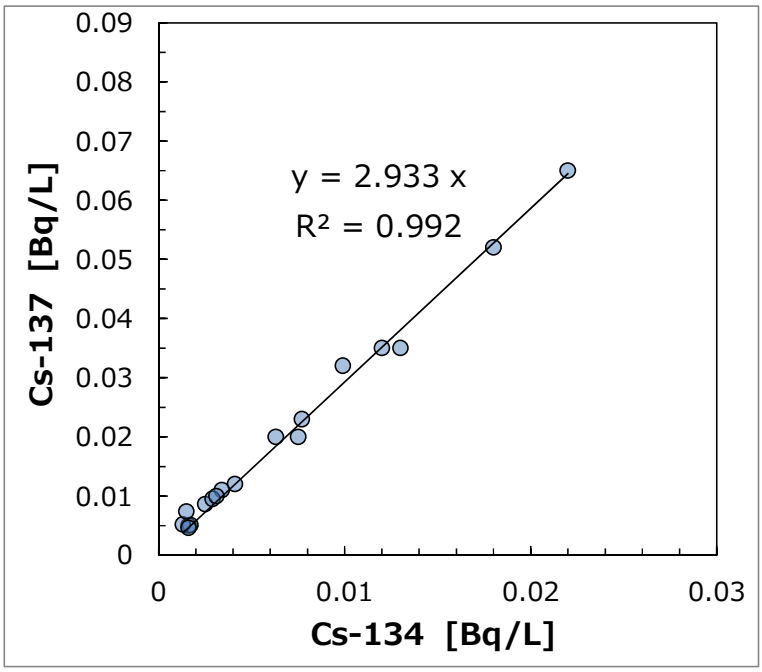


Figure 3.2-13 Concentration ratio (Cs-137/Cs-134) [Water (public water areas)]

3) Cs-134 and Cs-137 in groundwater

Cs-134 and Cs-137 were not detectable in groundwater samples collected at any of the 109 locations (detection limit: approx. 0.001 to 0.002 Bq/L).

3.3 Survey to check annual variation

At two locations[8] (both in rivers), namely, Location No.28 (Toneozeki Weir, Tonegawa River, Chiyoda Town, Gunma Prefecture) and Location No. 83 (Kasumi Bridge, Takahashi River, Kurashiki City, Okayama Prefecture), surveys were conducted four times during the period from August 25, 2014 to January 26, 2015.

Radionuclides were detected as shown in Table 3.3-1 and Table 3.3-2. Changes in concentration levels of radionuclides that were detected on all four occasions are shown in Figure 3.3-1 and Figure 3.3-2. No significant variation was observed for uranium and thorium series naturally occurring radionuclides as a whole (Ac-228, Pb-212, Pb-214, Tl-208, Bi-212, and Bi-214), nor for total β radioactivity and K-40 in particular.

Coefficients of variation[9] (sample standard deviation/average) are also indicated in Table 3.3-1 and Table 3.3-2 to show the dispersion of detected values. Regarding total β radioactivity and K-40, coefficients of variation were below 10% for sediment samples and were around 10 to 30% for water samples, while regarding radioactive cesium, they were around 20% both for sediment samples and water samples. The Radioactive Material Monitoring in the Water Environment conducted in FY2012[10] revealed that the variations in radioactive cesium concentration levels in river sediment samples (nine samples collected around the same time) were around 12% to 16%. The results of the latest monitoring for sediment samples were close to these figures although the survey period was different, and this suggests that variations depending on survey periods are of the same level as those depending on locations.

Table 3.3-1 Detection of radioactive materials in four surveys conducted at the same location [water]

Location	Radionuclide	Water [Bq/L]				Coefficient of variation [%]
		First	Second	Third	Fourth	
No.28	Survey date	Aug. 25, 2014	Oct. 27, 2014	Dec. 15, 2014	Jan. 26, 2015	
	K-40	0.097	0.11	0.078	0.094	13.9
	Cs-134	0.0015	0.0020	<0.0010	0.0018	14.2
	Cs-137	0.0074	0.0072	0.0048	0.0049	23.3
	Total β radioactivity	0.068	0.12	0.12	0.11	23.7

Location	Radionuclide	Water [Bq/L]				Coefficient of variation [%]
		First	Second	Third	Fourth	
No.83	Survey date	Aug. 30, 2014	Oct. 28, 2014	Dec. 15, 2014	Jan. 26, 2015	
	Be-7	<0.024	0.012	<0.0073	<0.0073	-
	K-40	0.034	0.045	<0.028	0.034	16.9
	Pb-212	<0.0019	<0.0021	<0.0019	0.0013	-
	Total β radioactivity	0.046	0.064	0.037	0.038	27.0

(*) Coefficients of variation are indicated only for radionuclides that were detected three times or more.

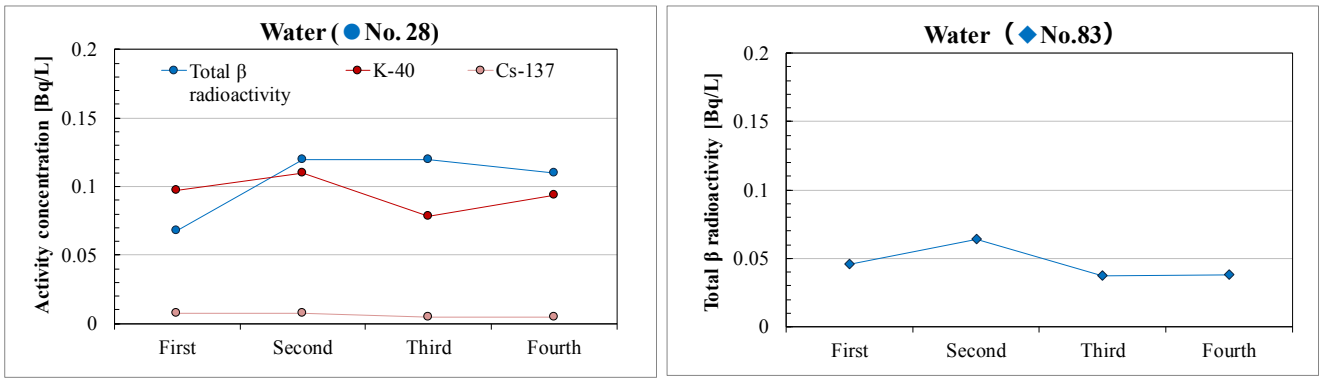


Figure 3.3-1 Detection of radioactive materials in four surveys conducted at the same location [water]

[8] It was decided to select one location each in eastern and western Japan. All 110 locations were first divided into two for convenience (Locations No. 1 to No. 55 were classified as eastern Japan and Locations No. 51 to No. 110 were classified as western Japan) and the two locations of the median number in respective categories were selected.

[9] In the report of March 2015, a coefficient of deviation was calculated by dividing the population standard deviation with the average. However, in light of the fact that samples for the latest monitoring were collected from the natural environment (population), a coefficient of deviation in this report was calculated by dividing the sample standard deviation by the average. The same applies hereinafter.

[10] Review on methods of the FY2012 Radioactive Material Monitoring in the Water Environment (March 2013)

Table 3.3-2 Detection of radioactive materials in four surveys conducted at the same location [sediments]

Location	Radionuclide	Sediments [Bq/kg (dry)]				Coefficient of variation [%]
		First	Second	Third	Fourth	
	Survey date	**Aug. 25, 2014**	**Oct. 27, 2014**	**Dec. 15, 2014**	**Jan. 26, 2015**	
No.28	Ac-228	15	9.8	12	15	19.6
	Bi-214	<12	11	13	13	9.4
	K-40	290	330	280	280	8.1
	Pb-212	18	16	21	16	13.3
	Pb-214	11	11	16	11	20.4
	Tl-208	16	12	13	14	12.4
	Cs-134	19	13	21	17	19.5
	Cs-137	60	44	76	61	21.7
	Total β radioactivity	410	350	350	380	7.7

Location	Radionuclide	Sediments [Bq/kg (dry)]				Coefficient of variation [%]
		First	Second	Third	Fourth	
	Survey date	**Aug. 30, 2014**	**Oct. 28, 2014**	**Dec. 15, 2014**	**Jan. 26, 2015**	
No.83	Ac-228	13	25	12	19	34.9
	Bi-212	42	34	23	28	25.8
	Bi-214	15	21	17	17	14.4
	K-40	870	830	910	770	7.1
	Pb-212	28	28	24	27	7.1
	Pb-214	21	23	19	15	17.5
	Ra-226	50	<42	36	<39	-
	Th-234	<30	<41	30	42	-
	Tl-208	25	20	21	25	11.6
	Total β radioactivity	1000	980	890	920	5.4

(*) Coefficients of variation are indicated only for radionuclides that were detected three times or more.

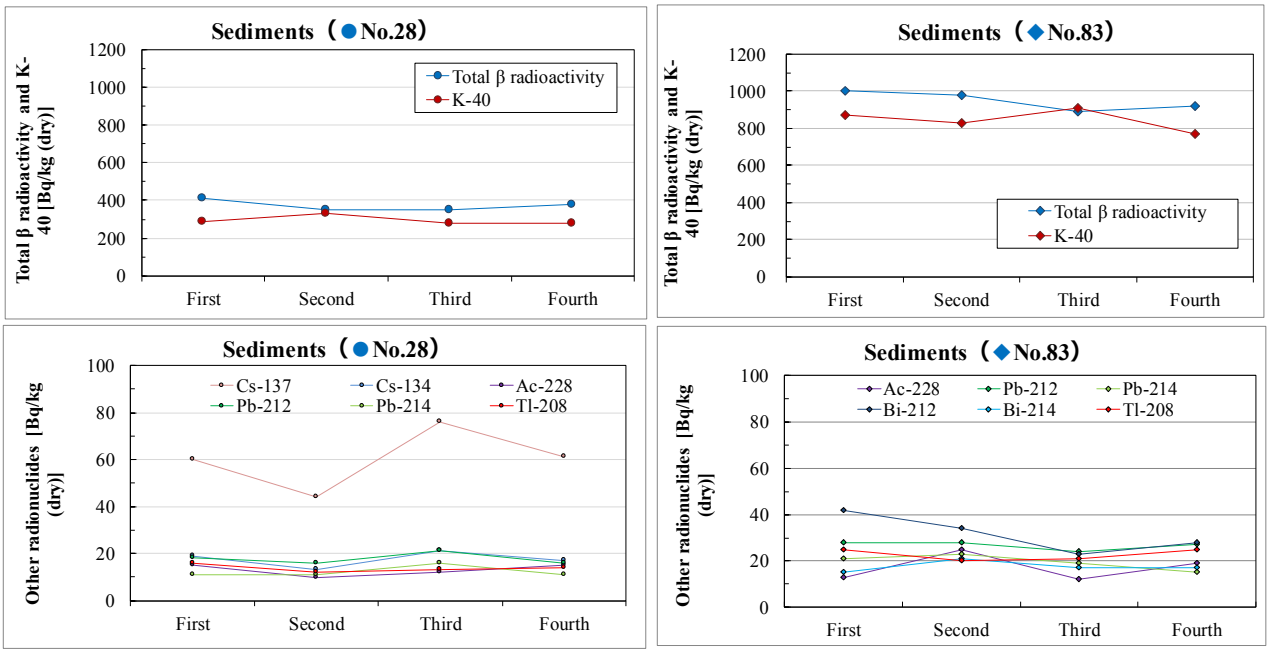


Figure 3.3-2 Detection of radioactive materials in four surveys conducted at the same location [sediments]

Part 2: Radioactive Material Monitoring in the Water Environment in and around Fukushima Prefecture (FY2011 to FY2014)

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 as shown in Figure 1.2-1.

(2) Targets

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

Radioactive concentrations in groundwater were also measured.

(3) Frequencies and periods

The monitoring for public water areas was conducted 2 to 10 times a year (varying by location) since August 2011.

The monitoring for groundwater was conducted 1 to 4 times a year (varying by location) since October 2011.

(4) Conducted analyses

Primarily, analyses targeting Cs-134 and Cs-137 were conducted.

Additionally, analyses on I-131, Sr-89, Sr-90 and other artificial radionuclides were also conducted for some of the collected samples.

(5) Compilation and evaluation of results

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

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

Public water areas: http://www.env.go.jp/jishin/monitoring/results_r-pw.html

Groundwater: http://www.env.go.jp/jishin/monitoring/results_r-gw.html

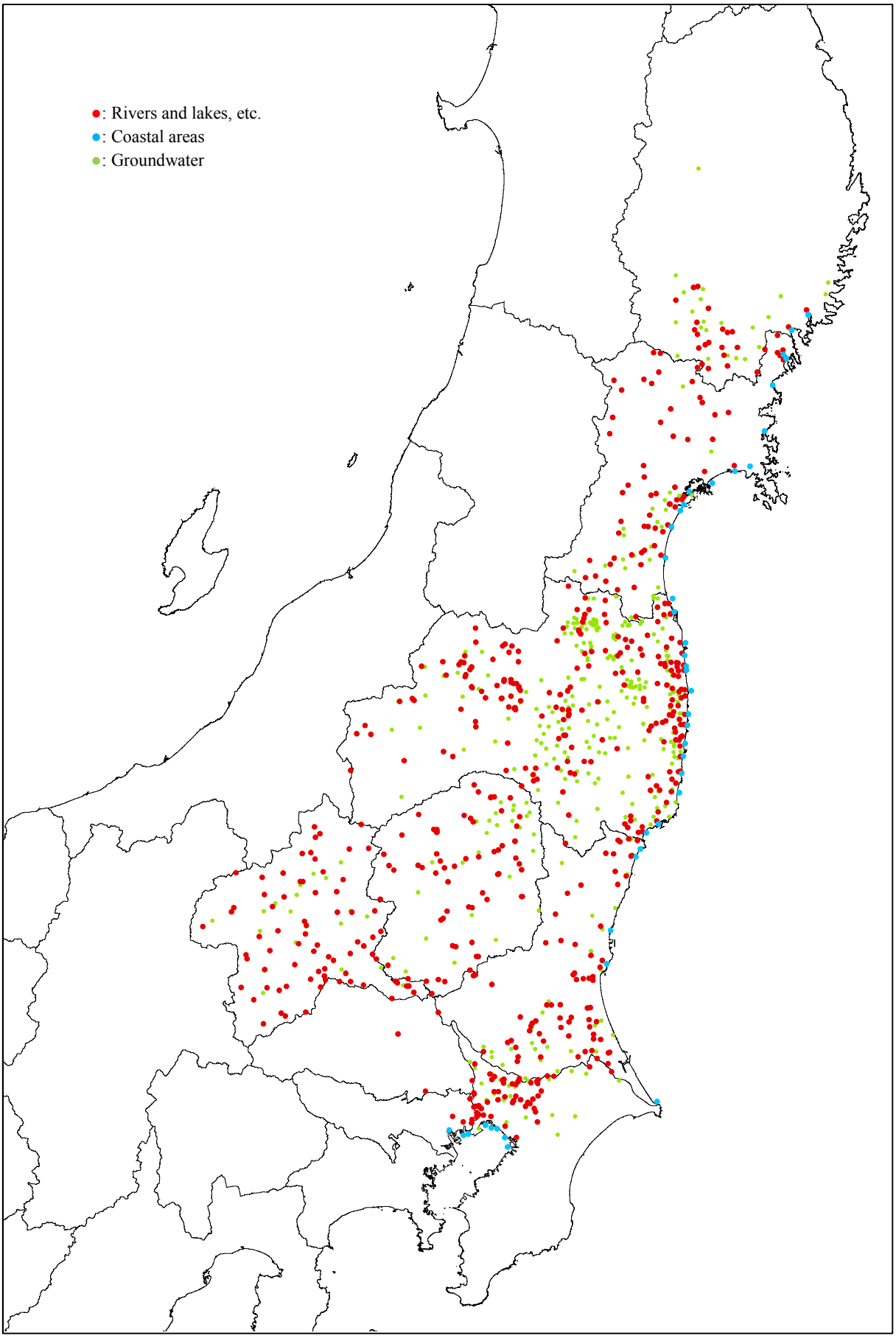


Figure 1.2-1 Map showing locations for the Post-Earthquake Monitoring

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 are conducted at chemical laboratories.

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 of the Water Quality Preservation Bureau, Ministry of the Environment)
- Sediment Survey Method (August 8, 2012; Notice Kansuitaisuihatsu No. 120725002 issued by the Director of the Environmental Management Bureau, Ministry of the Environment)
- Groundwater Quality Survey Method (September 14, 1989; Notice Kansuikan No. 189 issued by the Director 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

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

Additionally, analyses on I-131, 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 (dry)" in the case of sediment samples from public water areas. The measurement results were corrected for attenuation, and reported figures were activity concentrations as of the time of completing sampling.

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

Table 2.2-1 Detection limit targets for radionuclides for the radioactive material-related environmental monitoring in areas afflicted by the Great East Japan Earthquake

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 (dry)	Approx.1 Bq/L
Radioactive iodine (I-131)		Approx.1 Bq/L	Approx.10 Bq/kg (dry)	Approx.1 Bq/L
Radioactive strontium	Sr-90	—	Approx.1 Bq/kg (dry) (0.18 to 2.9 Bq/kg (dry))	Approx.1 Bq/L (*1)
	Sr-89	—	Approx.2 Bq/kg (dry)	Approx.1 Bq/L (*2)
Other artificial radionuclides (*3)		—	Ag-110m: 7 to 180 Bq/kg (dry) Sb-125: 130 to 330 Bq/kg (dry)	

*1: 0.0002 Bq/L for the FY2011 monitoring
*2: 0.001 Bq/L for the FY2011 monitoring
*3: Vary by type of radionuclides; The above table shows detection limit targets for Ag-110m and Sb-125, which were detected in the monitoring (see Chapter 5.3 of the main text).

3. Outline of the Results

The results of the Post-Earthquake Monitoring conducted in Tokyo Metropolis and other nine prefectures during the period from August 2011 to December 2014 were as outlined below.

3.1 Detection of radioactive cesium

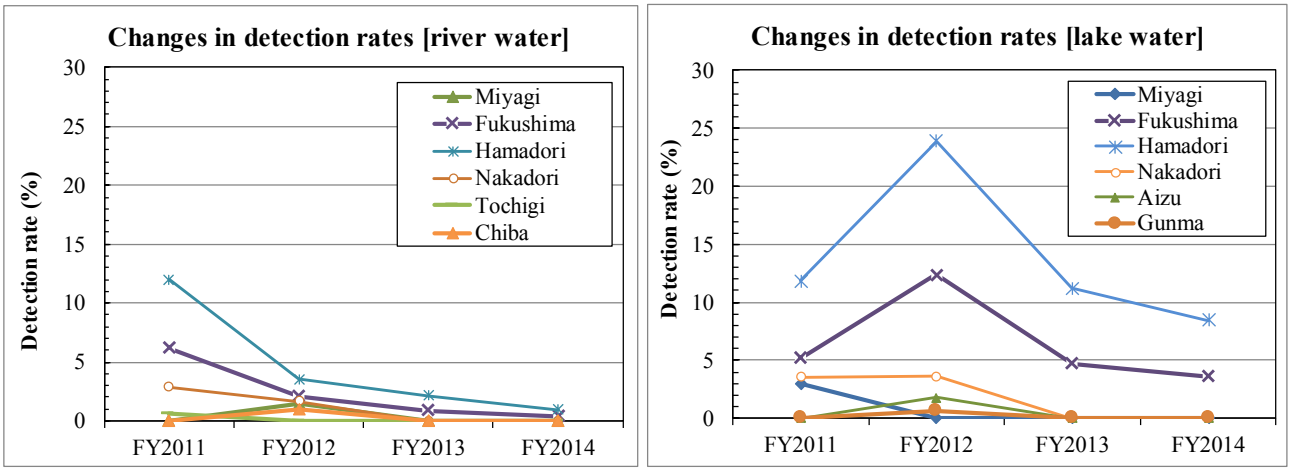
Radioactive cesium (the total of Cs-134 and Cs-137) was detected as follows.

(1) Public water areas (water)

Detection rates of radioactive cesium were generally decreasing for river water samples (7,000 or more in total) and lake water samples (4,100 or more in total) collected in all surveyed prefectures. Radioactive cesium has not been detected in prefectures other than Fukushima Prefecture since FY2013 (see Figure 3.1-1).

The maximum concentration levels in the FY2014 monitoring was 1.6 Bq/L for river water samples (detection rate: 0.9%) and 34 Bq/L for lake water samples (detection rate: 8.5%).

Radioactive cesium was not detectable in any of the samples collected at coastal areas (1,700 or more in total).



(*) Data for Fukushima Prefecture are the total of those for Hamadori, Nakadori, and Aizu. The same applies in other figures below.

Figure 3.1-1 Changes in detection rates of radioactive cesium in water samples from public water areas (left: rivers; right: lakes)

(2) Groundwater

Radioactive cesium was not detectable in groundwater samples (2,600 or more in total) collected in any of the surveyed prefectures, except for the two samples collected in Fukushima Prefecture wherein radioactive cesium was detected at 2 Bq/L and 1 Bq/L, respectively, in 2011.

(3) Public water areas (sediments)

1) Overall trends

Radioactive cesium was detected at the rate of over 80% in river sediment samples (7,000 or more in total), at over 90% in lake sediment samples (2,400 or more in total), and at over 50% in sediment samples collected

in coastal areas.

Concentration levels were generally decreasing for all of the samples collected in rivers, lakes, and coastal areas, and the decreasing trend was especially notable in samples collected in rivers.

2) Situation by location

As radioactive cesium was detected at many locations, the situations 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 sediment samples by sampling location."

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

Locations where concentration levels were relatively high (Category A or B: upper 10 percentile) were found in Hamadori in Fukushima Prefecture, as well as in Nakadori and Aizu in Fukushima Prefecture, and also in Miyagi, Chiba, and Ibaraki Prefectures.

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

<Rivers>

Category	Percentile (see Figure 4.3-1))	[River sediments] Range [Bq/kg (dry)]	Number of locations												
			Iwate	Miyagi	Fukushima Prefecture			Ibaraki	Tochigi	Gunma	Chiba	Saitama	Tokyo	Total	
					Hamadori Area	Nakadori Area	Aizu							Number of locations	Percentage
A	Upper 5 percentile	2,613 or more	0	0	15	0	0	1	0	0	3	0	0	19	4.8
B	Upper 5 to 10 percentile	1,326 ～ 2,613	0	1	2	3	1	2	0	0	11	0	0	20	5.1
C	Upper 10 to 25 percentile	522 ～ 1,326	0	7	13	15	1	9	0	1	14	0	0	60	15.2
D	Upper 25 to 50 percentile	188 ～ 522	2	15	10	10	6	27	11	4	12	0	2	99	25.0
E	Lower 50 percentile	188 or less	20	20	13	16	18	14	45	43	7	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 Prefecture	Fukushima Prefecture			Ibaraki	Tochigi	Gunma	Chiba	Total	
				Hamadori Area	Nakadori Area	Aizu					Number of locations	Percentage
A	Upper 5 percentile	26,707 or more	0	8	0	0	0	0	0	0	8	4.9
B	Upper 5 to 10 percentile	20,599 ～ 26,707	0	8	0	0	0	0	0	0	8	4.9
C	Upper 10 to 25 percentile	2,913 ～ 20,599	0	16	6	0	1	1	0	1	25	15.2
D	Upper 25 to 50 percentile	803 ～ 2,913	6	6	4	8	4	1	11	1	41	25.0
E	Lower 50 percentile	803 or less	15	3	2	23	14	6	13	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 locations	Percentage
A	Upper 5 percentile	533 or more	0	1	1	0	0	0	2	4.8
B	Upper 5 to 10 percentile	462 ～ 533	0	0	2	0	0	0	2	4.8
C	Upper 10 to 25 percentile	276 ～ 462	0	1	3	0	0	2	6	14.3
D	Upper 25 to 50 percentile	79 ～ 276	0	5	5	0	0	0	10	23.8
E	Lower 50 percentile	79 or less	2	5	4	5	5	1	22	52.4
Total			2	12	15	5	5	3	42	100.0

Changes in detected concentration levels were compiled as shown in Figure 3.1-2, which shows Table 4.3-45 graphically.

At most monitoring locations for rivers, a decreasing trend was observed. For lakes, concentration levels were generally decreasing or unchanged at most locations with some locations showing fluctuations. There were also some locations where an increasing trend was observed. For coastal areas, a decreasing trend was observed at most locations with some locations showing fluctuations.

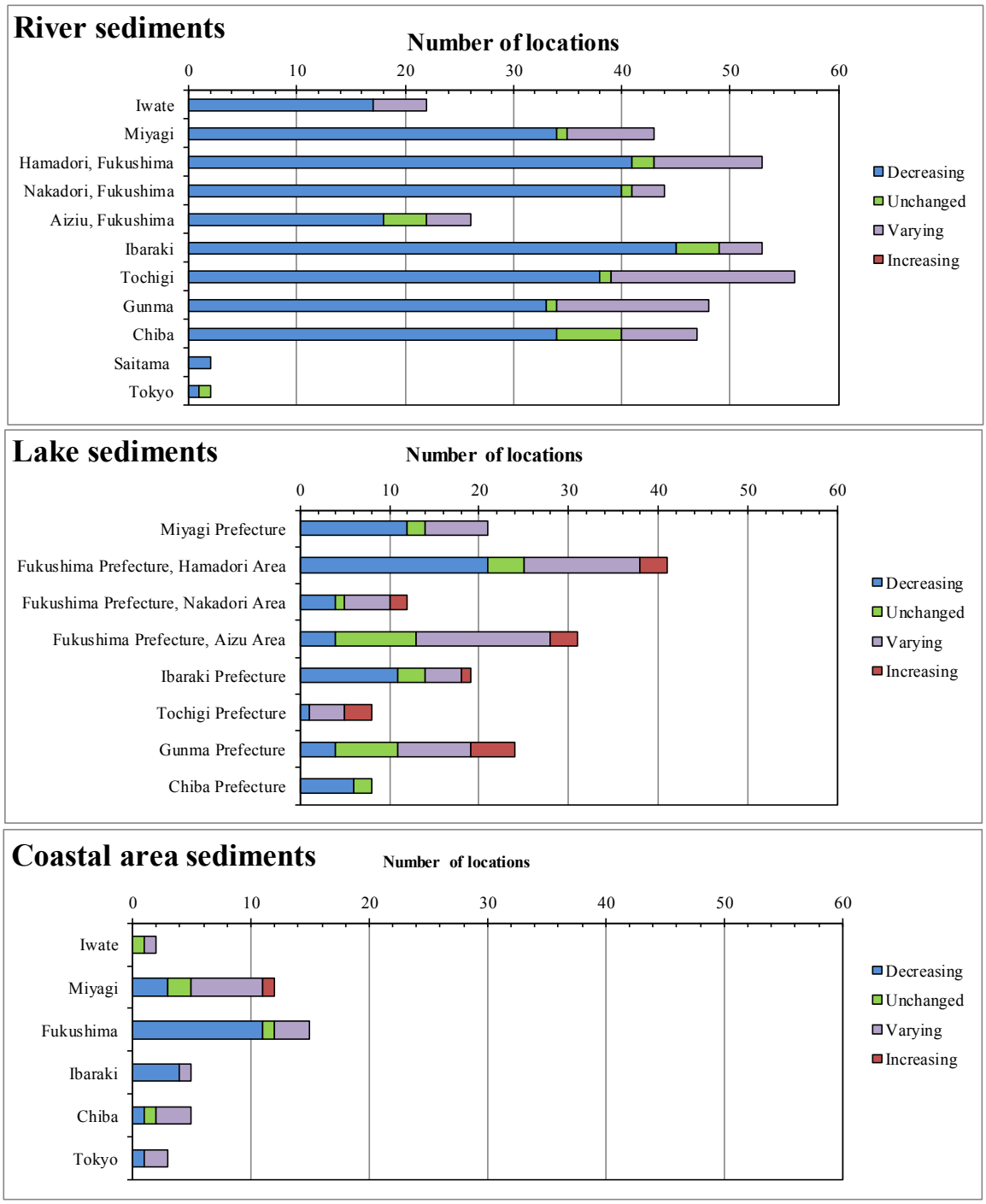


Figure 3.1-2 Changes in detected concentration levels of radioactive materials in sediment samples from public water areas (rivers, lakes, and coastal areas)

3.2 Detection of radionuclides other than radioactive cesium

(1) I-131

I-131 was not detectable in any of the monitoring surveys conducted from FY2011 to FY2012 for water samples from public water areas (approx. 3,000 samples from rivers, approx. 1,400 samples from lakes, and approx. 700 samples from coastal areas) and sediment samples from public water areas (approx. 3,000 samples from rivers, approx. 900 samples from lakes, and approx. 400 samples from coastal areas) as well as in any of the monitoring surveys conducted from FY2011 to FY2014 for groundwater samples (approx. 3,800 samples) (detection limit: 1 Bq/L for water and 10 Bq/kg for sediments).

(2) Sr-89 and Sr-90

Sr-90 was surveyed in the monitoring surveys conducted from FY2011 to FY2012 for sediment samples from public water areas (rivers, lakes, and coastal areas) (approx. 300 samples in total) and for groundwater samples (approx. 190 samples in total). As a result, Sr-90 was detected in some of the sediment samples from public water areas, but concentration levels were generally decreasing (see Figure 3.2-1).

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) and for groundwater samples (a total of approx. 190 samples surveyed from FY2011 to FY2014) (detection limit: 1 Bq/L for water and 2 Bq/kg for bottom sediments).

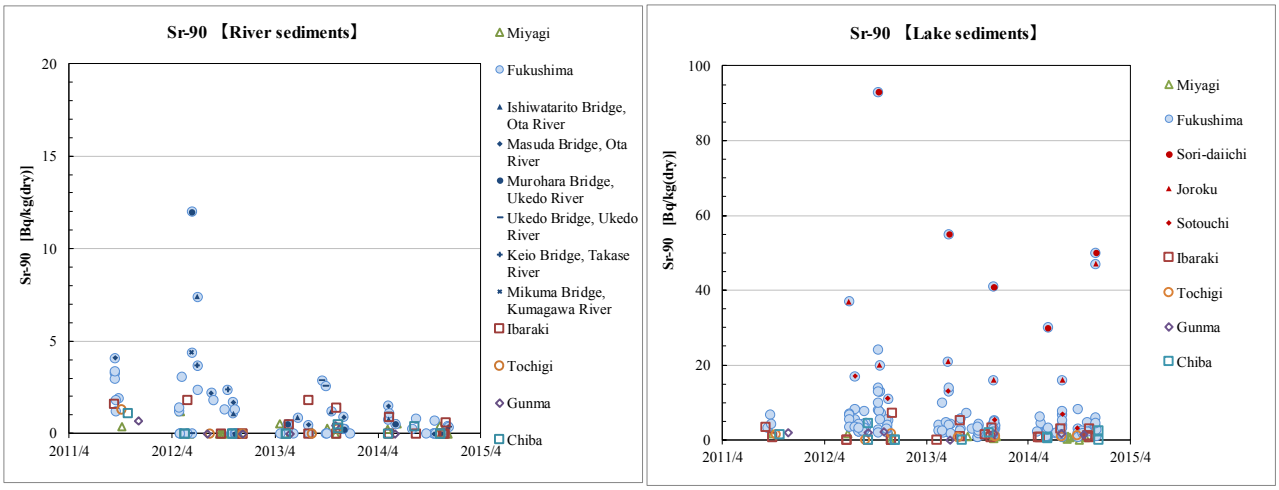


Figure 3.2-1 Detection of Sr-90 in sediment samples from public water areas (left: rivers; right: lakes)

(3) Other radionuclides

Ag-110m and Sb-125 were detected in FY2011 and FY2012 at detection rates below 1% within a total of over 10,000 samples surveyed from FY2011 to FY2014. They were detected near the Fukushima Daiichi NPS. Since FY2013, neither Ag-110m nor Sb-125 has been detectable.

4. Results (Radioactive Cesium (Cs-134 and Cs-137))

4.1 Water

(1) Public water areas

1) Rivers

Detection of radioactive cesium (Cs-134 and Cs-137) in river water samples was as shown in Table 4.1-1 and Figure 4.1-1.

Detection rates as a whole were generally decreasing since FY2011, and radioactive cesium was not detectable in FY2014 except in Hamadori in Fukushima Prefecture.

Detected values (the total of Cs-134 and Cs-137) were also in decline since FY2011. Radioactive cesium was detected in Hamadori in Fukushima Prefecture at a level of 1.6 Bq/L at the maximum in FY2014 but was not detectable in other locations (detection limit: 1 Bq/L for both Cs-134 and Cs-137).

2) Lakes

Detection of radioactive cesium (Cs-134 and Cs-137) in lake water samples was as shown in Table 4.1-2 and Figure 4.1-2.

Detection rates as a whole were decreasing since FY2012, and radioactive cesium was not detectable since FY2013 except in Hamadori in Fukushima Prefecture.

Detected values (the total of Cs-134 and Cs-137) were also in decline since FY2012. Radioactive cesium was detected in Hamadori in Fukushima Prefecture at a level of 34 Bq/L at the maximum in FY2014 but was not detectable in other locations (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 was as shown in Table 4.1-3.

Radioactive cesium was not detectable at any surveyed locations (detection limit: 1 Bq/L for both Cs-134 and Cs-137).

(2) Groundwater

Detection of radioactive cesium (Cs-134 and Cs-137) in groundwater samples was as shown in Table 4.1-4.

The monitoring surveys were conducted for approx. 2,600 samples collected in eight prefectures. In FY2011, Cs-134 and Cs-137 were detected only at one location and two locations (all in Fukushima Prefecture), respectively, at a level of 1 Bq/L, which is the detection limit for radioactive cesium. In FY2012 onward, radioactive cesium was not detectable at any surveyed locations for groundwater.

<Note>

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

Radioactive cesium (total for Cs-134+Cs-137): 10 Bq/kg

・Reference 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, Labour and Welfare)

Radioactive cesium (total for Cs-134+Cs-137): 10 Bq/kg

Table 4.1-1 Detection of radioactive cesium in river water samples (by fiscal year)

Prefecture	FY2011				FY2012				FY2013				FY2014				Total			
	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)
Iwate	18	0	0.0	-	64	0	0.0	-	80	0	0.0	-	80	0	0.0	-	242	0	0.0	-
Yamagata	10	0	0.0	-	0	0	-	-	0	0	-	-	0	0	-	-	10	0	0.0	-
Miyagi	114	0	0.0	-	204	3	1.5	ND - 6.3	193	0	0.0	-	196	0	0.0	-	707	3	0.4	ND - 6.3
Fukushima	452	28	6.2	ND - 20	854	18	2.1	ND - 4.6	801	7	0.9	ND - 5.5	770	3	0.4	ND - 1.6	2877	56	1.9	ND - 20
Hamadori Area	192	23	12.0	ND - 20	342	12	3.5	ND - 4.6	325	7	2.2	ND - 5.5	326	3	0.9	ND - 1.6	1185	45	3.8	ND - 20
Nakadori Area	176	5	2.8	ND - 8.0	355	6	1.7	ND - 1.9	322	0	0.0	-	324	0	0.0	-	1177	11	0.9	ND - 8.0
Aizu	84	0	0.0	-	157	0	0.0	-	154	0	0.0	-	120	0	0.0	-	515	0	0.0	-
Ibaraki	128	0	0.0	-	214	0	0.0	-	212	0	0.0	-	212	0	0.0	-	766	0	0.0	-
Tochigi	161	1	0.6	ND - 1.0	277	0	0.0	-	276	0	0.0	-	274	0	0.0	-	988	1	0.1	ND - 1.0
Gunma	90	0	0.0	-	216	0	0.0	-	214	0	0.0	-	210	0	0.0	-	730	0	0.0	-
Saitama	2	0	0.0	-	8	0	0.0	-	8	0	0.0	-	8	0	0.0	-	26	0	0.0	-
Chiba	82	0	0.0	-	202	2	1.0	ND - 1.3	200	0	0.0	-	200	0	0.0	-	684	2	0.3	ND - 1.3
Tokyo	3	0	0.0	-	12	0	0.0	-	8	0	0.0	-	8	0	0.0	-	31	0	0.0	-
Total	1060	29	2.7	ND - 20	2051	23	1.1	ND - 6.3	1992	7	0.4	ND - 5.5	1958	3	0.2	ND - 1.6	7061	59	0.8	ND - 20

ND: Not detectable

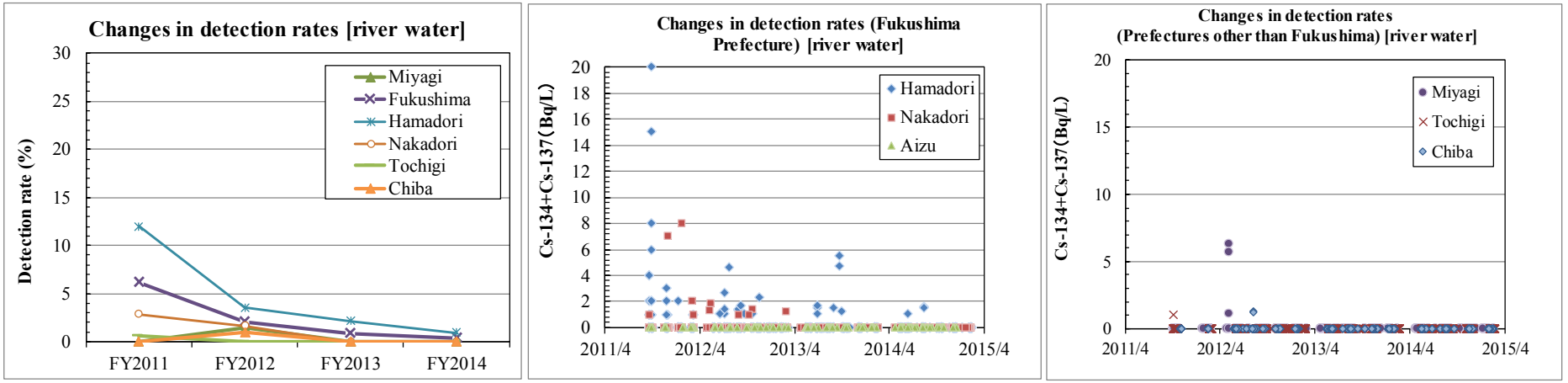


Figure 4.1-1 Detection rates of radioactive cesium in river water samples (left) and changes in detected values (center and right)

Table 4.1-2 Detection of radioactive cesium in lake water samples (by fiscal year)

Prefecture	FY2011				FY2012				FY2013				FY2014				Total			
	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)
Yamagata	4	0	0.0	-	0	0	-	-	0	0	-	-	0	0	-	-	4	0	0.0	-
Miyagi	34	1	2.9	ND - 3.0	90	0	0.0	-	118	0	0.0	-	114	0	0.0	-	356	1	0.3	ND - 3.0
Fukushima	211	11	5.2	ND - 27	581	72	12.4	ND - 100	761	36	4.7	ND - 47	799	29	3.6	ND - 33.8	2352	148	6.3	ND - 100
Hamadori Area	76	9	11.8	ND - 27	272	65	23.9	ND - 100	321	36	11.2	ND - 47	342	29	8.5	ND - 33.8	1011	139	13.7	ND - 100
Nakadori Area	56	2	3.6	ND - 5.0	83	3	3.6	ND - 1.2	109	0	0.0	-	113	0	0.0	-	361	5	1.4	ND - 5.0
Aizu	79	0	0.0	-	226	4	1.8	ND - 5.1	331	0	0.0	-	344	0	0.0	-	980	4	0.4	ND - 5.1
Ibaraki	48	0	0.0	-	93	0	0.0	-	152	0	0.0	-	152	0	0.0	-	445	0	0.0	-
Tochigi	24	0	0.0	-	54	0	0.0	-	62	0	0.0	-	64	0	0.0	-	204	0	0.0	-
Gunma	51	0	0.0	-	144	1	0.7	ND - 1.0	188	0	0.0	-	187	0	0.0	-	570	1	0.2	ND - 1.0
Chiba	32	0	0.0	-	50	0	0.0	-	53	0	0.0	-	50	0	0.0	-	185	0	0.0	-
Total	404	12	3.0	ND - 27	1012	73	7.2	ND - 100	1334	36	2.7	ND - 47	1366	29	2.1	ND - 33.8	4116	150	3.6	ND - 100

ND: Not detectable

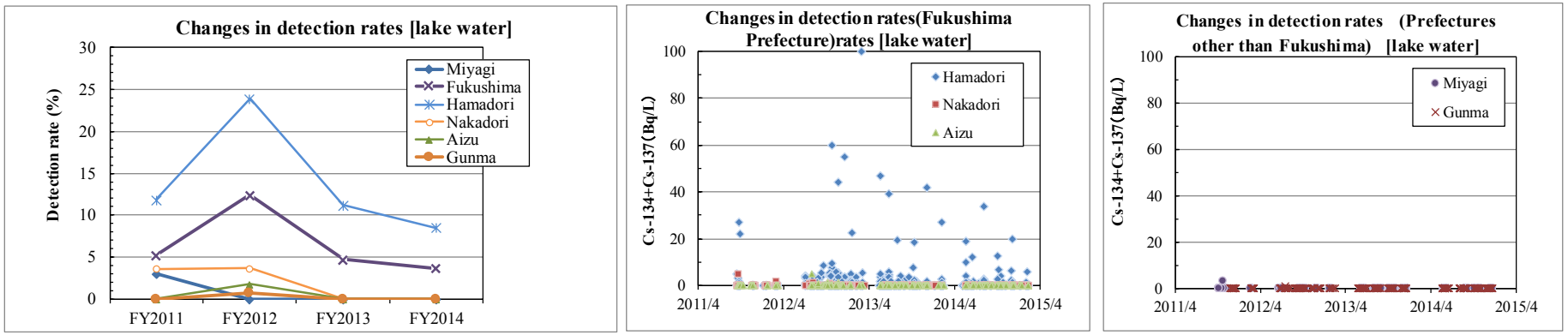


Figure 4.1-2 Detection rates of radioactive cesium in lake water samples (left) and changes in detected values (center and right)

Table 4.1-3 Detection of radioactive cesium in coastal area water samples (by fiscal year)

Prefecture	FY2011				FY2012				FY2013				FY2014				Total			
	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)
Iwate	5	0	0.0	-	8	0	0.0	-	8	0	0.0	-	8	0	0.0	-	29	0	0.0	-
Miyagi	94	0	0.0	-	96	0	0.0	-	102	0	0.0	-	104	0	0.0	-	396	0	0.0	-
Fukushima	116	0	0.0	-	189	0	0.0	-	300	0	0.0	-	300	0	0.0	-	905	0	0.0	-
Ibaraki	45	0	0.0	-	62	0	0.0	-	40	0	0.0	-	40	0	0.0	-	187	0	0.0	-
Chiba	0	0	-	-	62	0	0.0	-	46	0	0.0	-	46	0	0.0	-	154	0	0.0	-
Tokyo	0	0	-	-	38	0	0.0	-	36	0	0.0	-	36	0	0.0	-	110	0	0.0	-
Total	260	0	0.0	-	455	0	0.0	-	532	0	0.0	-	534	0	0.0	-	1781	0	0.0	-

Table 4.1-4 Detection of radioactive cesium in groundwater samples (by fiscal year)

Prefecture	FY2011				FY2012				FY2013				FY2014				Total			
	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)
Iwate	42	0	0.0	-	44	0	0.0	-	44	0	0.0	-	22	0	0.0	-	152	0	0.0	-
Miyagi	79	0	0.0	-	44	0	0.0	-	48	0	0.0	-	24	0	0.0	-	195	0	0.0	-
Yamagata	79	0	0.0	-	0	0	-	-	0	0	-	-	0	0	-	-	79	0	0.0	-
Fukushima	540	2	0.4	ND - 2.0	543	0	0.0	-	766	0	0.0	-	771	0	0.0	-	2620	2	0.1	ND – 2.0
Ibaraki	89	0	0.0	-	54	0	0.0	-	54	0	0.0	-	27	0	0.0	-	224	0	0.0	-
Tochigi	76	0	0.0	-	54	0	0.0	-	54	0	0.0	-	27	0	0.0	-	211	0	0.0	-
Gunma	40	0	0.0	-	40	0	0.0	-	42	0	0.0	-	21	0	0.0	-	143	0	0.0	-
Chiba	54	0	0.0	-	46	0	0.0	-	46	0	0.0	-	23	0	0.0	-	169	0	0.0	-
Total	999	2	0.2	ND - 2.0	825	0	0.0	-	1054	0	0.0	-	915	0	0.0	-	2620	2	0.1	ND - 2.0

ND: Not detectable

(*) In FY2011, both Cs-134 and Cs-137 were detected at one location and only Cs-137 was detected at one location at a level of 1 Bq/L (detection limit), respectively (see the main text).

4.2 Sediments

Detection of radioactive cesium (Cs-134 and Cs-137) in sediment samples from pubic water areas (rivers, lakes, and coastal areas) were as outlined below (detection limit was set at 10 Bq/kg).

(1) Public water areas (rivers)

Radioactive cesium (Cs-134 and Cs-137) detected in river sediment samples was as shown in Table 4.2-1 and Figure 4.2-1.

Detection rates varied between 60% and 100% with a slight decreasing trend observed over years. Detection rates remained over 80% in many of the surveyed prefectures in FY2014.

In the meantime, locations where detected values (the total activity concentrations of Cs-134 and Cs-137) were high were decreasing while the number of locations with low detected values was increasing. It was observed that detected values were generally decreasing over years.

(2) Public water areas (lakes)

Detection of radioactive cesium (Cs-134 and Cs-137) in lake sediment samples was as shown in Table 4.2-2 and Figure 4.2-2.

Detection rates varied between 83% and 100% and remained over 90% in all surveyed prefectures in FY2014 as well.

As a whole, locations where detected values (the total of Cs-134 and Cs-137) were high were decreasing and the number of locations with low detected values was increasing, although such trend was not as clear as in the case of river sediment samples.

In Hamadori in Fukushima Prefecture, high values exceeding 100,000 Bq/kg were observed even in FY2014.

(3) Public water areas (coastal areas)

Detection of radioactive cesium (Cs-134 and Cs-137) in coastal area sediment samples was as shown in Table 4.2-3 and Figure 4.2-3.

Detection rates varied between 50% and 100% and were over 50% in FY2014 in all surveyed prefectures except for those where only a small number of samples were collected.

A decrease in the number of locations where detected values (the total of Cs-134 and Cs-137) were high was not as clear for prefectures where only a small number of samples were collected, but in Fukushima and Miyagi Prefectures, the number of locations where detected values continued to be low was increasing, and detected values were thus decreasing over the years as a whole. However, in Miyagi Prefecture, there were locations where detected values exceeded 1,000 Bq/kg even in FY2014.

Table 4.2-1 Detection of radioactive cesium in river sediment samples (by fiscal year)

Prefecture	FY2011				FY2012				FY2013				FY2014				Total			
	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)
Yamagata	2	2	100.0	34 - 470	0	0	-	-	0	0	-	-	0	0	-	-	2	2	100.0	34 - 470
Miyagi	24	24	100.0	31 - 3,000	58	57	98.3	ND - 9,700	76	76	100.0	18 - 4,200	75	74	98.7	ND - 2,220	233	231	99.1	ND - 9,700
Fukushima	147	141	95.9	ND - 260,000	389	386	99.2	ND - 780,000	501	499	99.6	ND - 460,000	501	496	99.0	ND - 297,000	1538	1522	99.0	ND - 780,000
Hamadori Area	62	62	100.0	45 - 260,000	201	201	100.0	42 - 780,000	239	239	100.0	68 - 460,000	243	243	100.0	18 - 297,000	745	745	100.0	18 - 780,000
Nakadori Area	42	41	97.6	ND - 35,000	58	58	100.0	63 - 24,900	77	77	100.0	68 - 11,100	76	74	97.4	ND - 10,900	253	250	98.8	ND - 35,000
Aizu	43	38	88.4	ND - 2,020	130	127	97.7	ND - 10,200	185	183	98.9	ND - 13,400	182	179	98.4	ND - 7,800	540	527	97.6	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	76	75	98.7	ND - 3,170	224	222	99.1	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	32	32	100.0	134 - 8,700	102	100	98.0	ND - 8,700
Gunma	26	22	84.6	ND - 4,600	72	72	100.0	16 - 4,100	95	95	100.0	21 - 4,300	94	94	100.0	38 - 5,100	287	283	98.6	ND - 5,100
Chiba	16	16	100.0	440 - 7,400	32	32	100.0	460 - 8,200	32	32	100.0	151 - 5,700	32	32	100.0	121 - 5,700	112	112	100.0	121 - 8,200
Total	251	239	95.2	ND - 260,000	626	622	99.4	ND - 780,000	811	808	99.6	ND - 460,000	810	803	99.1	ND - 297,000	2498	2472	99.0	ND - 780,000

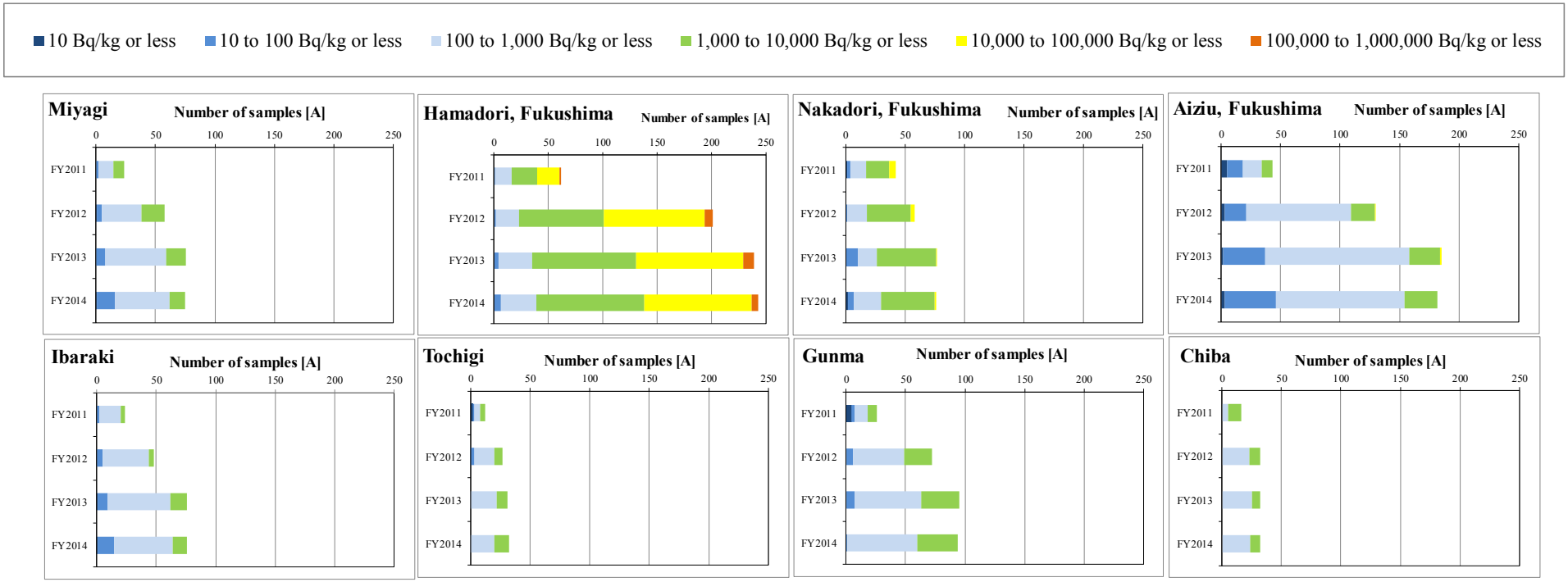


Figure 4.2-1 Detection of radioactive materials in river sediment samples (changes) (Prefectures where only a small number of samples were collected are omitted.)

Table 4.2-2 Detection of radioactive cesium in lake sediment samples (by fiscal year)

Prefecture	FY2011				FY2012				FY2013				FY2014				Total			
	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)
Iwate	18	18	100.0	62 - 990	64	63	98.4	ND - 1,040	80	71	88.8	ND - 340	80	68	85.0	ND - 301	242	220	90.9	ND - 1,040
Yamagata	10	6	60.0	ND - 132	0	0	-	-	0	0	-	-	0	0	-	-	10	6	60.0	ND - 132
Miyagi	113	111	98.2	ND - 11,100	199	191	96.0	ND - 3,700	192	182	94.8	ND - 2,450	196	187	95.4	ND - 1,620	700	671	95.9	ND - 11,100
Fukushima	441	421	95.5	ND - 92,000	847	808	95.4	ND - 165,000	795	750	94.3	ND - 45,000	770	724	94.0	ND - 24,700	2853	2703	94.7	ND - 165,000
Hamadori Area	192	191	99.5	ND - 92,000	336	329	97.9	ND - 165,000	325	321	98.8	ND - 45,000	326	318	97.5	ND - 24,700	1179	1159	98.3	ND - 165,000
Nakadori Area	176	174	98.9	ND - 30,000	354	353	99.7	ND - 20,000	316	316	100.0	10 - 8,300	324	317	97.8	ND - 3,060	1170	1160	99.1	ND - 30,000
Aizu	73	56	76.7	ND - 25,000	157	126	80.3	ND - 2,590	154	113	73.4	ND - 1,410	120	89	74.2	ND - 720	504	384	76.2	ND - 25,000
Ibaraki	128	125	97.7	ND - 5,800	214	208	97.2	ND - 4,800	212	209	98.6	ND - 4,200	212	208	98.1	ND - 1,640	766	750	97.9	ND - 5,800
Tochigi	159	150	94.3	ND - 4,900	275	267	97.1	ND - 1,780	276	245	88.8	ND - 1,540	274	231	84.3	ND - 820	984	893	90.8	ND - 4,900
Gunma	88	74	84.1	ND - 410	211	184	87.2	ND - 1,560	214	179	83.6	ND - 1,560	210	177	84.3	ND - 2,160	723	614	84.9	ND - 2,160
Saitama	2	2	100.0	35 - 530	8	8	100.0	12 - 540	8	8	100.0	10 - 67	8	7	87.5	ND - 68	26	25	96.2	ND - 540
Chiba	83	83	100.0	50 - 9,700	199	199	100.0	17 - 20,200	200	199	99.5	ND - 7,900	200	200	100.0	11 - 5,200	682	681	99.9	ND - 20,200
Tokyo	2	2	100.0	580 - 700	12	12	100.0	131 - 670	8	8	100.0	75 - 460	8	8	100.0	96 - 430	30	30	100.0	75 - 700
Total	1044	992	95.0	ND - 92,000	2029	1940	95.6	ND - 165,000	1985	1851	93.2	ND - 45,000	1958	1810	92.4	ND - 24,700	7016	6593	94.0	ND - 165,000

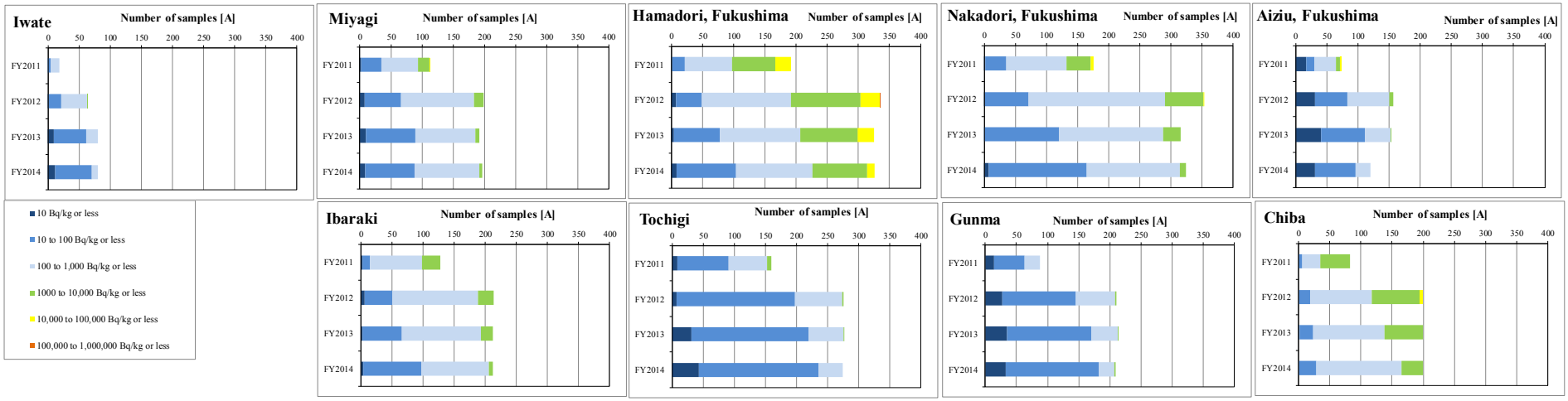


Figure 4.2-2 Detection of radioactive cesium in lake sediment samples (changes) (Prefectures where only a small number of samples were collected are omitted.)

Table 4.2-3 Detection of radioactive cesium in coastal area sediment samples (by fiscal year)

Prefecture	FY2011				FY2012				FY2013				FY2014				Total			
	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values (Bq/L)
Iwate	3	0	0.0	ND - 0	4	2	50.0	ND - 39	4	2	50.0	ND - 46	4	2	50.0	ND - 16	15	6	40.0	ND - 46
Miyagi	52	34	65.4	ND - 830	48	38	79.2	ND - 1,530	51	47	92.2	ND - 2,040	52	42	80.8	ND - 1,090	203	161	79.3	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	150	139	92.7	ND - 830	477	454	95.2	ND - 1,600
Ibaraki	28	27	96.4	ND - 230	31	17	54.8	ND - 69	20	11	55.0	ND - 67	20	11	55.0	ND - 67	99	66	66.7	ND - 230
Chiba	0	0	-	-	31	20	64.5	ND - 134	23	14	60.9	ND - 54	23	14	60.9	ND - 21	77	48	62.3	ND - 134
Tokyo	0	0	-	-	19	17	89.5	ND - 780	18	18	100.0	12 - 780	18	17	94.4	ND - 630	55	52	94.5	ND - 780
Total	163	138	84.7	ND - 1,240	230	187	81.3	ND - 1,530	266	237	89.1	ND - 2,040	267	225	84.3	ND - 1,090	926	787	85.0	ND - 2,040

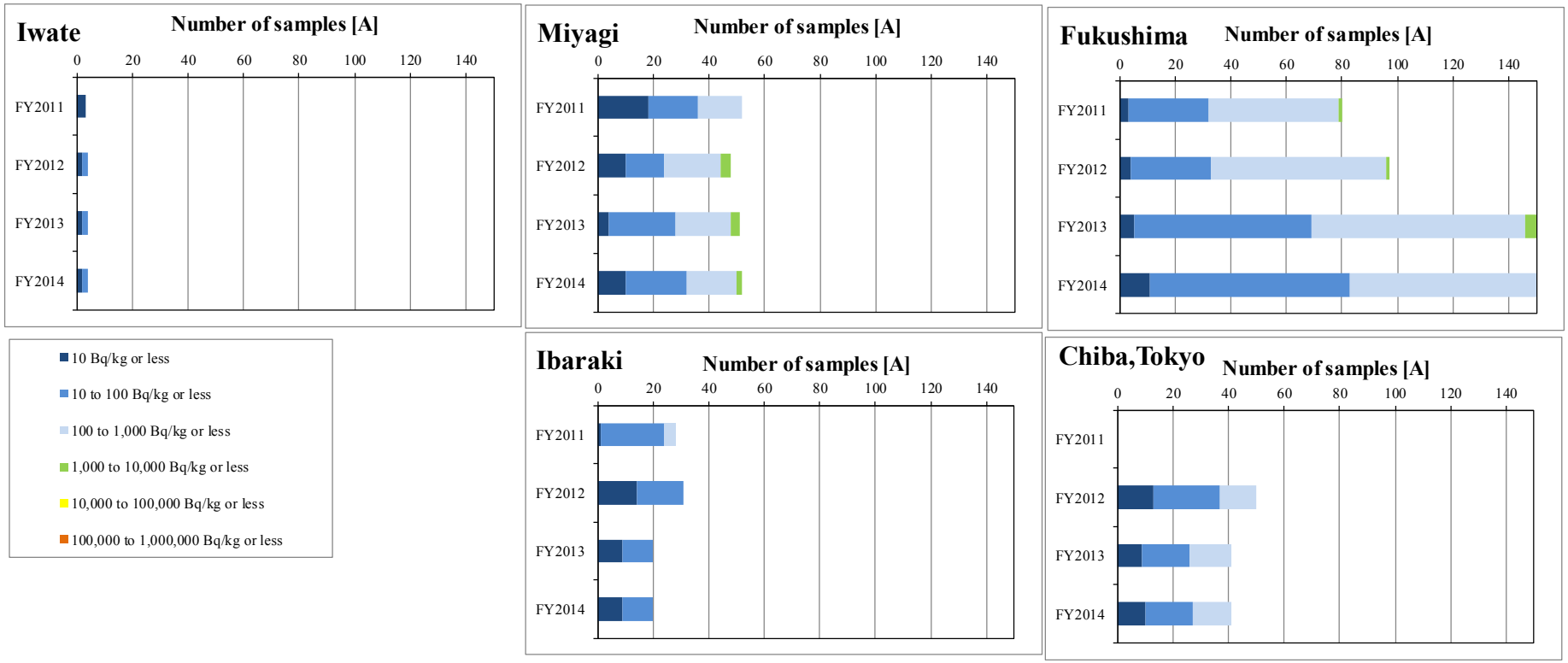


Figure 4.2-3 Detection of radioactive cesium in coastal area sediment samples (changes) (Prefectures where only a small number of samples were collected are omitted.)

4.3 Detection of radioactive materials in sediments by location

(1) Evaluation policy

Circumstances where radioactive materials were detected were compiled more in detail by sampling location, while separately considering the property of 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. The evaluation excluded Yamagata prefecture, where surveys have not been conducted since FY2012.

1) Detected concentration levels

i. Obtain the average for each location by using all survey results concerning concentrations of radioactive cesium (the total of Cs-134 and Cs-137) (arithmetic average calculated by assuming ND to be zero; hereinafter referred to as the "average for each location").

ii. Arrange all such averages (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 revealed a good correlation between them (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 thinking in order to evaluate their changes over the years.

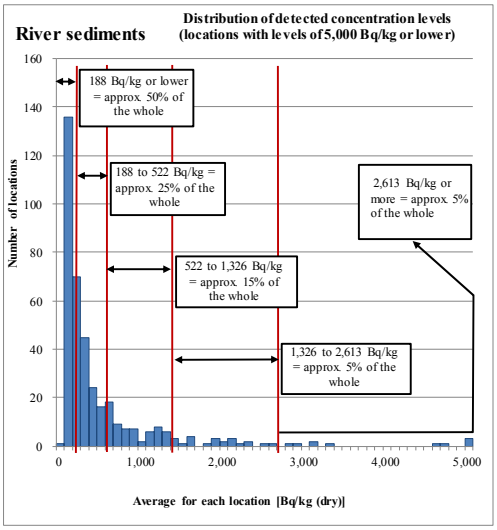
(i) Based on visual judgment of graphs that show changes in detected values over the years for each location, those negatively sloped are judged as "decreasing" and those positively sloped are judged as "increasing."

(ii) When visual judgment 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."

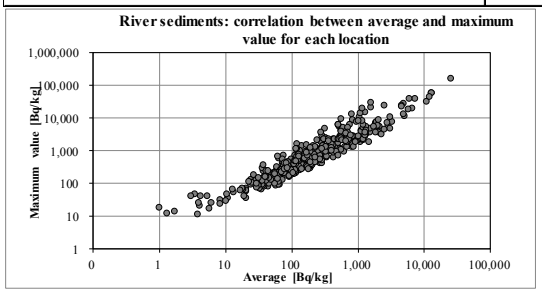
(iii) When neither a decreasing nor an increasing trend is clear (either the lower or upper 95% of the slope is negative and the other is positive), when a coefficient of variation (sample standard deviation/average) is less than 0.5, it is judged as "unchanged," and when a coefficient of variation is 0.5 or higher, it is judged as "varying."

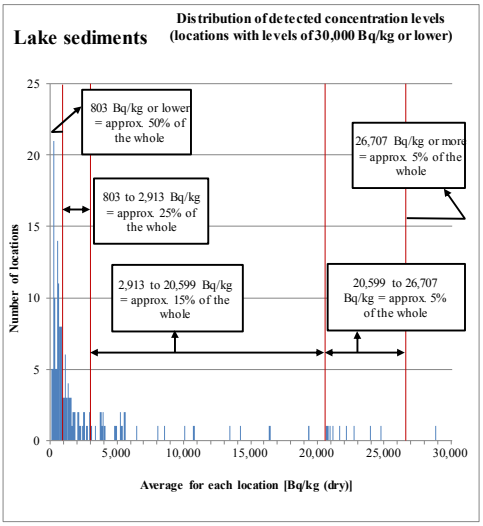
ii. However, data may show fluctuations, depending on minor differences in sampling points or properties of

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 judged to show an increasing trend based on the abovementioned thinking, it is necessary to accumulate further data and conduct careful examination for making a judgment on whether the increasing trend will be continuously observed in the relevant location.

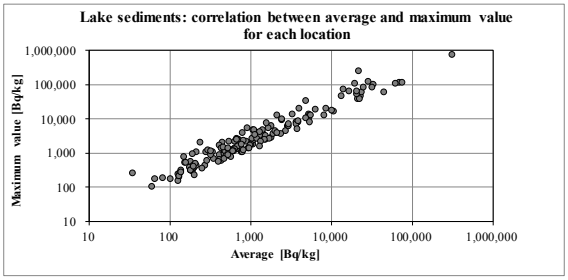


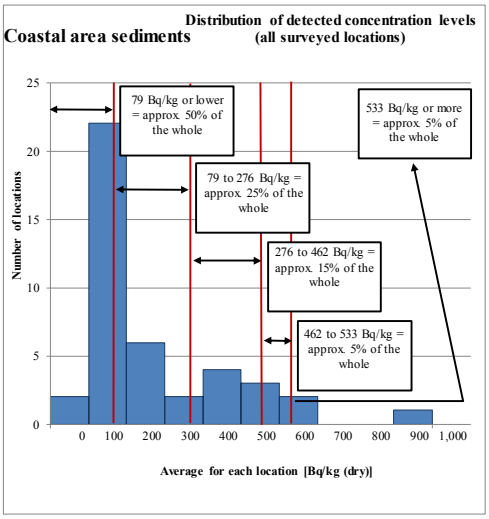
Category	Percentile	Range [River sediments] [Bq/kg (dry)]			Number of locations	Same as on the left. [%]
A	Upper 5 percentile	2,613	or more		19	4.8
B	Upper 5 to 10 percentile	1,326	-	2,613	20	5.1
C	Upper 10 to 25 percentile	522	-	1,326	60	15.2
D	Upper 25 to 50 percentile	188	-	522	99	25.0
E	Lower 50 percentile	188	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	26,707	or more		8	4.9
B	Upper 5 to 10 percentile	20,599	-	26,707	8	4.9
C	Upper 10 to 25 percentile	2,913	-	20,599	25	15.2
D	Upper 25 to 50 percentile	803	-	2,913	41	25.0
E	Lower 50 percentile	803	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	533	or more		2	4.8
B	Upper 5 to 10 percentile	462	-	533	2	4.8
C	Upper 10 to 25 percentile	276	-	462	6	14.3
D	Upper 25 to 50 percentile	79	-	276	10	23.8
E	Lower 50 percentile	79	or less		22	52.4
Total					42	100.0

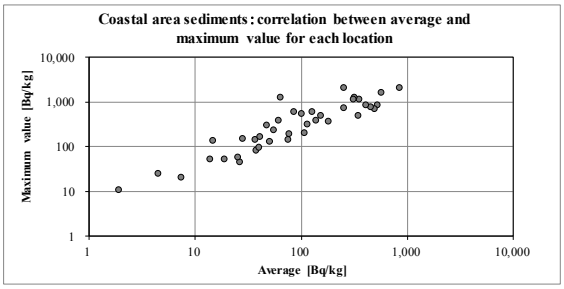


Figure 4.3-1 Categories based on the average for each location
(left: picture showing means of categorization; upper right: results of categorization[11]; lower right correlation between average and maximum value for each location)

[11] Setting of boundary values: The average of the minimum value of the upper category and the maximum value of the lower category is adopted as the boundary value between the relevant upper category and lower category.

(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 7 to 13 times from December 2011 to February 2015 for river sediment samples collected at 22 locations (this analysis excludes the survey results at one location where the survey was conducted only in 2011).

Regarding concentration levels of detected values, two locations were categorized into Category D and 20 locations were categorized into Category E (see Table 4.3-1 and Table 4.3-2).

Concentration levels were generally decreasing at 17 locations but were generally unchanged or varying at five 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	2	No.3、No.16
E	Lower than upper 25 to 50 percentile (lower 50%)	20	No.1、No.2、No.4、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、No.22

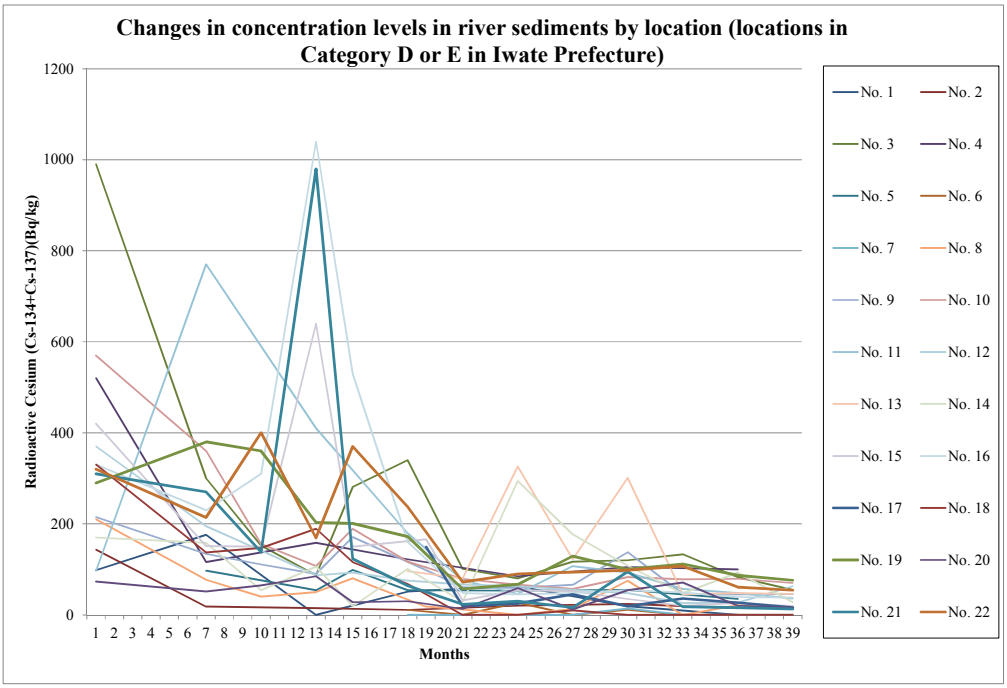


Figure 4.3-2 Changes in concentration levels over the years at respective locations (Iwate Prefecture: river sediments)

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

Location					River sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																																																
No.		Water area	Location	Municipality	FY2011								FY2012												FY2013												FY2014												Changes	Average (*2)	No.	(*2)	Trends (*3)
					8	9	10	11	12	1	2	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	4	5	6	7	8	9	10	11	12	1	2	3					
1		Sakari River Lower Reaches	Sano Bridge	Ofunato City					98						176						0					51						63						19						0						58	1	1.08	Decreasing
2		Kesen River	Aneha Bridge	Rikuzentakada City					143						18						15					11						20						24						15						35	2	1.36	Decreasing
3		Okawa River	Prefectural border with Miyagi	Ichinoseki City					990						300			152			87		281			340			101			80			117			120			133			83			55			218	3	1.14	Decreasing
4		Tsuyagawa River	Chiyogahara Bridge	Ichinoseki City					520						116						158					122						85						105						100						172	4	0.90	Decreasing
5		Kurosawa River	Kawarada Bridge	Kanegasaki Town											97			76			54		99			54						53						55						35						65	5	0.35	Decreasing
6		Isawa River	Oago Bridge	Oshu City																						11			0			27			0			11			0			0			0			6	6	1.60	Varying
7		Isawa River	Saijin Bridge	Oshu City																						0			0			0			0			14			0			0			0			2	7	2.83	Varying
8		Kitakami River	Fuji Bridge	Oshu City					210						77			40			50		80				18		12			0			13			75			0			21			13			47	8	1.21	Decreasing
9		Shiratori River	Shiratori Bridge	Oshu City					215						134			111			90		171				98		61			59			66			138			46			45			46			98	9	0.54	Decreasing
10		Koromo River	Koromogawa Bridge	Hiraizumi Town					570						360			156			107		189			117			79			66			57			83			78			79			70			155	10	0.96	Decreasing
11		Ota River	Hitosuji Bridge	Hiraizumi Town					97						770						410					179			76			46			107			93			57			48			36			174	11	1.28	Decreasing
12	Kitakami River System	Iwai River Middle Reaches	Kamino Bridge	Ichinoseki City					370						195			141			87		93			75			67			63			55			48			26			27			63			101	12	0.92	Decreasing
13		Iwai River Lower Reaches	Kozenji Bridge	Ichinoseki City																						96			80			326			122			301			45			48			46			133	13	0.86	Varying
14		Kitakami River	Chitose Bridge (Kozenji)	Ichinoseki City					170						158			54			106		19			101			29			294			177			108			47			93			28			106	14	0.73	Varying
15		Sokei River	Unada Bridge	Ichinoseki City					420						151			150			640		150				166		32			54			52			35			20			26			19			147	15	1.25	Decreasing
16		Sarusawa River	Kannon Bridge	Ichinoseki City					330						230			310			1,040		530			160			48			45			48			54			49			39			38			225	16	1.29	Decreasing
17		Satetsu River	Oide Bridge	Ichinoseki City																							149		19			25			45			19			36			27			16			42	17	1.05	Decreasing
18		Satetsu River	Kanzaki Bridge	Ichinoseki City					330						137			147			189		116			68			0			0			10			0			0			0			0			77	18	1.34	Decreasing
19		Senmaya River Upper Reaches	Miyata Bridge	Ichinoseki City					290						380			360			203		201			172			57			67			129			100			112			87			76			172	19	0.64	Decreasing
20		Kitakami River	Kitakamigawa Bridge	Ichinoseki City					73						51			65			85		28			30			13			59			12			54			71			20			16			44	20	0.58	Varying
21		Kinomi River	Higuchi Bridge	Ichinoseki City					310						270			138			980		123			64			23			30			16			95			18			16			13			161	21	1.64	Decreasing
22		Kinryu River	Tenjin Bridge	Ichinoseki City					320						214			400			169		370			237			72			90			94			98			107			61			54			176	22	0.69	Decreasing

Total number of samples: 241 Detection times: 219

Average: 110

*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 P.60 — Decreasing, Increasing, Unchanged, Varying

2) Miyagi Prefecture

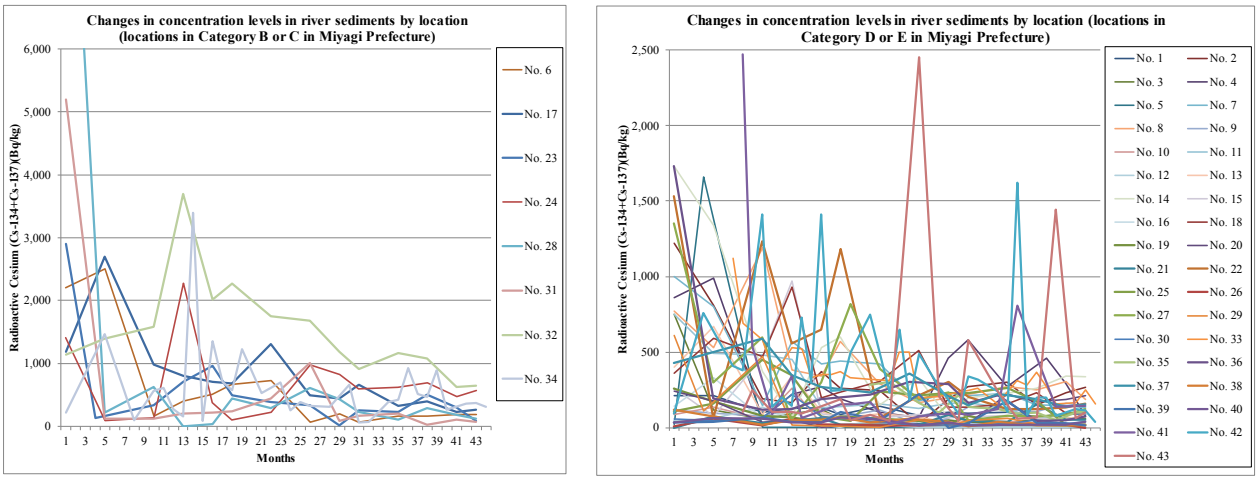
In Miyagi Prefecture, surveys were conducted 12 to 33 times from October 2011 to February 2015 for river sediment samples collected at 43 locations (this analysis excludes the survey results at 37 locations where the survey was conducted only in 2011).

Regarding concentration levels of detected values, one location was categorized into Category B, seven locations into Category C, 15 locations into Category D, and 20 locations into Category E (see Table 4.3-3 and Table 4.3-4).

Concentration levels were generally decreasing at 34 locations but were generally unchanged or varying at nine 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	1	No.32
C	Upper 10 to 25 percentile	7	No.6、No.17、No.23、No.24、No.28、No.31、No.34
D	Upper 25 to 50 percentile	15	No.2、No.4、No.7、No.8、No.11、No.14、No.18、No.22、No.27、No.33、No.36、No.37、No.41、No.42、No.43
E	Lower than upper 25 to 50 percentile (lower 50%)	20	No.1、No.3、No.5、No.9、No.10、No.12、No.13、No.15、No.16、No.19、No.20、No.21、No.25、No.26、No.29、No.30、No.35、No.38、No.39、No.40



(*) 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)

Location						River sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																																																
No.	Water area			Location	Municipality	FY2011								FY2012												FY2013												FY2014												Changes	Average(*2)	No.	Coefficient of variation	Trends(*3)
						8	9	10	11	12	1	2	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	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				139			83			99		96				103			71			93		85				116	1	0.38	Decreasing
2			Shishiori River	Namiita Bridge	Kesennuma City			1,220				810				189			165		370		262				245			28			186		268				300			150			231		265				335	2	0.92	Decreasing
3			Okawa River	Tateyama-ohashi Bridge	Kesennuma City			750				115				56			91		121		56				39			43			51		35				33			54			60		61				112	3	1.66	Decreasing
4			Okawa River	Kamiyama Bridge	Kesennuma City			860				990				59			222		271		190				99			65			460		580				269				460		288		76				349	4	0.84	Decreasing
5			Okawa River	Okawa River Estuary	Kesennuma City			23			1,660					0			0		0		0				0			0			0		0				0			0			0		0				120	5	3.69	Decreasing
6			Omose River	Ozaki Bridge	Kesennuma City			2,200				2,500				159			400		510		670				730			64			194		63				158			158			185		182				584	6	1.34	Decreasing
7	Kitakami River System		Arima River	Unanda Bridge	Kurihara City			1,000				800				146			570		420		440				420			173			229		210				225			152			145		131				362	7	0.74	Decreasing
8	Kitakami River System		Kinryu River	Obata Bridge	Kurihara City			770				530				1,190			380		340		570				289			165			196		221				271			250			304		184				404	8	0.70	Decreasing
9	Kitakami River System		Kitakami River	Tome-ohashi Bridge (Tome)	Kurihara City			113				98				74			118		199		71				115			22			63		133				119			106			158		139				109	9	0.40	Unchanged
10	Kitakami River System	Hasama River Area	Sanhasama River	Doman Bridge (Kurikoma Dam))	Kurihara City			85				137				55			260		24		20				25			13			38		45				40			33			26		22				59	10	1.13	Decreasing
11	Kitakami River System	Hasama River Area	Nihasama River	Kajiya Bridge	Kurihara City			750				490				480			450		131						153			123			161		167				124			54			98		91				252	11	0.86	Decreasing
12	Kitakami River System	Hasama River Area	Hasama River	Hanayama Dam, inflow area	Kurihara City			44				60				135			56		0		14				17			0			0		0				0			0			0		10				24	12	1.61	Decreasing
13	Kitakami River System	Hasama River Area	Hasama River	Wakayanagi	Kurihara City			400				670				84			340		104		65				90			71			33		52				62			55			61		72				154	13	1.20	Decreasing
14	Kitakami River System	Hasama River Area	Hasama River	Yamayoshida Bridge	Tome City			1,730				1,340				370			69		530		600				150			327			68		197				225			258			339		337				467	14	1.03	Decreasing
15	Kitakami River System	Eai River	Eai River	Todoroki Bridge (Todoroki)	Osaki City			260				77				470			970		89			66			67			85			66						80			67			49		46				184	15	1.44	Decreasing
16	Kitakami River System	Eai River	Eai River	Shinborisaihon, entrance	Osaki City			141				330				63			104		18		0				59			37			17		17				16			18			11		0				59	16	1.48	Decreasing
17	Kitakami River System	Eai River	In Furukawa District, Osaki City	Shinborisaihon, entrance	Osaki City			1,190				2,700				980			800		710		690				1,310			490			450		660				324			398			229		265				800	17	0.80	Decreasing
18	Kitakami River System	Eai River	Dekigawa River	Kogota Bridge	Misato Town			360				590				470			930		195		233				305			510			134		133				153			232			95		101				317	18	0.75	Decreasing
19	Kitakami River System	Eai River	Eai River	Oikawa Bridge (Tandai)	Wakuya Town /Ishinomaki Town			260				172				79			66		37		73				56			41			21		79				20			19			13		18				68	19	1.02	Decreasing
20	Kitakami River System		Kyu-Kitakami River	Kadonowaki	Ishinomaki City			240				175				36			49		0		10				0			27			18		26				221			171			184		212				98	20	0.97	Varying
21			Naruse River	Onobashi Bridge (Ono)	Higashi-Matsushima City			0				74				28			41		65		17				19			19			82		44				40			153			53		54				49	21	0.77	Varying
22			Sunaoshi River	Tagajozeki Weir	Tagajo City			1,530				62				1,230			560		650		1,180				61			215			302		202				122			123			132		156				466	22	1.06	Decreasing
23			Sunaoshi River	Nenbutsu Bridge	Tagajo City			2,900			129					340			710		960		490				380			340			17		255				225			500			307		87				546	23	1.32	Decreasing
24			Teizan-unga Canal (Kyu-sunaoshi River)	Teizan Bridge	Shiogama City/Shichigahama Town/ Tagajo City			1,410				95				141			2,280		380		101				218			980			820		600				620			690			470		570				670	24	0.88	Varying
25	Nanakita River System		Nanakita River	Nanakita Bridge	Sendai City			109				157				450			350		71			43			238			215			230		226				264			173			20		18				183	25	0.69	Varying
26	Nanakita River System		Nanakita River	Fukuda-ohashi Bridge	Sendai City			10				60				14			60		17			17			13			12			16		13				18			22			16		0				21	26	0.85	Decreasing
27	Nanakita River System		Umeda River	Fukuda Bridge	Sendai City			1,350				300				600			53		300			820			390			186			233		47				76			71			84		124				331	27	1.12	Decreasing
28	Nanakita River System		Nanakita River	Takasago Bridge	Sendai City			11,100				220				630			0		42		450				291			610			430		225				114			293			185		124				1,051	28	2.76	Decreasing
29	Natori River System		Natori River	Yuriage-ohashi Bridge	Sendai City /Natori City			610			108					470			14								0			52			11		47				61			26			23		18				120	29	1.67	Decreasing
30	Natori River System		Masuda River	Yakushi Bridge	Natori City			56				47				68			220		73						35		23				17		20				28			52			27		43				55	30	0.97	Decreasing
31	Natori River System		Masuda River	Koyama Bridge	Natori City			5,200				116				124			202		221		236				450			1,010			81		168				208			21			112		74				587	31	2.30	Decreasing
32	Natori River System		Masuda River	Bishamon Bridge	Natori City			1,140				1,390				1,590			3,700		2,020		2,270				1,750			1,680			1,190		910				1,170			1,080			630		650				1,512	32	0.52	Decreasing
33	Abukuma River System		Abukuma River	Hadeniwa Bridge	Marumori Town									1,120	690	580	380	430	530	520 330	350	350	370	330		320		310 500	500	196		203		236	247	259		153	236	312	280	363	272	157		165	251	155			358	33	0.54	Decreasing
34	Abukuma River System		Abukuma River	Marumori Bridge	Marumori Town			220				1,470		570	101	560	610	280	162	3,400 90	1,360	710	580	1,230		530		700 253	390	320		312		660	59	75		380	420	930	520	470	890	262		364	373	318			593	34	1.03	Varying
35	Abukuma River System		Abukuma River	Higashine Bridge	Kakuda City																					283		301		161		96		212	138			122		91		98		46		98	108				146	35	0.54	Decreasing
36	Abukuma River System	Shiroishi River	Shiroishi River	Before the confluence with Kawaragosawa River (Sunaoshi Bridge)	Shiroishi City			1,730				191				116			123		190					218			302				286		165			212				45			46		71				284	36	1.56	Decreasing
37	Abukuma River System	Shiroishi River	Saikawa River	Etsubo Bridge	Shiroishi City			430								590			350		270					234			360				206		146			225				188			137		153				274	37	0.50	Decreasing
38	Abukuma River System	Shiroishi River	Matsukawa River	Miya-ohashi Bridge	Zao Town			119								19			47		54		66			31			58				39		10			39				13			15		14				40	38	0.75	Decreasing
39	Abukuma River System	Shiroishi River	Arakawa River	Niragami Bridge	Murata Town/Ogawara Town			33				36				68			38		32		101				47			222			0		27				178			26			26		14				61	39	1.06	Varying
40	Abukuma River System	Shiroishi River	Shiroishi River	Shirahata Bridge	Shibata Town			32				61				60			32		31		68				52			12			31		12				19			20			16		37				35	40	0.55	Decreasing
41	Abukuma River System		Abukuma River	Tsukinoki-ohashi Bridge	Kakuda City/Shibata Town										2,470 540		88		340	63			154	152		166		24		74		88		94	84			123		810		463		137		145	143				324	41	1.72	Decreasing
42	Abukuma River System		Abukuma River	Abukuma-ohashi Bridge(Iwanuma)	Iwanuma City/Watari Town			91			760			410	380	1,410	136	196	143	730 300	1,410	243	247	500		750		231 650	181	490		270		91	338	318		240	101	1,620	82	197	200	77		123	111	37			396	42	1.02	Varying
43	Abukuma River System		Abukuma River	Abukuma River Estuary (Watari-ohashi Bridge)	Iwanuma City/Watari Town										103 249		104		102	91			187	49		85		41		2,450		209		45	580			237		60		70		1,440		65	98				330	43	1.84	Varying
						Total number of samples		656	Detection times		628																																								312	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 P.60 — Decreasing, Increasing, Unchanged, Varying

3) Fukushima Prefecture

i. Hamadori

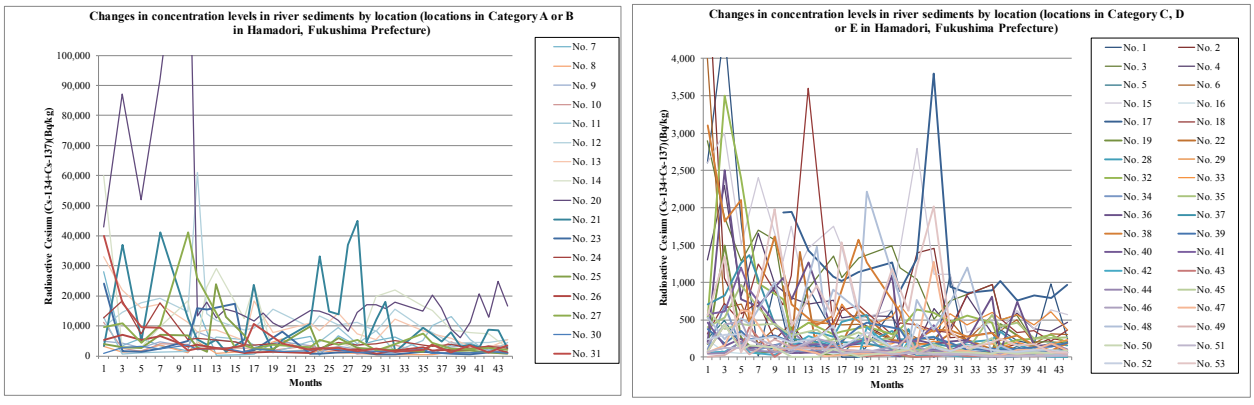
In Hamadori, Fukushima Prefecture, surveys were conducted 17 to 35 times from September 2011 to February 2015 for river sediment samples collected at 53 locations.

Regarding concentration levels of detected values, 15 locations were categorized into Category A, two locations into Category B, 13 locations into Category C, 10 locations into Category D, and 13 locations into Category E (see Table 4.3-5 and Table 4.3-6).

Concentration levels were generally decreasing at 41 locations but were generally unchanged or varying at 12 locations.

Table 4.3-5 Categorization 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	15	No.7、No.9、No.10、No.11、No.12、No.13、No.14、No.20、No.21、No.23、No.24、No.25、No.26、No.27、No.31
B	Upper 5 to 10 percentile	2	No.8、No.30
C	Upper 10 to 25 percentile	13	No.1、No.2、No.3、No.4、No.6、No.15、No.17、No.18、No.32、No.36、No.38、No.48、No.53
D	Upper 25 to 50 percentile	10	No.22、No.28、No.29、No.35、No.37、No.39、No.41、No.45、No.47、No.52
E	Lower than upper 25 to 50 percentile (lower 50%)	13	No.5、No.16、No.19、No.33、No.34、No.40、No.42、No.43、No.44、No.46、No.49、No.50、No.51



(*) 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)

River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)

FY2011

No.	Water area	Location	Municipality	8	9	10	11	12	1	2	3
1	Jizogawa River	Hamahata Bridge	Shinchi Town		2,600		4,400		1,790		18
2	Koizumi River	Koizumi Bridge	Soma City		5,300		1,060		580		740
3		Hyakken Bridge			2,900		1,880		1,280		1,700
4	Udagawa River	Horisaka Bridge			1,300		2,300		820		1,660
5		Hyakken Bridge			240		490		155	155	
6	Manogawa River	Ochiai Bridge	Minamisoma City		4,000		660		710		180
7		Majima Bridge			28,000		3,400		5,800		3,400
8	Niida River	Kusano	Iitate Village		3,200		1,290		1,800		3,700
9		Komiya			4,900		4,400		2,800		4,700
10		Kidouchi Bridge	Minamisoma City		11,200		2,600		1,570		4,200
11		Sakekawa Bridge			13,000		610		1,140		1,230
12	Ota River	Ishiwatado Bridge			9,700		14,400		17,600		19,100
13		Kaminouchi Bridge			33,000		22,000		16,000		17,200
14		Masuda Bridge			60,000		2,900		2,900		9,700
15		JR Tetsudo Bridge			2,600		3,000		1,510		2,400
16		Maruyama Bridge			230		71		48		72
17	Odaka River	Shimokawara Bridge									
18		Zencho Bridge			310		720		470		1,250
19		Hatsukara Bridge			173		1,500		260		44
20	Ukedo River	Murohara Bridge	Namie Town		43,000		87,000		52,000		92,000
21		Ukedo Bridge			3,300		37,000		5,000		41,000
22	Furumichi River	Before the confluence with Takasegawa River	Tamura City								
23	Takase River	Keio Bridge	Namie Town		24,000		1,650		1,460		2,400
24	Maeda River	National Route 6, west	Futaba Town		12,800		18,300		7,400		17,600
25		Nakahama Bridge	Namie Town		3,900		2,900		2,700		7,000
26	Kumagawa River	National Route 6, west	Okuma Town		5,300		7,100		5,200		6,600
27		Mikuma Bridge			9,600		10,800		4,500		10,200
28	Tomioka River	Nabekura Bridge	Kawauchi Village								
29		Sakaigawa Bridge									
30		National Route 6, west	Tomioka Town		930		2,800		3,200		2,400
31		Kobama Bridge			40,000		17,600		9,500		9,400
32	Idegawa River	Motogama Bridge	Naraha Town		530		3,500		2,400		990
33	Kawauchi River	Before the confluence with Kidogawa River	Kawauchi Village								
34	Kidogawa River	Nishiyama Bridge			111		690		139		99
35		Nagatoro Bridge	Naraha Town		400		530		970		670
36		Kidokawa Bridge			200		2,500		780		680
37	Asami River	Boda Bridge	Hirono Town		710		830		1,260	1,370	
38	Ohisa River	Kageiso Bridge	Iwaki City		3,100		1,820		2,100	450	
39	Kohisa River	Rengo Bridge			380		184		350	240	
40	Niida River	Kasumida Bridge			460		148		250	123	
41		Matsuba Bridge			580		610		1,200	910	
42	Natsui River	Kitanouchi Bridge	Ono Town		66		76		206	61	
43		Kyudayu Bridge	Iwaki City		80		440		117	400	
44		Rokujumai Bridge			43		58		210	96	
45	Yoshima River	Iwaanatsuri Bridge			620		380		450	430	
46		Before the confluence with Natsui River			182		440		480	237	
47	Fujiwara River	Shima Bridge			64		157		630	610	
48		Minato-ohashi Bridge			530		239		520	450	
49	Samegawa River	Idosawa Bridge			0		30		161	36	
50		Samegawa Bridge			78		440		91	157	
51	Shitoki River	Komuro Bridge			74		121		122	300	
52	Binda River	Kobana Bridge			237		300		310	226	
53		Binda Bridge			570		1,350		66	260	

FY2012

No.	4	5	6	7	7	8	9	10	11	12	12	1	2	3
1		980		54		940			320	0		0		
2		231		460		142			470	680		480		
3		1,570		240		920			1,350	1,070		1,330		
4		970		800		710			760	530		560		
5		109		55		143			84	23		290	0	
6		390		310		460			450	430		440		
7			1,820	15,900		280			500	750		4,400		
8			1,090	4,800		770			1,580	2,670			5,700	
9			3,300	7,900		5,400			4,300	2,900			4,800	
10			3,800	2,250	2,600	2,800			2,520	2,800		1,850		
11			1,530	3,300	3,400	6,300			5,300	3,700		1,070		
12			14,700	61,000	14,100	11,900			8,700	9,300		15,600		
13			11,300	8,000	8,600	8,700			5,200	18,400		7,700		
14			18,300	3,800	22,800	29,000			12,500	23,400		1,270		
15			1,280	1,750	1,210	1,460			1,750	1,470		510		
16			121	180	123	92			48	53		45		
17			1,940	1,950		1,430			1,080	1,020		1,140		
18			700	1,090		3,600			360	620		690		
19			108	410	54	78			18	42		17		
20			165,000	13,400	17,800	12,800	15,600	14,600	13,400	11,600	14,200	11,000	9,500	
21			12,400	5,600	3,700	5,200	1,370		5,600	23,700	8,400	1,870	5,200	
22			950	162	1,410		80		165	176		640		
23			5,000	15,800	15,400			17,400	1,370	1,830			8,100	
24			5,300	5,800				4,800	3,700	3,600		4,200		
25			6,700	2,900	1,310	23,900	13,100		6,800	2,260		2,310		
26			3,200	3,800				1,610	1,070	1,200		1,380		
27			41,000	26,000				2,900	3,500	2,460		3,700		
28						330		310	270	470			570	242
29						490			440	710	560		400	
30			3,600	2,150			2,530		1,300	2,330			1,540	
31			1,940	2,470			2,530		3,600	10,700			4,300	
32			780	320		460			310	340			410	
33						181	290	83	194	142			149	
34			198	81			86		137	130			271	
35			320	121		178			236	280			217	
36			1,060	780		1,270			320	154			192	
37		450		240		230			153	200			183	
38		1,620		710			430		560			1,570	1,270	
39		290		202			149		127			400	460	
40		156		52			68		75	92			85	
41		460		161			181		151	122			250	
42		29		155		280			172			0	400	
43		0		159			116		149			22	14	
44		66		350			47		72			63	72	
45		450		290			370		206			330	276	
46		69		63			246		191	34		48		
47		102		126			55	13				46		
48		1,000		214			1,480	580	910			630	2,220	
49		238		134										
50		136		0			0		106			16	33	
51		149		103			265	78	208	48			96	
52		270		198			259		420	137			330	
53		1,980		420			960		540	1,540			156	

FY2013

No.	4	5	6	7	8	9	10	11	12	1	2	3
1		620	95		151		0		1,100		24	
2		235	540		1,400		1,460		261		273	
3		1,490	1,200		1,040		510		750		840	
4		550	370		165		650		390		820	
5		100	70		84		60		64		65	
6		224	380		250		236		490		225	
7		6,400	161		6,800		3,500		5,100		6,200	
8		630	1,870		1,010		960		510		400	
9		3,400	1,370		3,300		2,280		1,810		2,050	
10		3,500	2,500		3,040		760		1,560		3,600	
11		4,900	4,700		9,500		4,100		8,400		1,420	
12		9,500	13,400		10,300		11,300		8,300		15,500	
13		10,900	8,400		14,300		7,400		5,500		12,300	
14		2,090	2,520		4,500		2,400		19,800		21,900	
15		630	1,460		2,790		1,110		1,110		327	
16		53	60		84		50		16		36	
17		1,270	890		1,310		3,800		940		860	
18		307	460		430		359		325		840	
19		48	19		0		71		52		20	
20		15,100	14,800	13,900	11,900	8,300	14,500	17,000	17,000	15,700	18,000	
21		10,700	33,000	14,700	14,000	37,000	45,000	4,700	12,100	18,000	1,510	
22		231	220		182		171		316			
23		770	860		1,140		1,370		510		520	
24		2,500	2,510		4,500		3,600		4,100		5,200	
25		9,900	2,040		6,000		2,740		2,380		2,060	
26		1,070	2,640		1,740		2,280		830		1,780	
27		2,850	5,300		3,700		5,300		1,870		4,000	
28		350	235		239		276		144		205	
29		550	690		400		340		580		430	
30		1,780	2,580		2,170		1,150		1,540		1,400	
31		1,970	2,460		2,730		1,720		2,390		1,390	
32		310	370		640		590		470		560	
33		177	224		154		217		170		148	
34		16	38		108		111		67		49	
35		259	390		110		58		117		94	
36		1,100	218		226		174		210		230	
37			93	380	128		187		138		169	
38			610	260	235		370		360		273	
39			380	204	243		262		191		96	
40			14	57	41		100		17		47	
41			195	228	211		430		80		224	
42			31	219	12		42		21		0	
43			42	13	0		14		36		10	
44			99	94	65		91		59		45	
45			79	164	47		175		80		85	
46			157	63	163		37		17		38	
47		38		96	144		1,280		100		78	
48			790	139	770		369		730		1,200	
49		68		278	41		148		48		45	
50		64		109	46		59		58		65	
51		40		59	52		41		48		41	
52		134		113	450		132		83		161	
53		1,180		620	1,210		2,020		349		117	

FY2014

No.	4	5	6	7	8	9	10	11	12	1	2	3	Changes	Average (*2)	No.	Coefficient of variation	Trends (*3)
1		13	361		224		170		980		245			686	1	1.55	Decreasing
2		333	114		181		158		247		214			707	2	1.55	Decreasing
3		970	500		560		209		206		194			1,032	3	0.64	Decreasing
4		308	390		590		382		344		470			720	4	0.68	Decreasing
5		83	46		149		24		28		60			112	5	0.96	Decreasing
6		560	360		500		183		309		300			548	6	1.43	Decreasing
7		2,140	740		3,650		4,400		1,940		3,240			4,933	7	1.25	Decreasing
8		530	420		1,260		1,130		1,230		980			1,706	8	0.85	Decreasing
9		1,270	1,620		3,070		3,680		2,050		990			3,286	9	0.50	Decreasing
10		1,320	1,270		4,800		2,240		3,360		3,350			3,021	10	0.68	Varying
11		5,200	10,100		13,100		5,300		1,080		4,480			4,907	11	0.75	Varying
12		9,300	7,700		4,300		4,600		4,600		5,500			13,061	12	0.86	Decreasing
13		8,400	7,400		5,900		3,150		2,860		5,500			10,787	13	0.64	Decreasing
14		16,500	15,000		8,700		7,800		7,300		2,590			12,942	14	1.03	Decreasing
15		480	368		620		381		630		570			1,279	15	0.63	Decreasing
16		27	68		46		53		21		16			70	16	0.74	Decreasing
17		900	1,020		760		830		790		970			1,272	17	0.57	Decreasing
18		970	510		329		358		220		365			695	18	1.02	Decreasing
19		65	443		289		133		21		0			168	19	1.88	Decreasing
20		14,900	20,300	16,000	8,800	6,000	11,300	20,800	13,000	24,700	16,500			24,897	20	1.25	Decreasing
21		9,400	7,300	4,900	7,900	3,190	3,690	3,020	8,800	8,600	2,810			12,049	21	1.02	Varying
22		111	175		95		54		80		103			296	22	1.20	Decreasing
23		1,370	1,100		800		660		1,110		1,140			4,598	23	1.46	Decreasing
24		3,690	3,350		3,860		2,510		3,210		2,560			5,686	24	0.80	Decreasing
25		1,360	3,770		1,560		1,830		1,110		690			4,634	25	1.10	Decreasing
26		3,010	1,880		1,970		2,360		3,120		1,230			2,744	26	0.66	Decreasing
27		7,400	4,400		2,400		2,340		2,690		1,960			7,221	27	1.27	Decreasing
28		230	339		172		100		196		156			269	28	0.43	Decreasing
29		600	500		570		430		610		366			510	29	0.22	Unchanged
30		2,450	970		990		1,020		1,430		980			1,875	30	0.42	Decreasing
31		2,020	3,870		1,220		3,660		1,180		3,520			5,917	31	1.45	Decreasing
32		460	168		228		244		297		197			662	32	1.18	Decreasing
33		182	137		208		126		171		235			177	33	0.27	Unchanged
34		113	78		82		100		64		62			129	34	1.06	Decreasing
35		570	410		460		249		252		267			325	35	0.67	Varying
36		810	74		740		150		167		83			551	36	1.04	Decreasing
37		77	124		87		95		93		93			331	37	1.13	Decreasing
38		321	229		286		159		92		182			773	38	1.03	Decreasing
39		112	98		113		130		144		191			225	39	0.49	Decreasing
40		0	0		12		29		71		56			89	40	1.15	Decreasing
41		61	54		71		58		41		66			288	41	1.05	Decreasing
42		10	0		15		29		0		0			83	42	1.32	Decreasing
43		12	11		23		12		42		20			79	43	1.53	Decreasing
44		21	26		17		56		182		109			88	44	0.85	Varying
45		254	53		63		59		34		49			225	45	0.76	Decreasing
46		0	50		15		20		16		18			117	46	1.15	Decreasing
47		37	22		97		102		187		92			194	47	1.54	Varying
48		41	159		54		83		20		53			573	48	0.94	Varying
49		19	0		26		18		70		36			78	49	1.05	Decreasing
50		48	71		48		68		55		91			84	50	1.06	Decreasing
51		14	11		12		25		21		20			85	51	0.94	Decreasing
52		98	81		77		99		100		60			194	52	0.59	Decreasing
53		201	246		162		174		63		64			648	53	0.97	Varying
														2,616	Average		

Total number of samples	1,179	Detection times	1,159

*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 P.60

Decreasing Increasing Unchanged Varying

ii. Nakadori

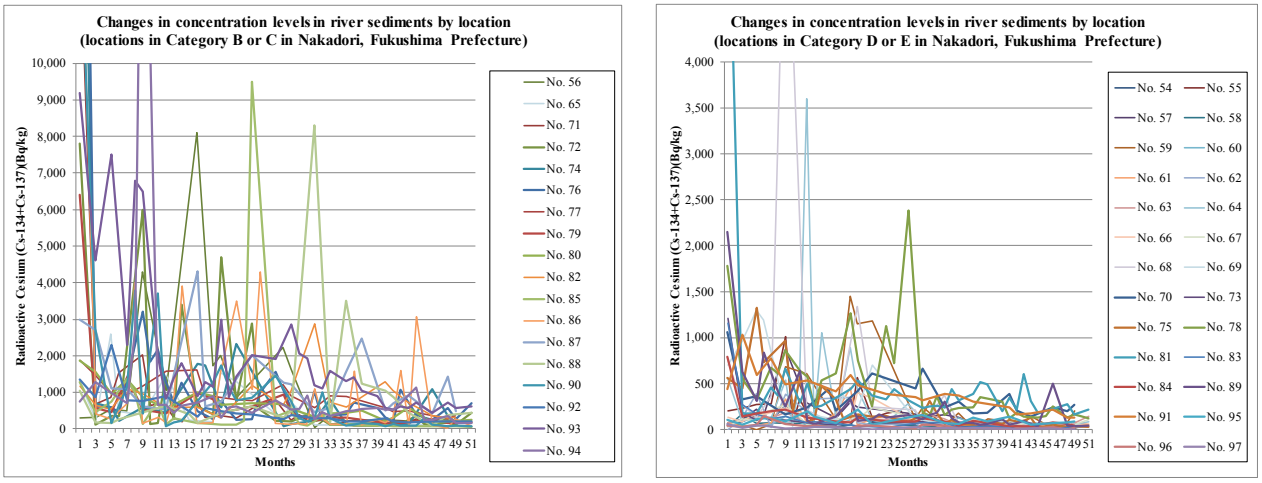
In Nakadori, Fukushima Prefecture, surveys were conducted 21 to 37 times from September 2011 to February 2015 for river sediment samples collected at 44 locations.

Regarding concentration levels of detected values, three locations were categorized into Category B, 15 locations into Category C, 10 locations into Category D, and 16 locations into Category E (see Table 4.3-7 and Table 4.3-8).

Concentration levels were generally decreasing at 40 locations but were generally unchanged or varying at four locations.

Table 4.3-7 Categorization 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	3	No.74、No.76、No.93
C	Upper 10 to 25 percentile	15	No.56、No.65、No.71、No.72、No.77、No.79、No.80、No.82、No.85、No.86、No.87、No.88、No.90、No.92、No.94
D	Upper 25 to 50 percentile	10	No.59、No.64、No.68、No.69、No.70、No.75、No.78、No.81、No.89、No.91
E	Lower than upper 25 to 50 percentile (lower 50%)	16	No.54、No.55、No.57、No.58、No.60、No.61、No.62、No.63、No.66、No.67、No.73、No.83、No.84、No.95、No.96、No.97



(*) 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)

River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)

No.	Water area	Location	Municipality	FY2011 8	9	10	11	12	1	2	3	FY2012 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		

No.	FY2013 4	5	6	7	8	9	10	11	12	1	2	3	FY2014 4	5	6	7	8	9	10	11	12	1	2	3	Changes	Average (*2)	No.	Coefficient of variation	Trends (*3)
54		51	135		80		14		53		25			36	28		17		23		33	52				71	54	0.83	Decreasing
55	77		113 57	51	46	59	39		33	53	22		40	47	17	54	30	53	24		22	12 36				134	55	1.41	Decreasing
56		2,230	1,630		43		380		212		234			243	244		215		279		240	241				1,176	56	1.57	Decreasing
57		170	132		159		135		66		71			81	52		71		51		45	51				165	57	1.08	Decreasing
58		37	40		29		40		11		21			21	17		19		16		0	17				40	58	0.88	Decreasing
59		116	248		42		179		15		120			78	0		139		14		63	203				297	59	1.45	Decreasing
60		71	80		46		127		64		54			16	24		24		22		23	78				61	60	0.57	Decreasing
61	108		57 63	40	31	38	50		72	69	69		15	57	78	18	49	24	58		33	64	58			89	61	0.98	Decreasing
62		68	19		13		35		13		17			39	12		10		11		12		27			99	62	1.35	Decreasing
63		109	175		113		47		63		51			37	58		28		11		27		138			91	63	0.54	Varying
64	282		107 80	88	51	59	58		18	73	67		80	66	57	42	18	31	51		26	52	80			275	64	2.26	Decreasing
65		240	730		102		106		114		199			75	148		99		114		85	131				539	65	1.24	Decreasing
66		85	57		49		66		39		61			49	61		25		17		25	19				110	66	0.93	Decreasing
67		132	98		35		69		110		75			38	65		53		42		25		112			99	67	0.65	Decreasing
68		213	49		370		73		66		64			69	21		64		60		51	60				503	68	2.68	Decreasing
69		106	96		60		50		56		87			90	71		64		66		49	18				304	69	1.30	Decreasing
70		450	660		241		298		174		178			390	206		139		237		202	264				345	70	0.62	Decreasing
71	800		241 390	232	224	295	129		194	233	187		165	263	194	208	186	272	126		180	154	199			796	71	2.78	Decreasing
72	220		197 280	400	233	251	113		114	90	103		101	145	177	146		344 136	114		179	107	444			938	72	1.91	Decreasing
73		83	85		42		21		40		39			24	38		24		32		33	28				121	73	2.05	Decreasing
74		67	130		222		810		134		116			181	134		124		1,080		362	174				1,569	74	2.93	Decreasing
75	88		157 310	179	59	101	49		51	18	97		58	102	86	91	129	19	48		25	36	30			228	75	1.26	Decreasing
76	1,570		540 285	360	1,020	256	380		400	730			570	305	229	1,070		387 305	250		570	264	690			1,580	76	3.16	Decreasing
77		1,210	900		570		900		880					590	470		490		365		283	363				911	77	0.49	Decreasing
78	2,380		191 144	360	154	212	229		244	350			300	118	179	134		132 149	246		130	162	122			498	78	1.00	Decreasing
79		930	430		229		302		321					169	141		171		268		165		187			759	79	1.76	Decreasing
80		680	540		330		410		440		510			233	317		600		169		200		238			685	80	0.66	Decreasing
81	320		235 250	259	242	440	318		390	520	490		198	341	219	600	310	185	220		278	166	216			508	81	2.04	Decreasing
82		650	1,030		2,880		740		610					1,290	1,050		720		370		299	322				831	82	0.68	Varying
83		61	77		72		22		29		38			24	15		16		17		23	18				115	83	2.10	Decreasing
84		87	119		87		44		99					33	38		31		75		60	40				130	84	1.23	Decreasing
85	340		500 135	85	200	380	122		143	112			96	85	70	71	79	76	66		67	67	61			555	85	2.87	Decreasing
86	149		119 152	137	1,100	277	129		137	1,580	105		257	167	305	1,590	71	3,060	98		25	287	75			1,295	86	2.08	Decreasing
87		1,260	1,220		470		570		1,560		2,480			510	700		910		420		1,440	490				1,306	87	0.78	Decreasing
88		300	510		8,300		176		3,500		1,250			1,050	880		440		94		381		450			1,011	88	1.80	Varying
89	154		108 157	179	300	124	76		66	50	63		112	52	68	99	58	33	500		44	33	44			243	89	1.56	Decreasing
90	1,460		750 285	193	297	1,000	280		98	123	152		135	78	132	100		95 287	110		77	85	71			1,082	90	2.26	Decreasing
91		350	319		390		370		300					241	165		168		213		125	130				404	91	0.55	Decreasing
92		257	370		296		289		197		193			297	211		177		207		196		200			523	92	0.94	Decreasing
93	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			2,061	93	1.03	Decreasing
94	790		520 540	910	278	470	360		490	510	550		560	530	530	710		1,140 246	254		344	153	152			1,177	94	2.77	Decreasing
95		143	153		65		64		127		89			138	109		52		71		78	82				106	95	0.43	Unchanged
96		11	55		40		12		12		18			0	13		12		22		0	14				32	96	1.00	Decreasing
97		27	13		14		10		15		11			11	0		13		11		0	0				17	97	0.91	Decreasing
																										543	Average		

Total number of samples	1,170	Detection times	1,160

*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 P.60 — Decreasing, Increasing, Unchanged, Varying

iii. Aizu

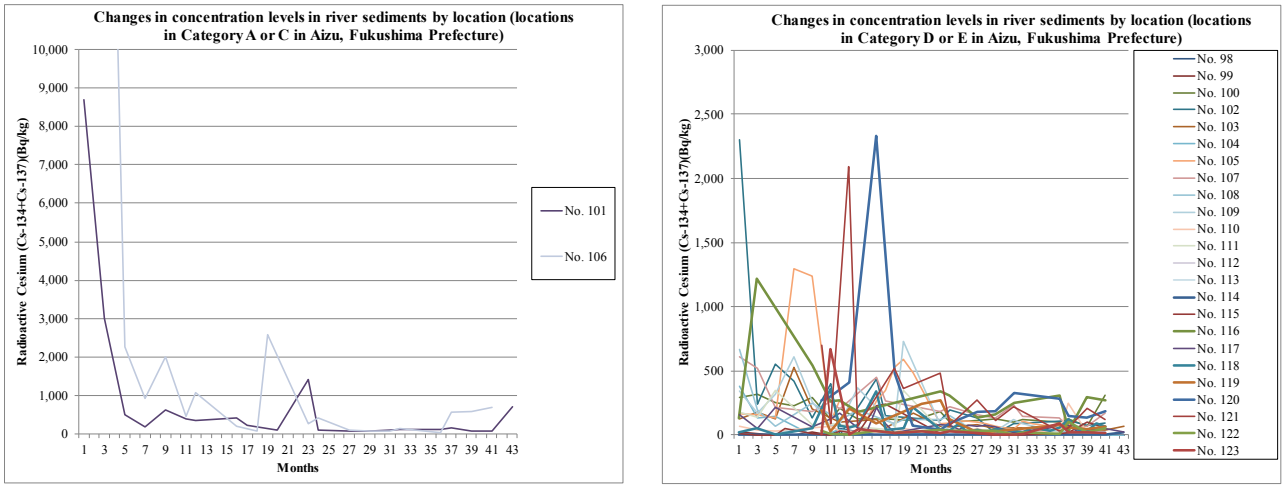
In Aizu, Fukushima Prefecture, surveys were conducted 13 to 31 times from September 2011 to December 2014 for river sediment samples collected at 26 locations.

Regarding concentration levels of detected values, one location was categorized into Category B, one location into Category C, six locations into Category D, and 18 locations into Category E (see Table 4.3-9 and Table 4.3-10).

Concentration levels were generally decreasing at 18 locations but were generally unchanged or varying at eight locations.

Table 4.3-9 Categorization 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.101
D	Upper 25 to 50 percentile	6	No.102、No.105、No.107、No.116、No.120、No.121
E	Lower than upper 25 to 50 percentile (lower 50%)	18	No.98、No.99、No.100、No.103、No.104、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



(*) 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)

Location				River sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																																															Average (*2)	No.	Coefficient of variation	Trends (*3)
No.	Water area	Location	Municipality	FY2011								FY2012														FY2013													FY2014													Changes				
				8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	10	11	12	1	1	2	3	4	5	6	7	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		13		0	50				0							0	0			0		0		0					0	0		0		0		0					4	98	3.43	Decreasing
99		Okawa Bridge	Aizuwakamatsu City		27		13		0		0		26		0	0				0	0						10	0			0		0		0					0	0		0		0		0					4	99	2.18	Decreasing
100	Yukawa River	Takimi Bridge			290		320		256		228		290		120	211		123			124			111			184	98			112		124		100	120				98	126		69		312							171	100	0.48	Unchanged
101		Shinyukawa Bridge			8,700		3,000		500		175		640		390	350				410	236			104			1,410	105			84		87		106	117				131	159		80		82		720					837	101	2.29	Decreasing
102		Before the confluence with Agano River			2,300		240		550		420		132		400	0				440	153						114	199			132		10		89					109	114		72		97							310	102	1.68	Decreasing
103	Miyakawa River	Saikuna Bridge	Aizubange Town		126		175		126		530		203		133	99				122	55			170			69	62			82		48		56	53				16	72		41		36		67					111	103	0.97	Decreasing
104	Agano River	Miyako Bridge			380		134		142				0		17	42				0	0			11			0	0			0		0		0	0				11	0		0		0		0					37	104	2.47	Decreasing
105	Nippashi River	Minami-ohashi Bridge	Kitakata City		167		158		130		1,300		1,240		101	270		173	132	263	350	530	590	480			88	92	108	105	103	87	70		41	109	85		71	46	92	20	0	18	0							226	105	1.39	Decreasing
106	Kyu-yukawa River	Awanomiya Bridge	Yugawa Village		13,000		25,000		2,260		930		2,010		470	1,080				207		72	2,590				279	410			103		72		88	139				40	570		580		690							2,530	106	2.37	Decreasing
107	Kyu-miyakawa River	Josuke Bridge	Aizubange Town		610		520		216				181		257	202				450	265						181	219			161		131		236	142				134	64		68		172							234	107	0.63	Decreasing
108	Tatsuki River	Ohashi	Kitakata City		670		199		67				250		157	112		198				86	121				118	152			17		14		25	26				26	29		16		27							122	108	1.25	Decreasing
109		Shimokawara Bridge			340		169		320		610		260		66	87		370				67	730				80	40			39		28		121	87				23	14		11		21							174	109	1.18	Decreasing
110	Nigori River	Nigorigawa Bridge			69		36		30				57		71	28				24		16	51				11	0			47		10		0	48				10	249		16		12							41	110	1.33	Varying
111		Yamazaki Bridge			180		139		350				82		90	82		61				40	350				41	43			0		0		0					25	0		0		0							82	111	1.33	Decreasing
112	Inagawa River	Aoyagi Bridge	Minamiaizu Town		0		0		0		0		0		0	0				0	0			0			0	0			0		0		0					0	0		0		0							0	112	-	Unchanged
113		Kurosawa Bridge	Tadami Town		0		0		10		44		0		0	0				0		0					0	0			0		0		0					0	0		0		0							3	113	-	Unchanged
114	Tadami River	Nishitani Bridge	Kaneyama Town		0		0						0		0	0		0				0	0				0	0			0		0		0	0				0	0		0		0		19					1	114	-	Unchanged
115		Fuji Bridge	Aizubange Town		14		0		0	51			13		0	32		12		226	241						12	36			11		0		0					13	21		99		56							44	115	1.62	Varying
116	Agano River	Shingo Dam	Kitakata City		129		1,220						540		260	270		183									340	309			137		163		251					308	36		296		272							314	116	0.88	Decreasing
117	Sukawa River	Sukawano	Inawashiro Town		161		52		218				61		123	169		58	39	213	86	18					83	76	44	73	70	78	63		21				55	79	78	27	34	46	50		24					78	117	0.70	Decreasing
118	Nagase River	Kogane Bridge			24		52		0				52		360	71	59	78		340	42	47	55	220			40	35	87	23	42	19	45		32	24	62		36	61	125	37	26	94	65							75	118	1.13	Decreasing
119	Takahashi River	Shinbashi Bridge												190	26		208			89					244		267	122			23		29							78	59		44		67							111	119	0.78	Varying
120	Koguro River	Umeno Bridge												270	300		410			2,330		480		73			42	94			183		184		324					284	149		133		188							363	120	1.54	Decreasing
121	Hishinuma River	Sekido District												700	90		2,090	67				520	360				480	74			272		115		223					28	56		211		122							361	121	1.44	Decreasing
122	Funatsu River	Funatsu Bridge	Koriyama City											32	10		0			31		17	21				40	33			36		34		0	24				10	104		23		52							29	122	0.84	Varying
123	Haragawa River	Estuary, front	Aizuwakamatsu City											0	670		0	47				13			27		16	28			12		0		0	11				92	22		19		17							61	123	2.69	Decreasing

Total number of samples	504	Detection times	384

Average: 243

*3: Results of the analysis of trends at respective locations using the method explained on P.60

Trends: Decreasing / Increasing / Unchanged / Varying

*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

4) Ibaraki Prefecture

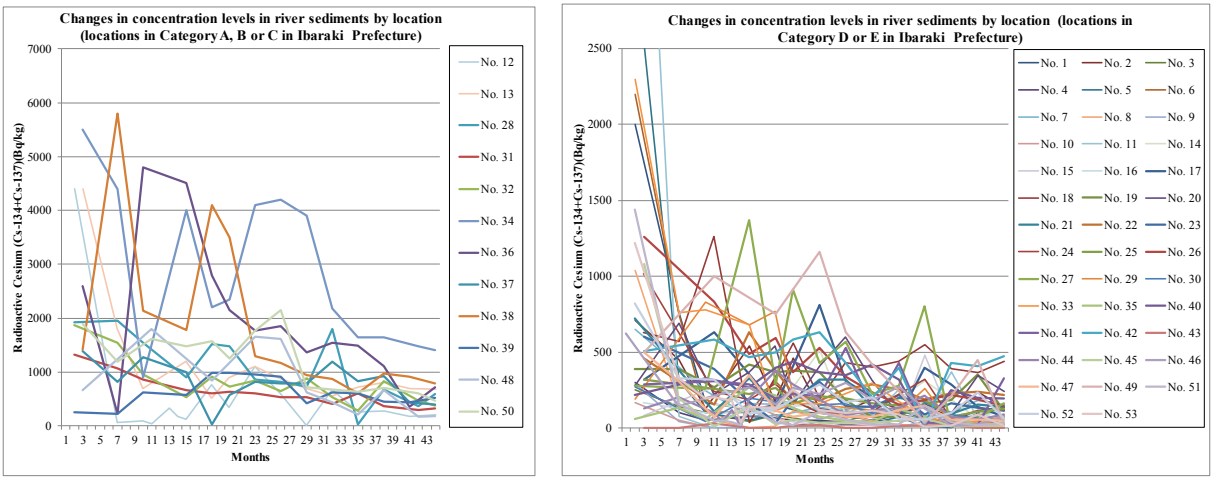
In Ibaraki Prefecture, surveys were conducted 11 to 17 times from August 2011 to February 2015 for river sediment samples collected at 53 locations (this analysis excludes the survey results at 39 locations where the survey was conducted only in 2011).

Regarding concentration levels of detected values, one location was categorized into Category A, two locations into Category B, nine locations into Category C, 27 locations into Category D, and 14 locations into Category E (see Table 4.3-11 and Table 4.3-12).

Concentration levels were generally decreasing at 45 locations but were generally unchanged or varying at eight locations.

Table 4.3-11 Categorization 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	1	No.34
B	Upper 5 to 10 percentile	2	No.36、No.38
C	Upper 10 to 25 percentile	9	No.12、No.13、No.28、No.31、No.32、No.37、No.39、No.48、No.50
D	Upper 25 to 50 percentile	27	No.1、No.2、No.5、No.6、No.7、No.11、No.14、No.17、No.18、No.19、No.20、No.21、No.22、No.23、No.24、No.25、No.26、No.27、No.29、No.33、No.40、No.41、No.42、No.46、No.49、No.52、No.53
E	Lower than upper 25 to 50 percentile (lower 50%)	14	No.3、No.4、No.8、No.9、No.10、No.15、No.16、No.30、No.35、No.43、No.44、No.45、No.47、No.51



(*) 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)

Location						River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																																																
No.	Water area			Location	Municipality	FY2011								FY2012												FY2013												FY2014												Changes	Average (*2)	No.	Coefficient of variation	Trends (*3)
						8	9	10	11	12	1	2	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	4	5	6	7	8	9	10	11	12	1	2	3					
1	Tagagawa River System		Satone River	Yamagoya Bridge	Kitaibaraki City		2,000					760			166				121			153			105		97			81			52			49			55			44			66			23			269	1	1.97	Decreasing
2				Murayama Bridge			710					450			125				540			176		460			126			116			187			128			137			81			234			137			258	2	0.77	Decreasing
3			Hanazono River	Kurabeishi			250					144			102				42			88		66			36			45			91			94			56			89			60			21			85	3	0.68	Decreasing
4				Isonare Bridge			300					103			53				76			68		50			50			38			47			89			54			57				112		155			89	4	0.77	Decreasing
5			Okita River	Sakae Bridge	Takahagi City		3,100					310			101				50			87		14			42			21			30			73			12			0			92			11			282	5	2.89	Decreasing
6				Sakai Bridge	Kitaibaraki City		2,200					750			109				103			310		186			101			68			98			83			50			50				24		61			300	6	1.93	Decreasing
7			Hananuki River	Shinhananuki Bridge	Takahagi City		650					400			248				82			82		102			135			115			140			101			141			108			182			151			188	7	0.83	Decreasing
8	Kujigawa River System		Kujigawa River	Yamagata	Hitachiomiya City		1,040					157			62				0			10		111			60			94			45			20			16			24			12			15			119	8	2.26	Decreasing
9				Sakaki Bridge	Hitachi City/Tokai Village		290					44			11	0	0	0	161			156		135			55			111			92			0			49			18			14			14			68	9	1.19	Decreasing
10	Nakagawa River System	Nakagawa River	Nakagawa River	Noguchi	Hitachiomiya City/Shirosato Town		169					52			13				163			88		13			11			15			18			12			15			11			12			0			42	10	1.35	Decreasing
11				Shimokunii	Mito Cityi		5,500					78			16				128			116		246			101			131			76			249			73			369			62			142			521	11	2.76	Decreasing
12				Katsuta Bridge	Mito City/ Hitachinaka City		4,400					60			86	34	330	176	114			760		340			1,110			600			13			670			258			274			170			202			565	12	1.83	Decreasing
13			Nakamaru River	Yanagisawa Bridge	Hitachinaka City			4,400				1,810			690				1,200			510		890			1,110			880			700			560			730			810			700			680			1,119	13	0.89	Decreasing
14		Hinumagawa River	Hinumamae River	Nagaoka Bridge	Ibaraki Town			460								158						109					510			90			226			193			312			188			61			126			221	14	0.67	Decreasing
15			Hinuma River	Takahashi				84								270						57					19			39			16			18			480			55			16			13			97	15	1.52	Varying
16			Kansei River	Kansei Bridge				167								92						139					159			82			79			86			51			24			113			31			93	16	0.52	Decreasing
17			Daiya River	Oya Bridge	Hokota City			320								630						143					810			310			204			68			400			290			137			77			308	17	0.76	Decreasing
18			Hinuma River	Hinuma Bridge	Mito City/Oarai Town			630				570				1,260			36			330		560			190			430			400			440			550			390			364			442			471	18	0.59	Decreasing
19	Tonegawa River System	Kitaura River	Hokota River	Asahi Bridge	Hokota City		390					390				270			420			370		380			370			182			68			73			163			182			352			113			266	19	0.49	Unchanged
20			Tomoe River	Shintomoegawa Bridge			280					690				220			370			540		159			410			600			314			87			156			99			348			242			323	20	0.58	Decreasing
21			Taiyo River	Tazuka Bridge			720									108			330			159		172			320			320			136			198			174			93			154			141			233	21	0.72	Decreasing
22			Takeda River	Uchijuku-ohashi Bridge	Namegata City			460								152			630			380		230			177			260			291			254			190			228			238			220			285	22	0.47	Decreasing
23			Yamada River	Nioroshi Bridge				600								390			174			35		190			304			143			137			217			92			165			135			114			207	23	0.72	Decreasing
24			Kurakawa River	Kurakawa Bridge				1,020								239			187			290		183			98			100			105			222			319			58			117			121			235	24	1.06	Decreasing
25			Gantsu River	JA Yokohashi Bridge				320								260			223			264		166			211			195			164			151			185			77			110			122			188	25	0.36	Decreasing
26			Nagare River	Suhoi Bridge	Kashima City			1,260								830			490			590		370			530			340			236			156			182			219			188			144			426	26	0.76	Decreasing
27		Kasumigaura River	Sonobe River	Sonobeshin Bridge	Omitama City		280								260				1,370			290		910			430			570			223			281			800			11				97		162			437	27	0.88	Decreasing
28			Sanno River	Tokoro Bridge			1,920					1,950			1,550				900			1,510		1,470			860			820			730			1,800			31			680				368		590			1,084	28	0.56	Decreasing
29			Koise River	Heiwa Bridge	Ishioka City		194								830				680			770		210			153			135			116			101			263			34				31		70			276	29	1.03	Decreasing
30			Kajinashi River	Kamishuku Bridge	Namegata City		270								42				197			172		226			154			163			97			120			57			88				55		68			131	30	0.55	Decreasing
31			Hishiki River	Hishiki Bridge	Kasumigaura City		1,320					1,070			860				660			610		630			600			530			540			405			610			364				301		324			630	31	0.45	Decreasing
32			Ichinose River	Kawanaka Bridge			1,870					1,540			950				530			920		730			840			650			880			530			284			830				460		382			814	32	0.53	Decreasing
33			Sakai River	Sakai Bridge/National Route 354	Tsuchiura City		2,300					760			780				680			112		160			160			224			296			178			70			37				46		80			420	33	1.43	Decreasing
34			Shinkawa River	Shinten Bridge				5,500				4,400			900				4,000			2,210		2,340			4,100			4,200			3,900			2,170			1,640			1,640				1,480		1,410			2,849	34	0.51	Decreasing
35			Sakura River	Eiri Bridge	Tsuchiura City/Tsukuba City		58					136			62				270			213		128			76			52			39			126			73			79			21			37			98	35	0.73	Decreasing
36			Bizen River	Bizengawa Bridge	Tsuchiura City			2,600				228			4,800				4,500			2,800		2,150			1,770			1,860			1,360			1,540			1,490			1,110			350			720			1,948	36	0.70	Decreasing
37			Hanamuro River	Shinwa Bridge				1,390				820			1,280				1,000			29		570			810			790			790			1,200			830			930			432			396			805	37	0.45	Unchanged
38			Seimei River	Katsuhashi Bridge	Ami Town			1,420				5,800			2,130				1,790			4,100		3,500			1,290			1,170			940			870			610			970			920			790			1,879	38	0.82	Decreasing
39			Onogawa River	Okuhara-ohashi Bridge	Ryugasaki City/Ushiku City		260					220			620				570			980		990			960			910			420			620			610			450			432			520			612	39	0.42	Unchanged
40			Shintone River	Shintone Bridge	Inashiki City		220								330				270			400		440			370			350			420			318			11			249			199			194			290	40	0.41	Unchanged
41		Hitachitonegawa River	Yorokoshi River	Horinouchi Bridge	Itako City			290								310			290			196		222			210			530			117			430			34			36			22			329			232	41	0.67	Varying
42			Maekawa River	Ayame Bridge				510								580			470			500		580			630			430			200			400			16			430			409			473			433	42	0.38	Decreasing
43		Kinugawa River	Kinugawa River	Kawashima Bridge	Chikusei City			0				0				32			0			0		14			18			0			0			16			17			20			0			0			8	43	1.29	Varying
44				Takishita Bridge	Moriya City			130				202				100 / 40	119	11	196			380		289			187			83			113			133			213			75			56			90			142	44	0.66	Varying
45			Tagawa River	Tagawa Bridge	Chikusei City			1,080				201				10			146			24		54			35			40			36			52			65			16			17			16			128	45	2.18	Decreasing
46		Kokaigawa River	Kokai River	Kuroko Bridge		620						142				213			269			153		262			226			300			186			275			131			13			23			76			206	46	0.73	Decreasing
47				Fumimaki Bridge	Toride City			500				310				68			350			112		75			98			73			75			120			150			57			53			50			149	47	0.92	Decreasing
48			Yatagawa River	Maruyama Bridge	Tsukuba City			660								1,800						840					1,660			1,610			620			440			212			660				171		177			805	48	0.76	Decreasing
49			Nishiyata River	Sakaimatsu Bridge				500								1,000						750					1,160			630			420			244			37			208			450			30			494	49	0.75	Decreasing
50			Inari River	Oguki Bridge				1,900				1,190				1,610			1,470			1,580		1,250			1,770			2,150			720			680			640			710				610		460			1,196	50	0.47	Decreasing
51		Tonegawa River	Tonegawa River	Kurihashi Bridge	Koga City		1,440					159				52 / 48	42	18	123			39		22			109			55			23			26			149			42			20			29			141	51	2.40	Decreasing
52				Fukawa	Tone Town		820					330				320			95			122					290			171			202			62			57			100			236			65			221	52	0.93	Decreasing
53				Sawara	Inashiki City		1,220					330			195	202	181	39	140			133		256			117			101			115			88			11			14			90			15			191	53	1.46	Decreasing
						Total number of samples		726	Detection times		711																																								451	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 P.60 — Decreasing, Increasing, Unchanged, Varying

5) Tochigi Prefecture

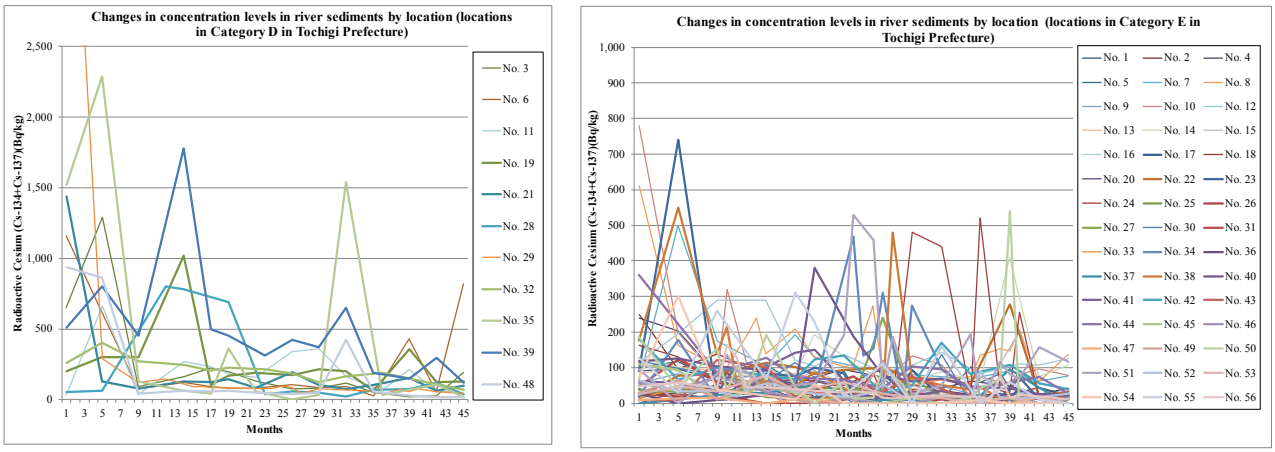
In Tochigi Prefecture, surveys were conducted 11 to 23 times from October 2011 to February 2015 at 56 locations (rivers) in public water areas (this analysis excludes the survey results at 49 locations where the survey was conducted only in 2011).

Regarding concentration levels of detected values, 11 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 38 locations but were generally unchanged or varying at 18 locations.

Table 4.3-13 Categorization 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	0	(None)
D	Upper 25 to 50 percentile	11	No.3、No.6、No.11、No.19、No.21、No.28、No.29、No.32、No.35、No.39、No.48
E	Lower than upper 25 to 50 percentile (lower 50%)	45	No.1、No.2、No.4、No.5、No.7、No.8、No.9、No.10、No.12、No.13、No.14、No.15、No.16、No.17、No.18、No.20、No.22、No.23、No.24、No.25、No.26、No.27、No.30、No.31、No.33、No.34、No.36、No.37、No.38、No.40、No.41、No.42、No.43、No.44、No.45、No.46、No.47、No.49、No.50、No.51、No.52、No.53、No.54、No.55、No.56



(*) 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)

Location							River sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																																																			Average (*2)	No.	Coefficient of variation	Trends (*3)
No.	Water area				Location	Municipality	2011								2012														FY2013													FY2014													Changes				
							8	9	10	11	12	1	2	3	4	5	6	6	7	8	8	9	10	11	12	1	2	3	4	5	6	6	7	8	9	10	11	12	1	2	3	4	5	6	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			13				12			14			23				18			26			12						36	1	0.91	Decreasing
2					Komei Bridge				250				97				139					78			43		64			51				97			38			36			24				24			45			19			72	2	0.87	Decreasing
3				Takaomata River	Takaomata Bridge	Nasu Town			650				1,290				89					162			221		197			133				76			79			116			52				20			25			191			236	3	1.51	Decreasing
4				Yukawa River	Yukawa Bridge				240				204				79					75			54		73			95				73			50			43			62				49			25			43			83	4	0.76	Decreasing
5				Nakagawa River	Kamikuroiso	Nasushiobara City/Nasumachi Town			101				116				64	87		44	72	109			59		16			91	49		28	73	42		74			11			102	58		83	45	90		44			24			64	5	0.46	Unchanged
6				Yosasa River	Yosasa Bridge	Nasu Town			1,160				610				73					120			91		79			78				105			85			90			24				430			55			820			273	6	1.20	Varying
7				Kurokawa River	Shinden Bridge				64				500				175					105			194		128				104			90			80			74			68				90			62			77			129	7	0.91	Decreasing
8				Yosasa River	Kawada Bridge	Otawara City			610				162				102	102		189	239	139			209		130			103	109		274	77	87		50			67			75	134		152	146	206		61			137			155	8	0.76	Decreasing
9				Nakagawa River	Kurobane				57				83				40	35		54	34	102			53		58			59	61		42	31	16		33			49			26	38		63	23	31		19			25			45	9	0.46	Decreasing
10				Matsuba River	Tributary				780				199				75	320		114	115	62			82		69			68	36		80	119	84		132			106			19	73		61	59	80		96			79			126	10	1.25	Decreasing
11				Sabigawa River	Udagawa Bridge				32				660				34					270			234		183			154				336			360			162				66			212			67			46			201	11	0.86	Decreasing
12				Momura River	Momuranaka Bridge				114				196				290					290			120		105			137				87			107			143				83				110		106			125			144	12	0.49	Decreasing
13				Hokigawa River	Yunohara	Nasushiobara City			83				100							84		98			58		36				72		56				42							12			16			11						56	13	0.58	Decreasing
14					Sekiba Bridge				126				101				76					81			82		193				111			64			67			88				60			410			75			106			117	14	0.81	Varying
15					Iwai Bridge	Otawara City			16				50				66					79			62		93			55				53			51			19				14				204		12			15			56	15	0.89	Varying
16					Hokigawa Bridge				165				89				30	72		54	34	52			52		53			17	21		46	18	11		36			25			11	17		22	15	24		11			17			39	16	0.90	Decreasing
17				Nakagawa River	Shinnaka Bridge	Nakagawa Town			40				14				51	31		30	107	38			56		16			33	19		14	57	0		94			18			19	17		19	15	42		15			12			33	17	0.80	Decreasing
18				Mumogawa River	Kosei Bridge				28				26				12	12	14	14		34			43		30			31	22		20	19	16		14			15			16	11		18	0	20		16			15			19	18	0.48	Decreasing
19				Arakawa River	Saikachi Bridge	Shioya Town			198				300				300					1,020			102		168			191				176			217			201			65				355			125			126			253	19	0.95	Decreasing
20					Renjo Bridge	Sakura City			0				33				32					44			15		33			63				0			12			14			13				0			13			11			20	20	0.94	Decreasing
21				Uchikawa River	Tanaka Bridge	Yaita City			1,440				130				78					127			122		143			85				195			103			72			105				152			63			97			208	21	1.78	Decreasing
22					Asahi Bridge	Sakura City			18				77				82					114			101		82			94				100			72			68			54				279			19			33			85	22	0.75	Varying
23				Arakawa River	Mukada Bridge	Nasu Karasuyama City			90				740				11	12	49	30		84			75		99			84	27		30	85	58		19			35			16	10		20	39	73		12			21			75	23	2.02	Decreasing
24				Egawa River	Tributary				162				130				58	85	52	51		58			66		63			45	18		84	24	20		480			440			21	520		36	28	255		20			18			119	24	1.31	Varying
25	Tonegawa River System	Kinugawa River System		Kinugawa River	Kawaji Daiichi Power Station, front	Nikko City			19				40							36		75			19		45				38			33			71			17			21				13			17			13			33	25	0.62	Decreasing
26				Yunishi River	Maesawa Bridge				25											10		0					0				13			0			0			12			0				11			21						8	26	1.09	Varying
27				Ojika River	Tributary				37				32							36		18			16		15				14			240			17			35			11				14			20			11			37	27	1.66	Varying
28				Kinugawa River	Kosagoe				55				63							800		780					690				35			59			47			23			66				73			118			36			219	28	1.45	Varying
29				Itaana River	Tributary				4,900				290				120			146		113	91	91	86						75	81	94	86	43		73						62	41		72	53	75		55			47			319	29	3.38	Decreasing
30				Yukawa River	Tributary				118											63		60			114		72				0			0			11			137			0				10			0						49	30	1.07	Decreasing
31				Daiya River	Shinkyo Bridge				47				123				58					37			54		38				75			21			33			15			12				20			17			20			41	31	0.76	Decreasing
32				Shidobuchi River	Sujichigai Bridge				260				400				270					245			203		226				212			182			123			162				189			150			108			67			200	32	0.38	Decreasing
33				Daiya River	Kaishin Bridge (Harigai)				13				45				45			24		69	15	0	57		13				16	15	0	15	11		18			12				24	11	13	0	12		0			0			19	33	0.99	Decreasing
34				Kinugawa River	Sanuki	Shioya Town			20				177				11			29		109	18	12	74		42				470	134	154	310		17	274			97				14	0	0	0	20		0			19			87	34	1.41	Varying
35				Nishi-Kinugawa River	Nishi-Kinugawa Bridge	Utsunomiya City			1,520				2,290				126					65			45		360			56				0			31			1,540				32			69			108			18			447	35	1.72	Decreasing
36				Kinugawa River	Kinugawabashi Bridge (Hoshakuji Temple)				28				0				10					24			20		14			31				0			0			0				0			13			0			0			10	36	1.18	Decreasing
37					Daidoizumi Bridge	Mooka City			0				12				24					30			42		51			0				10			11			0				22			95			43			0			24	37	1.11	Varying
38				Egawa River	Tributary	Shimotsuke City			175				550				137	214	56	62		58			49		88			41	30		34	17	480		70			51			38	46		13	20	0		19			11			98	38	1.47	Decreasing
39				Akabori River	Nikko City Hall, front	Nikko City			510				800				450					1,780			500		450				310			420			370			650			191				150			293			117			499	39	0.83	Decreasing
40					Kiwadajima				117				125				104					93			40		380				187			78			61			69			48				41			26			25			100	40	0.94	Decreasing
41				Tagawa River	Ozobashi Bridge	Utsunomiya City			62				57				28	69	104	28		101			142		150			64	23		18	13	36		17			35			20	12		27	12	13		14			16			46	41	0.91	Decreasing
42				Kamagawa River	Tsukushi Bridge				182				65				99					78			68		123			133				27			50			169			81				107			56			40			91	42	0.51	Varying
43				Tagawa River	Meiji Bridge	Kaminokawa Town			10				10				122					101			18		29			32				31			76			41			0				17			14			0			36	43	1.05	Varying
44					Yanabashi Bridge	Oyama City			360				223				86					128			73		69			66				43			104			96			42				57			74			27			103	44	0.86	Decreasing
45		Watarase River Area	Omoi River	Kurokawa River	Kaijima Bridge	Kanuma City			109				93				11					46			30		0			19				0			15			0			10				14			0			0			25	45	1.44	Decreasing
46					Onari Bridge	Mibu Town			56				38				75					32			15		0			13				0			0			17				0			0			0			0			18	46	1.40	Decreasing
47				Oashi River	Akaishi Bridge	Kanuma City			10				14				15					0			11		11			0				0			0			0			0				0			18			0			6	47	1.26	Varying
48				Koyabu River	Koyabu Bridge				940				860				42					65			56		65			46				36			49			420			60				29			19			18			193	48	1.68	Decreasing
49				Omoi River	Tamotsu Bridge	Tochigi City			30				66				12					79			10		0				0			119			0			0				0			0			0			0			23	49	1.73	Varying
50					Otome-ohashi Bridge	Oyama City			186				40				154	34	106	27		191			46		0			62	13		15	101		53	0			0			15	43		65	540	0		0			0			74	50	1.62	Varying
51			Uzuma River Area	Uzuma River	Uzuma Bridge	Tochigi City			95				0				82	135	89	89		34			52		56			192	530		460	44	186		26			50			195	0		115	82	69		157			116			124	51	1.07	Varying
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			18	19		32	54		20	15			21			15	90		18	15	13		18			28			32	52	0.62	Varying
53					Hajika Bridge	Ashikaga City			26				48				34					80			36		46			59				28			16			15			0				15			0			14			30	53	0.78	Decreasing
54					Nakabashi Bridge				71				300				37					22			12		53			0				0			0			0				10			0			0			0			36	54	2.27	Decreasing
55					Watarase-ohashi Bridge	Tatebayashi City			128				30				260					67			310		228			21				112			0			160				0			59			12			0			99	55	1.06	Decreasing
56					Shinkai Bridge	Tochigi City			48				57				43	164	127	46		45			40		36			29	34		30	16	13		19			22				17	11	77	16	24			18		11			41	56	0.92	Decreasing
							Total number of samples		935	Detection times		849																																													104	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 P.60 — Decreasing, Increasing, Unchanged, Varying

6) Gunma Prefecture

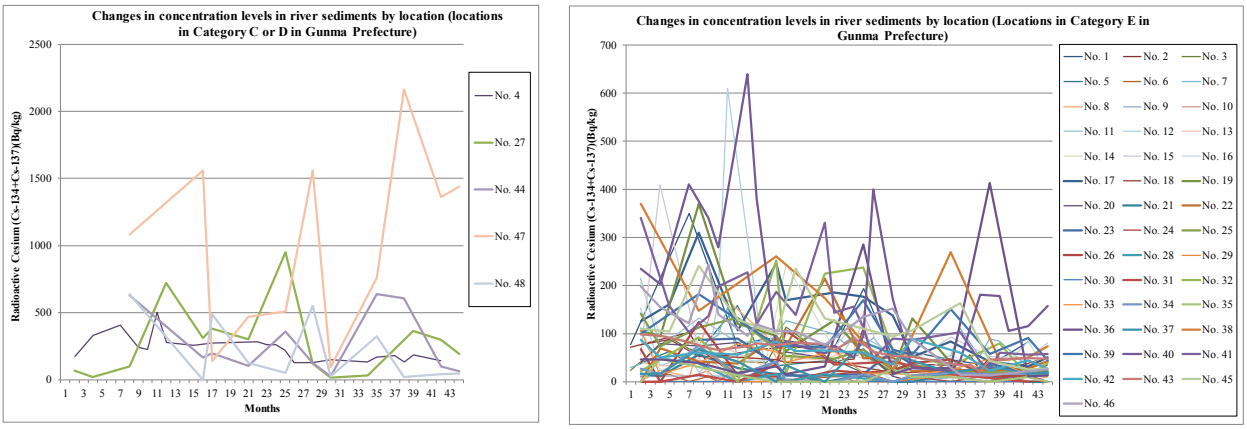
In Gunma Prefecture, surveys were conducted 8 to 23 times from November 2011 to January 2015 at 48 locations (rivers) in public water areas (this analysis excludes the survey results at eight locations where the survey was conducted only in 2011).

Regarding concentration levels of detected values, one location was categorized into Category C, four locations into Category D, and 43 locations into Category E (see Table 4.3-15 and Table 4.3-16).

Concentration levels were generally decreasing at 33 locations but were generally unchanged or varying at 15 locations.

Table 4.3-15 Categorization 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	0	(None)
C	Upper 10 to 25 percentile	1	No.47
D	Upper 25 to 50 percentile	4	No.4、No.27、No.44、No.48
E	Lower than upper 25 to 50 percentile (lower 50%)	43	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.16、No.17、No.18、No.19、No.20、No.21、No.22、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.39、No.40、No.41、No.42、No.43、No.45、No.46



(*) 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)

Location						River sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																																																																																																			
No.	Water area			Location	Municipality	2011								FY2012												FY2013												FY2014												Changes	Average (*2)	No.	Coefficient of variation	Trends (*3)
						8	9	10	11	12	1	2	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	4	5	6	7	8	9	10	11	12	1	2	3					
1			Tonegawa River	Hirose Bridge	Minakami Town				77						350				74		90							72		194			52		61					42		34			83						103	1	0.90	Decreasing
2				Tsukiyono Bridge					71			87			102		37	55 / 54	60		68		71					70 / 46	47	115	40		60		36					33 / 55	25	50	23		38		51				56	2	0.41	Decreasing
3			Akaya River	Kosode Bridge					24				92		68				42		40		113					39		60			13		90					16		17			19		24				47	3	0.70	Decreasing
4			Sakura River	In Ooaza Yachi	Kawaba Village					173		330			410		244	227 / 500	279		259		271					282 / 260	263	222	126		129		147				135	169	179	132	185		141						230	4	0.41	Decreasing
5			Katashina River	Kirinoki Bridge	Katashina Village					38			63		38				159		31							46		17			17		34				15			13			17						41	5	0.99	Decreasing
6				Tonemachitakatoya	Numata City					10			15		0		10	0 / 15	0		0							10 / 10	0	0	0		0		0				42	0	0	0	0		0						5	6	1.88	Varying
7				Futae Bridge					30			51			39		86	96 / 154	47		74		126					99 / 80	95	74	92		39		34				54	110	53	89	85		30		36				73	7	0.46	Unchanged
8		Tonegawa River	Agatsuma River	Shinto Bridge	Naganohara Town					0		24			11			187			95		0					0		0			0		0					38		27			0		10				28	8	1.88	Decreasing
9			Shirasuna River	Shuttatsu Bridge	Nakanojo Town					12									12									0		12			0		0					10		0			0		0				5	9	1.30	Decreasing
10			Agatsuma River	Downstream of Azuma Bridge	Higashi-Agatsuma Town					0		0			11		22	0 / 14	14		10		0				0	0	0	12	0		0		0				0	0	0	0	11		0		0				4	10	1.63	Decreasing
11			Nakuta River	Tonoda Bridge	Takayama Village					215		73				133			81		85		83					68		93			60		38					19		15			17		21				72	11	0.76	Decreasing
12			Agatsuma River	Agatsuma Bridge	Shibukawa City					153		33			53	19	37	170 / 610			0		11				16	34	95	51	56		46		10				0	26	11	11	0		13		17				64	12	1.99	Decreasing
13			Tonegawa River	Taisho Bridge						39		34			31	49	15	56 / 69			30		50				46	54	65	147	16		15		20				25	20	14	12	15		35		53				40	13	0.74	Varying
14			Takizawa River	Shintakizawa Bridge	Shibukawa City/Yoshioka Town					206		97				80			50		48		245					65		48			24		39				23			15			24		22				70	14	1.00	Decreasing
15			Tonegawa River	Gunma-ohashi Bridge	Maebashi City					55		410				64			0			37	53					73		140			12		43				93			52			50		80				83	15	1.21	Decreasing
16				Fukushima Bridge	Tamamura Town					112		23				44			43			46	39					64		56			0		0				57			0			85		16				42	16	0.79	Varying
17			Nagai River	Kamigonda Bridge	Takasaki City					126			160			310			107			247	170					186		176			137		52				84			42			31		51				134	17	0.61	Decreasing
18			Karasu River	Karasugawa Bridge						77			88			52			51			45	39					41		30			19		19					26		13			11		35				39	18	0.58	Decreasing
19			Usui River	Nakase Bridge	Annaka City					106		94				370			120			95	63					127		57			19		131					17		27			26		22				91	19	1.00	Decreasing
20				Hanataka Bridge	Takasaki City					38		78				74			82			40	61					47		68			12		0				0			0			13		0				37	20	0.88	Decreasing
21			Kabura River	Tadakawa Bridge	Shimonita Town					17		11				56			29			15	17				0			13			0		0				17			12			0		0				13	21	1.14	Decreasing
22				Kaburagawa Bridge	Takasaki City/Fujioka City					0		69				42			38			91	73				214			49			50		22				24			23			27		43				55	22	0.94	Varying
23			Ogawa River	Kinzan Bridge	Kanra Town											87			90			36	13				13			16			63		36					13		37			18		18				37	23	0.77	Decreasing
24	Tonegawa River System	Karasu River	Nanmoku River	Ozawa Bridge	Nanmoku Village											68			10			18	0				13			21			0		11				0			13			0		0				13	24	1.48	Decreasing
25			Someya River	Yakushi Bridge	Shinto Village					142		73				113			133			67	53					47		67			24		35				23			20			20		17				60	25	0.72	Decreasing
26			Inogawa River	Kamakura Bridge	Takasaki City					68		0				125			12			11	0					23		19			23		39				46			10			12		14				29	26	1.16	Decreasing
27			Karasu River	Iwakura Bridge	Takasaki City/Tamamura Town					67		19				101			720			310	380				302			950			122		16				29				362		296		192				276	27	0.99	Varying
28			Kanna River	Shinkaname Bridge	Ueno Village											37			0			16	0				16						0						17						0						11	28	1.24	Decreasing
29			Kanna River	Morito Bridge	Kanna Town					0		0				0			0			0	0				0						0						13						0						1	29	3.16	Varying
30			Kanna River	Tobukyo Bridge	Fujioka City/Kamikawa Town					0		0				0			0			43	0				0						0						0						0						4	30	3.16	Varying
31			Kanna River	Kannagawa Bridge	Kamisato Town					0		0				14			0			36	107					36					42						16						0						25	31	1.33	Varying
32			Tonegawa River	Bando-ohashi Bridge	Honjo City					22		46				93			0			252	17				224			237			66		53				33				79		11		39				84	32	1.04	Varying
33			Akagishirakawa River	In Shimohosoi Town	Maebashi City					108		15				40			78			61	41					63		17			18		13				25			47			15		10				39	33	0.75	Decreasing
34			Momonoki River	Utsuboi Bridge						27		15				75			14			41	0					0		16			0		13				19			16			17		15				19	34	1.01	Decreasing
35			Arato River	Okuhara Bridge						0		48							13			0	0					0		0			26		10				10			0			10		0				9	35	1.57	Decreasing
36		Tonegawa River	Kasukawa River	Hozumi Bridge	Isesaki City					46		46				39			18			31	16				31			286			15		29				28			413			11		13				73	36	1.65	Varying
37			Hirose River	Nakajima Bridge						15		17				68			41			0	35				0			83			57		45				19			32			17		18				32	37	0.77	Varying
38			Hayakawa River	Hayakawa Bridge						370						147						261					173			82			25		95				270				45		51		73				145	38	0.77	Decreasing
39				Maejima Bridge	Ota City					99						183						77					70			169			67		56				150			58			91		44				97	39	0.50	Varying
40			Tonegawa River	Tone-ozeki Weir	Chiyoda Town /Gyoda City					235		203			410		340	280		640 / 380		72	83				59	75	50	95	400		172		28				23	45	181		178 / 105		116		158				188	40	0.83	Decreasing
41			Koguro River	Kayano Bridge	Kiryu City					340			158		103		136	198		228 / 120		187		139			330	143	157	113	48		90		87					102 / 72	41	26	61		56		57				130	41	0.64	Decreasing
42			Watarase River	Takatsudo	Midori City					86		50				60			56			84		64			65			61			36		89					60		23			45		27				58	42	0.35	Decreasing
43				Intake for Akaiwayosui water channel	Kiryu City					98		96			82		69	66		74 / 80		76		81			78	65	90	78	62		53		52					35 / 35	20	46	46		49		47				64	43	0.32	Decreasing
44		Watarase River Area	Tatara River	Ejiri Bridge	Oura Town											630						164	197				104			360			126		26					640		610			101		64				275	44	0.88	Varying
45			Kiryu River	Kannon Bridge	Kiryu City					110			104			240			128			100		235			131			110			94		107					164		43			25		27				116	45	0.56	Decreasing
46				Sakai Bridge	Kiryu City/Ashikaga City					198		155			122		243	140		95 / 118		105		104			76			135			152		88					14		12			22		26				106	46	0.61	Decreasing
47			Tsuruuda River	Lake Jonuma	Tatebayashi City											1080						1560	141				470			510			1560		92					760		2160			1360		1440				1,012	47	0.66	Varying
48			Yatagawa River	Togoda Bridge	Meiwa Town/Itakura Town											640						0	490				124			52			550		28					320		22			40		48				210	48	1.16	Decreasing

Total number of samples	715	Detection times	608

Average	93

*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 P.60 — Decreasing, Increasing, Unchanged, Varying

6) Chiba and Saitama Prefectures and Tokyo Metropolis

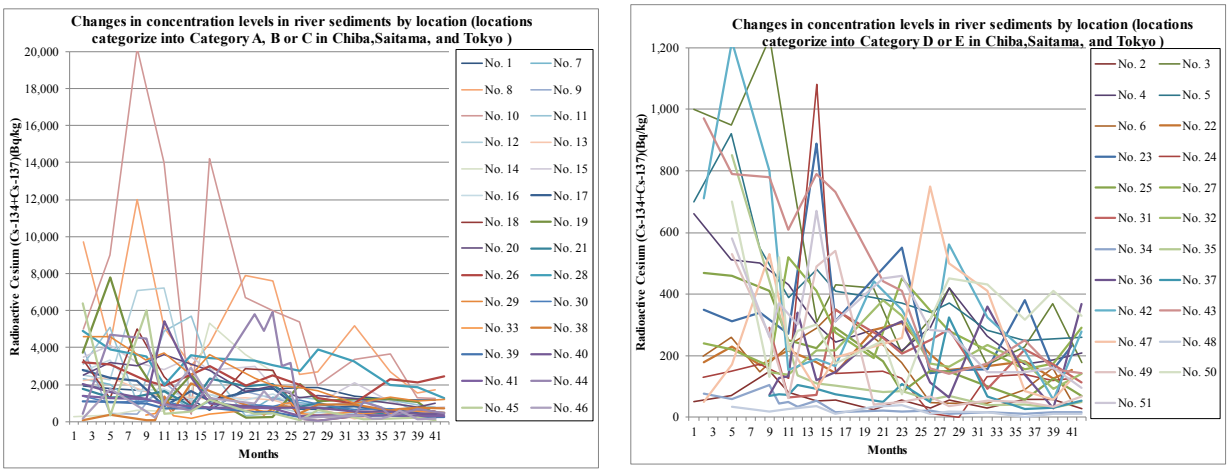
In Chiba and Saitama Prefectures and Tokyo Metropolis, surveys were conducted 12 to 22 times from October 2011 to February 2015 at 51 locations (rivers) in public water areas (47 locations in Chiba Prefecture, two locations in Saitama Prefecture, and two locations in Tokyo Metropolis).

Regarding concentration levels of detected values, three locations were categorized into Category A, 11 locations into Category B, 14 locations into Category C, 14 locations into Category D, and nine locations into Category E (see Table 4.3-17 and Table 4.3-18).

Concentration levels were generally decreasing at 37 locations but were generally unchanged or varying at 14 locations.

Table 4.3-17 Categorization 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	3	No.8、No.10、No.28
B	Upper 5 to 10 percentile	11	No.1、No.11、No.12、No.15、No.16、No.18、No.19、No.20、No.26、No.29、No.44
C	Upper 10 to 25 percentile	14	No.7、No.9、No.13、No.14、No.17、No.21、No.30、No.33、No.38、No.39、No.40、No.41、No.45、No.46
D	Upper 25 to 50 percentile	14	No.3、No.4、No.5、No.22、No.23、No.25、No.27、No.31、No.32、No.42、No.43、No.47、No.50、No.51
E	Lower than upper 25 to 50 percentile (lower 50%)	9	No.2、No.6、No.24、No.34、No.35、No.36、No.37、No.48、No.49



(*) 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)

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 (upper reaches)	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 reaches)		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		
						Detection times		738	Detection times		736														

No.	FY2013												FY2014												Changes	Average (*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		1,800			1,750			1,840		1,810				1,370			1,210			1,150		1,170				1,459	1	0.27	Unchanged
2		26			56			31		55				31			57			59			27			57	2	0.54	Decreasing
3		420			210			320		420				171			229			369			178			506	3	0.69	Decreasing
4		285			217			291		420				263			173			185			207			335	4	0.44	Decreasing
5		390			370			340		370				283			248			255			258			426	5	0.44	Decreasing
6			236		177			49		45				46			89			161		48				166	6	0.60	Decreasing
7			720		1,330			1,020		910				920			1,160			580		221				1,102	7	0.51	Decreasing
8		7,900			7,600			2,560		2,690				5,200			2,660			1,550		1,700				4,997	8	0.64	Decreasing
9		1,600			1,250			930		820					1,120		610			680		470				1,140	9	0.82	Decreasing
10		6,700			6,000			5,400		1,970				3,360			3,640			1,290		1,220				6,597	10	0.89	Decreasing
11		305			430			1,310		1,190				1,100			1,160			900		790				2,134	11	0.87	Decreasing
12		920			820			460		460				440			440			440		305				1,863	12	1.26	Decreasing
13		1,280			1,170			750		710				129			510			510		392				1,119	13	0.60	Decreasing
14		3,600			2,680			162		222				265			390			410		419				1,203	14	1.31	Varying
15			2,980		1,890			800		970				2,070			1,060			740			750			2,222	15	0.54	Decreasing
16		1,150			1,480			760		760					730		640			600		456				1,328	16	0.62	Decreasing
17		1,590			1,790			680		670				850			550			458		309				1,277	17	0.62	Decreasing
18		2,840			2,780			126		58				265			620			640		540				1,531	18	0.97	Decreasing
19		202			231			2,030		1,080				1,220			1,220			1,050		352				1,915	19	1.04	Decreasing
20		1,620			1,900			1,280		1,390				1,250			1,000			760		1,000				2,027	20	0.48	Decreasing
21		1,910			2,020			810		1,010				540			420			234		408				1,183	21	0.57	Decreasing
22		284			307			205		154				167			181			126		153				193	22	0.27	Unchanged
23		450			550			143			154			157			380			155		232				335	23	0.60	Decreasing
24			149		127			12			0			132			139			120		126				186	24	1.41	Varying
25			182		81			150		149				99			58			125			70			216	25	0.66	Decreasing
26		1,940			2,480			2,000		1,240				980			2,270			2,100			2,450			2,248	26	0.28	Decreasing
27		191			450			348		282				216			155			175			292			281	27	0.40	Unchanged
28			3,300		3,040			2,730		3,900				3,240			2,000			1,840			1,260			3,043	28	0.32	Decreasing
29			2,350		1,950			1,820		1,680				990			1,330			1,100			1,200			2,481	29	0.51	Decreasing
30			890		820			1,150		920				630			670			570			490			870	30	0.29	Decreasing
31			258		206			250		287				92			219			171			114			198	31	0.48	Unchanged
32			380		330			175		164				235			180			93			142			201	32	0.41	Unchanged
33			660	550	580	960	1,020	420		330				520	390	500	400	680		540			490			541	33	0.46	Unchanged
34			20		19			20		12				16			11			15			16			35	34	0.76	Decreasing
35			83		84			56		70				38			42			31			50			138	35	1.65	Decreasing
36			283		310			112		65				360			139			30			368			186	36	0.64	Varying
37			48		108			50		323				67			27			31			54			86	37	0.85	Varying
38			700	380	700	850	810	440		940				920	840	680	590	650		760			700			736	38	0.65	Varying
39			480		480			222		295				279			335			260			255			562	39	0.56	Decreasing
40			790		730			770		770				520			530			406			430			1,324	40	1.00	Decreasing
41			730		710			304		309				306			321			286			277			688	41	0.58	Decreasing
42		440			350			178		560				323			215			56			277			403	42	0.80	Decreasing
43			440		410			158		141				175			251			156			144			468	43	0.65	Decreasing
44			5,800	4,900	5,900	3,010	3,180	138		34				295	1,060	730	314	411		670			460			2,003	44	1.04	Varying
45			410		460			80		640					108		167			213		52				1,212	45	1.76	Decreasing
46			960	1,640	1,130	1,680	1,590	146		232					329 154	174	284	570		131		160				853	46	0.90	Decreasing
47			238		259			750		500				410			85			56		125				264	47	0.79	Varying
48		34			38			10		19				17			0			10			10			20	48	0.60	Decreasing
49		41			49			67		36				53			48			35			68			176	49	1.17	Decreasing
50			248		75			316		450				430			317			410			330			327	50	0.49	Unchanged
51			450		460			283		278				145			147			160			96			332	51	0.50	Decreasing
																										1,082	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 P.60 — Decreasing, Increasing, Unchanged, Varying

(2)-2 Lakes

1) Miyagi Prefecture

In Miyagi Prefecture, surveys were conducted 7 to 13 times from October 2011 to December 2014 for lake sediment samples collected at 21 locations.

Regarding concentration levels of detected values, six locations were categorized into Category D and 15 locations were categorized into Category E (see Table 4.3-19 and Table 4.3-20).

Concentration levels were generally decreasing at 12 locations but were generally unchanged or varying at nine locations.

Table 4.3-19 Categorization 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	0	(None)
D	Upper 25 to 50 percentile	6	No.8、No.9、No.13、No.15、No.16、No.17
E	Lower than upper 25 to 50 percentile (lower 50%)	15	No.1、No.2、No.3、No.4、No.5、No.6、No.7、No.10、No.11、No.12、No.14、No.18、No.19、No.20、No.21

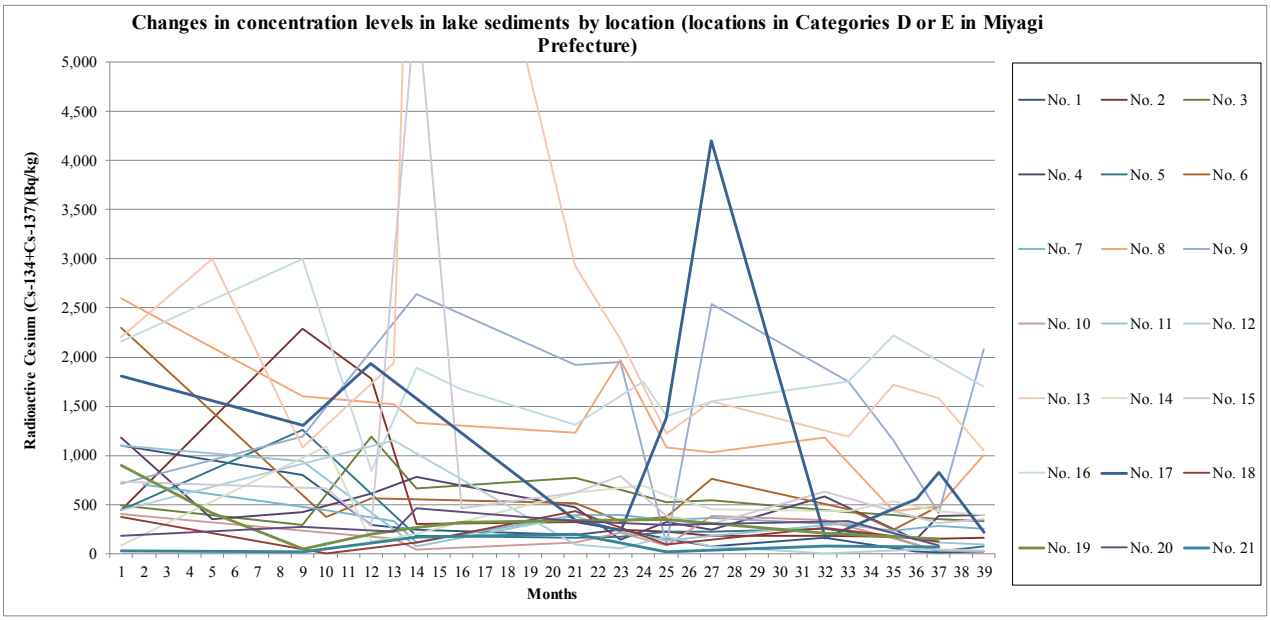


Figure 4.3-11 Changes in concentration levels over the years at respective locations
(Miyagi Prefecture: lake sediments)

Table 4.3-20 Detection of radioactive cesium at respective locations (Miyagi Prefecture: lake sediments)

Location					Lake Sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																																												Changes	average (*2)	No.	coefficient of variation	Trends (*3)
No.	Water area		Location	Municipality	FY2011								FY2012												FY2013												FY2014																
					8	9	10	11	12	1	2	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	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							193		241		154		69					164				23	14		18					276	1	1.21	Decreasing
2	Kitakami River System	Hanayama Dam	Dam site	Kurihara City			440								2,290			1,780		300							320		243		225		184					185			168		153		161					537	2	1.33	Decreasing
3	Kitakami River System	Narugo Dam	Dam site	Osaki City			490								290			1,190		660							770		650		520		540						420		394		350		331					550	3	0.45	Decreasing
4	Kitakami River System	Lake Naganuma	Dam site	Osaki City			1,180				350				420			610		780							470		146		318		238					580				141	384		392					462	4	0.61	Decreasing
5	Kitakami River System	Shukunosawatameike Pond	Pond exit	Kurihara City			440								1,260					183							161		176		216		225					246			164		19		76					288	5	1.18	Decreasing
6	Naruse River System	Futatsuishi Dam	Dam site	Kami Town			2,300									370		560		550							510		331		369		760						450		245		480							630	6	0.91	Decreasing
7	Naruse River System	Urushizawa Dam	Dam site	Kami Town				700								440			330	115							390		390		343		364						286		231		284		252					344	7	0.41	Decreasing
8	Naruse River System	Minamikawa Dam	Dam site	Taiwa Town			2,600								1,600				1,520	1,330							1,230		1,970		1,080		1,030					1,180			432		476		1,000					1,287	8	0.46	Decreasing
9	Sunaoshi River System	Sonoseki Dam	Dam site	Rifu Town			710								1,190					2,640							1,920		1,950		88		2,540						1,750		1,150		415		2,080					1,494	9	0.57	Varying
10	Nanakita River System	Nanakita Dam	Dam site	Sendai City			400								232				148	44							107		213		80		380					340				91	33		20					174	10	0.79	Varying
11	Marutazawatameike Pond		Pond exit	Sendai City			1,100								940					69							380		222		129		181						313			165	109		94					337	11	1.05	Decreasing
12	Natori River System	Okura Dam	Dam site	Sendai City			440												1,150								88		47		175		68					0				41	46		35					209	12	1.70	Decreasing
13	Lake Amanuma		Lake exit	Sendai City			2,200				3,000				1,080				1,940	9,700							2,930		2,180		1,220		1,550						1,190		1,720		1,580		1,050					2,411	13	0.95	Decreasing
14	Natori River System	Kamafusa Dam	Dam site	Kawasaki Town			85									1,090		126		204							620			690	590		450						430		530		431		395					470	14	0.58	Varying
15	Abukuma River System	Kawarago Dam	Dam site	Shiroishi City			730									660		280		5,700		460					620		790		380		297					630			430		306		352					895	15	1.62	Varying
16	Abukuma River System	Shichikashuku Dam	Dam site	Shichikashuku Town			2,160								3,000			840		1,890		1,670					1,310			1,750	1,400		1,550						1,750		2,220		1,960		1,700					1,785	16	0.29	Unchanged
17	Lake Bagyunuma		Lake exit	Shiroishi City			1,810								1,310			1,940									340		231		1,380		4,200					160				560	830		215					1,180	17	1.01	Varying
18	Abukuma River System	Murata Dam	Dam site	Murata Town			370									0				115							430				92							259					121							198	18	0.80	Varying
19	Kitakami River System	Lake Izunuma	Lake exit	Tome City			900				420				48			195		270		320					340				350							208					149							320	19	0.72	Decreasing
20	Natori River System	Tarumizu Dam	Dam site	Natori City			185								270				222	460							326				288								329				79							270	20	0.42	Unchanged
21	Naruse River System	Miyatoko Dam	Dam site	Taiwa Town			31								12					163							195				18							75					66							80	21	0.90	Varying
					total number of samples		233	Detection times		231																																						676	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 P.60 — Decreasing, Increasing, Unchanged, Varying

2) Fukushima Prefecture

i. Hamadori

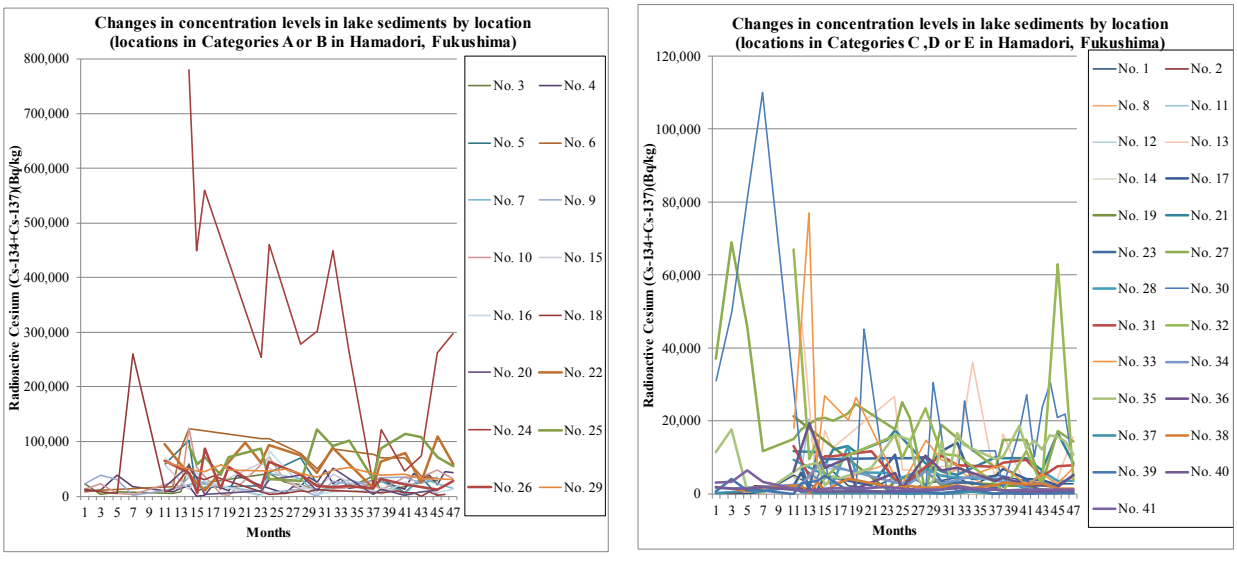
In Hamadori, Fukushima Prefecture, surveys were conducted 5 to 33 times from September 2011 to February 2015 for lake sediment samples collected at 41 locations.

Regarding concentration levels of detected values, eight locations were categorized into Category A, eight locations into Category B, 16 locations into Category C, six locations into Category D, and three locations into Category E (see Table 4.3-21 and Table 4.3-22).

Concentration levels were generally decreasing at 21 locations, generally unchanged or varying at three locations, and generally increasing at three locations.

Table 4.3-21 Categorization 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.5、No.6、No.10、No.22、No.24、No.25、No.26、No.29
B	Upper 5 to 10 percentile	8	No.3、No.4、No.7、No.9、No.15、No.16、No.18、No.20
C	Upper 10 to 25 percentile	16	No.8、No.11、No.13、No.17、No.19、No.21、No.23、No.27、No.28、No.30、No.31、No.32、No.33、No.34、No.35、No.36
D	Upper 25 to 50 percentile	6	No.1、No.14、No.38、No.39、No.40、No.41
E	Lower than upper 25 to 50 percentile (lower 50%)	3	No.2、No.12、No.37



(*) 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)

Location				Lake Sediments/Radioactive Cesium (Cs-134+Cs-137)/Concentration(Bq/kg)(*1)																																																
No.	Location		Municipality	FY2011								FY2012												FY2013												FY2014												Changes	average (*2)	No.	coefficient of variation	Trends (*3)
				8	9	10	11	12	1	2	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	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			4,300	1,280	2,650		3,700		4,400		2,580			5,200	4,800		3,530		2,830		2,740		2,730			2,841	1	0.64	Increasing
2	Soso (farm pond)	Uchizawa	Soma City		250		45		830	2,140																350	370	530		340		277		254			390	222		307		213		282		239			440	2	1.10	Decreasing
3	Matsugabo Dam (Lake Utagawa)		Soma City		22,000		3,600		7,500							4,900	7,800	59,000	23,400							42,000	26,200	20,900		10,800		15,400		16,800			36,900	10,400		17,200		25,100		28,800					21,039	3	0.68	Varying
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			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			22,694	4	0.58	Varying
5	Soso (farm pond)	Ainosawa	Iitate Village												59,000			103,000	8,100	15,500					19,400	43,000		70,000		22,700		14,200					28,700	33,900		7,200		33,000		3,530					32,945	5	0.85	Decreasing
6	Ganbe Dam Reservoir		Iitate Village		8,200		12,200									18,000	87,000	123,000	121,000						106,000	106,000		78,000		50,000		87,000					77,000	71,000		71,000		36,800		32,800					67,813	6	0.56	Varying
7	Soso (farm pond)	Fugane Dam	Iitate Village												12,000			20,500	26,600	26,500					2,540	41,000		32,000		4,100		19,900		30,900			17,800	26,900		3,610		33,000		22,400		14,100			20,866	7	0.54	Varying
8	Soso (farm pond)	Sasatoge	Iitate Village												4,700			4,000	2,900	2,760					8,200	1,030		7,500		5,100		6,600					1,090	2,960		3,090		3,390		980					3,879	8	0.60	Varying
9	Takanokura Dam Reservoir		Minamisoma City		22,000		39,000		30,000		1,560					12,400	19,100	35,000	23,600							7,300	9,800	13,200		960		26,800		23,400			27,200	33,900		35,100		24,200		35,200					22,091	9	0.53	Increasing
10	Yokokawa Dam Reservoir		Minamisoma City		13,800		23,000		4,500		3,500					25,900	14,200	125,000	53,000		2,900	2,020				72,000	29,300	12,500		24,300		12,300					22,900	11,900		34,700		35,700		48,000		32,200			28,744	10	0.99	Varying
11	Soso (farm pond)	Tarayachi	Minamisoma City												420	7,600	20,500	7,200				6,400																											8,424	11	0.87	Decreasing
12	Soso (farm pond)	Takeshiyachi	Minamisoma City															1,180	1,340	1,240	790					550 1,180		600		410		520		600			1,240	294		293		1,080		265		225			738	12	0.55	Decreasing
13	Soso (farm pond)	Ryugasaku	Minamisoma City													47,000		1,080	17,400	12,500						26,600 6,600		6,600		7,400		8,000		36,000			3,670	16,300		1,590		2,410		4,140		15,600			13,306	13	0.99	Varying
14	Soso (farm pond)	Uwatashiro	Kawamata Town												4,200			5,100	690	820					380	1,060		780		311		140					165	193		190		226		660					1,065	14	1.46	Decreasing
15	Soso (farm pond)	Koakuto	Namie Town												56,000			13,000	32,000	13,000					61,000	51,000		14,600		12,500		40,000					3,260	16,300		1,530		8,900		10,300					23,814	15	0.85	Decreasing
16	Soso (farm pond)	Yosouchi	Iitate Village												70,000			33,000	44,000	27,700					520	84,000		20,700		3,030		8,900					11,300	4,000		25,300		17,300		7,300		13,000			24,670	16	1.00	Decreasing
17	Soso (farm pond)	Myobusaku No. 2	Minamisoma City												2,240	5,800	1,180	830	5,100				2,250			10,800 1,750		6,400		11,800		14,000		4,000			4,900	6,800		4,080		3,760		2,460		5,000			5,175	17	0.72	Varying
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					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				21,554	18	2.28	Decreasing
19	Soso (farm pond)	Uenokawa	Katsurao Village												21,200										1,100	3,600		6,400		2,420		3,050					2,580	2,450		2,030		1,070		810		710			3,952	19	1.43	Decreasing
20	Soso (farm pond)	Heigoiri	Iitate Village												17,600			56,000	34,000	2,790					9,900	31,000		39,000		9,400		52,000					4,200	12,600		1,910		7,700		10,800					20,636	20	0.89	Varying
21	Soso (farm pond)	Mekurasawa No. 2	Namie Town												11,700			11,400	7,900	12,100	13,200	11,500			14,800	17,400		8,300		6,300		5,200					10,000	9,700		9,700		6,500		16,800		8,300			10,635	21	0.33	Unchanged
22	Soso (farm pond)	Joroku	Namie Town												96,000			40,000	23,800	10,000			98,000		62,000	93,000		74,000		43,000		89,000					16,000	64,000		79,000		25,600		110,000		58,000			61,338	22	0.52	Varying
23	Furumichigawa Power Plant Dam		Tamura City													7,600	1,580	11,000	9,500						9,800		9,900	10,000		3,200		2,980		3,100			1,620	2,830		3,750		87		161					5,141	23	0.78	Varying
24	Soso (farm pond)	Sawairi No. 1	Futaba Town															780,000	450,000	560,000					254,000	460,000		279,000		302,000		450,000		266,000			20,500	121,000		46,000		74,000		263,000		297,000			308,167	24	0.67	Decreasing
25	Soso (farm pond)	Suzunai No. 4	Okuma Town															91,000	59,000	72,000	40,000	71,000			88,000	32,000		27,700		123,000		92,000		102,000			31,600	88,000		114,000		108,000		72,000		55,000			74,488	25	0.40	Unchanged
26	Soso (farm pond)	Nishihaguro	Futaba Town												65,000			43,000	5,200	87,000	13,900	54,000			15,100	63,000		39,000		18,500		17,100		18,200			13,800	31,000		22,600		17,200		12,900		28,300			31,378	26	0.72	Decreasing
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				17,700 25,000	20,700	350		18,800		15,300					7,200	14,800		14,700		2,600		17,100		14,300			20,563	27	0.69	Decreasing
28	Soso (farm pond)	Atamamori 2	Okuma Town												9,400			6,300	5,700	2,790	13,000	5,900			5,700	3,900		7,000		4,900		4,500					4,100	4,200		1,160		6,300		3,470		3,620			5,408	28	0.50	Decreasing
29	Soso (farm pond)	Yonomori	Tomioka Town												62,000		54,000		47,000	45,000	57,000	48,000				47,000	50,000	42,000		36,000		48,000		53,000			41,000	39,000		39,900		31,600		32,800		30,900			44,678	29	0.20	Decreasing
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			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			19,287	30	1.24	Decreasing
31	Soso (farm pond)	Takinosawa	Tomioka Town												13,200		4,700		10,300	10,300			11,800			4,100 2,060		7,400		10,500		7,800					7,500	8,600		9,300		4,800		7,600		7,900			7,991	31	0.37	Unchanged
32	Soso (farm pond)	Kamisigeoka No. 1	Naraha Town												67,000		9,500	14,800	4,200		10,400					16,000 9,800		23,400		11,000		10,600					2,940	590		11,800		2,370		63,000		3,890			16,331	32	1.22	Varying
33	Soso (farm pond)	Shimoshigeoka	Naraha Town												18,100		77,000	8,400	27,000		20,100	26,400				4,900 2,660		14,600		9,500		7,900		5,100			7,600	7,600		2,410		5,300		2,600		7,100			14,126	33	1.24	Decreasing
34	Komachi Dam		Ono Town		1,730		1,460									2,480		7,500	8,200							3,100	2,790	6,300		2,860		3,700		4,800				3,320 3,650		1,880		3,100		1,690					3,660	34	0.56	Varying
35	Kido Dam		Naraha Town		11,400		17,600		810		290					7,400		8,700	2,290	4,700 4,200			7,200			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			9,966	35	0.56	Increasing
36	Soso (farm pond)	Otsutsumi	Naraha Town												6,200		19,300	13,200	7,200		9,700	1,450				5,700 1,470		10,500		6,500		7,100					3,650	4,500		2,390		2,370		1,840		5,300			6,375	36	0.74	Decreasing
37	Iwaki (farm pond)	Shinike	Iwaki City		310		540		830	510					1,780	500		132								89	78	112		68		111		750			18	141		380		610				304			404	37	1.05	Decreasing
38	Kodama Dam Reservoir (Lake Kodama)		Iwaki City				1,360		600	1,710						2,280	213	3,200	960		4,000	3,800				1,740	2,020	1,730		1,770		2,300		1,740			2,340	3,190		2,520		2,790		1,290		1,480			2,049	38	0.48	Unchanged
39	Iwaki (farm pond)	Kanoritsutsumishita	Iwaki City		600		4,000		820	1,200					48	2,800		3,600	5,000		990	1,240				170	500	510		82		730		1,310			32	92		53		80		150		140			1,098	39	1.31	Decreasing
40	Takashiba Dam Reservoir (Lake Takashiba)		Iwaki City		1,940		1,430		1,410		1,920					800	1,070	790	690		700	710			790		870	880		1,050		1,530		1,140			1,050	860		720		780		950		990			1,049	40	0.36	Decreasing
41	Shitoki Dam Reservoir		Iwaki City		3,000		3,300		6,400		3,300					930	980	1,120	1,310		1,690	1,400			1,820		1,120	1,200		1,270		2,000		1,340			1,230	900		1,110		1,200		1,220		1,130			1,771	41	0.71	Decreasing
				total number of samples	745	Detection times			745																																								24,209	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 P.60 — Decreasing, Increasing, Unchanged, Varying

ii. Nakadori

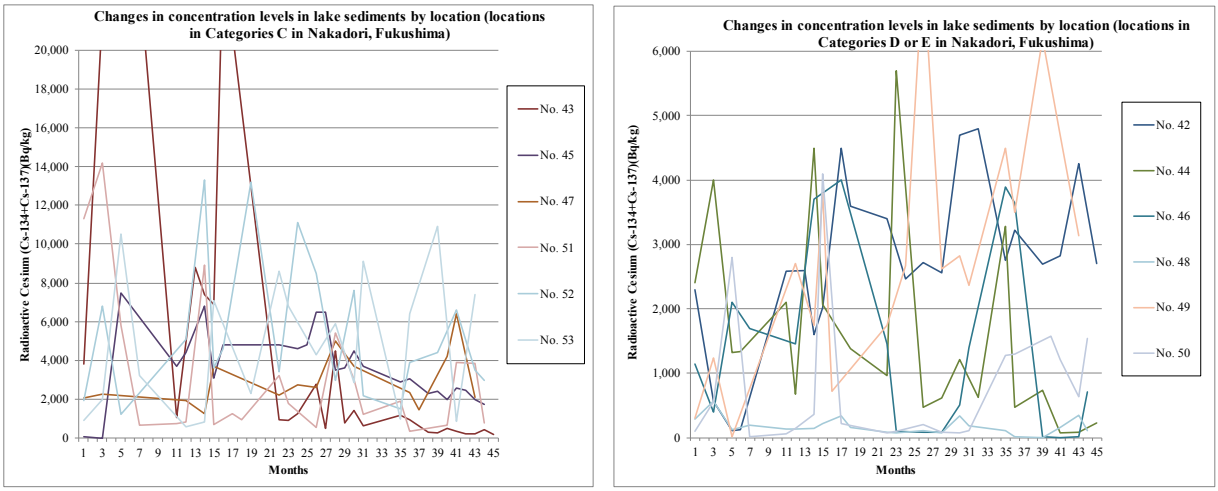
In Nakadori, Fukushima Prefecture, surveys were conducted 15 to 27 times from September 2011 to February 2015 for lake sediment samples collected at 12 locations.

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

Concentration levels were generally decreasing at four locations, generally unchanged or varying at six locations, and generally increasing at two locations.

Table 4.3-23 Categorization 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	6	No.43、No.45、No.47、No.51、No.52、No.53
D	Upper 25 to 50 percentile	4	No.42、No.44、No46、No.49
E	Lower than upper 25 to 50 percentile (lower 50%)	2	No.48、No.50



(*) Scales of the vertical axes differ in the left and right 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)

Lake Sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)

Location			FY2011								FY2012											
No.	Location	Municipality	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

	FY2013														FY2014													Changes	average (*2)	No.	coefficient of variation	Trends (*3)
No.	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			3,400		2,470		2,720		2,560		4,700		4,800			2,750	3,220			2,690		2,820		4,250		2,700			2,685	42	0.48	Increasing
43			930	890	1,260		2,770	520	4,500	790	1,400	630				1,190	920		317	257	500	346	216	233	437	176			4,742	43	1.83	Decreasing
44			960	5,700			470		620		1,220		630			3,280	470			730		71		85		226			1,641	44	0.92	Decreasing
45			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				3,624	45	0.52	Decreasing
46			1,460	92			83		88		510	1,400				3,900	3,640			18		0		13	710				1,390	46	1.03	Varying
47			2,210		2,750		2,630		5,000		3,700						2,340	1,440			4,200	6,400		2,080					2,931	47	0.48	Unchanged
48			88	75			106		69		340	179				104	16			0		159		351	107				177	48	0.74	Varying
49			1,740		2,670		7,300		2,620		2,830	2,370				4,500	3,500			6,200		4,700		3,140					2,894	49	0.67	Increasing
50			75	99			202		88		68	107				1,280	1,300				1,570	1,210		640	1,540				787	50	1.34	Varying
51			3,200	1,770			540		5,400		3,000	1,200				1,880	326				670	3,890		3,860	780				3,265	51	1.16	Decreasing
52			3,400		11,100		8,500		2,970		7,600	2,180				1,480	3,900			4,400		6,600		3,480	2,990				5,417	52	0.68	Varying
53			8,600	6,800			4,300		5,900		2,870	9,100				970	6,400			10,900		840		7,400					4,814	53	0.73	Varying

total number of samples	253	Detection times	250

average: 2,864

*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 P.60 — Decreasing, Increasing, Unchanged, Varying

iii. Aizu

In Aizu, Fukushima Prefecture, surveys were conducted 10 to 30 times from September 2011 to February 2015 for lake sediment samples collected at 31 locations.

Regarding concentration levels of detected values, eight locations were categorized into Category D and 23 locations were categorized into Category E (see Table 4.3-25 and Table 4.3-26).

Concentration levels were generally decreasing at four locations, generally unchanged or varying at 24 locations, and generally increasing at three locations.

Table 4.3-25 Categorization 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	0	(None)
D	Upper 25 to 50 percentile	8	No.54、No.55、No.56、No.58、No.59、No.60、No.74、No.78
E	Lower than upper 25 to 50 percentile (lower 50%)	23	No.57、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

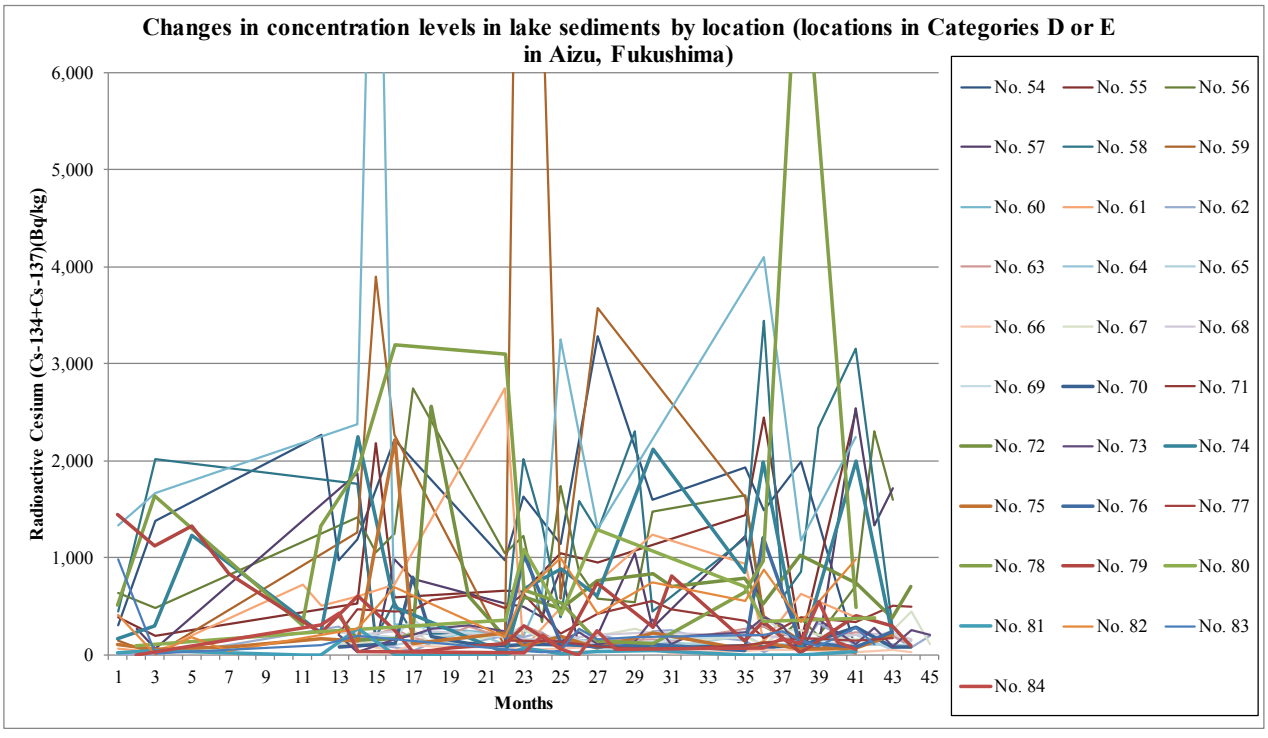


Figure 4.3-14 Changes in concentration levels over the years at respective locations
(Aizu, Fukushima Prefecture: lake sediments)

Table 4.3-26 Detection of radioactive cesium at respective locations (Aizu, Fukushima Prefecture: lake sediments)

Lake Sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)

No.	Location		Municipality	FY2011 8	FY2011 9	FY2011 10	FY2011 11	FY2011 12	FY2011 1	FY2011 2	FY2011 3	FY2012 4	FY2012 5	FY2012 6	FY2012 7	FY2012 8	FY2012 9	FY2012 10	FY2012 11	FY2012 12	FY2012 1	FY2012 2	FY2012 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		Kitashiobara Village		630		480											1,420 / 1,060	1,250	2,750			
57	Lake Onogawa		Kitashiobara Village			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		Kitashiobara Village		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	Lake Inawashiro	Takahashi River Estuary	Inawashiro Town														86	154	270	166	128		284
64	Lake Inawashiro	Oguro River Estuary	Inawashiro Town														200	76	179	114	127		245
65	Lake Inawashiro	Tenjinhama Beach	Inawashiro Town														111	110	99	132	135		
66	Lake Inawashiro	Hishinuma River Estuary	Inawashiro Town														83	108	39	96	89		68
67	Lake Inawashiro	Intake of Asakasosui	Inawashiro Town														126	118	115	251	108		116
68	Lake Inawashiro	Hamajihama Beach	Koriyama City														235	203	240	169	242		221
69	Lake Inawashiro	Funatsu Port	Koriyama City														223	213	186	370	182		223
70	Lake Inawashiro	Offshore of Funatsu River Estuary	Koriyama City														74	86	118	800	186		116
71	Lake Inawashiro	Seishogahama Beach	Koriyama City														220	470	440	460	560		610
72	Lake Inawashiro	Haragawa River Estuary	Aizuwakamatsu City														390	151	168	215	2,560		610
73	Lake Inawashiro	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	Lake Numazawa	Midpoint between the center of the lake and off the estuary (at the depth of 30 m)	Kaneyama Town																				
77	Lake Numazawa	Offshore of Maenosawa River Estuary	Kaneyama Town																				
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	Tadami Town		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					

No.	FY2013 4	FY2013 5	FY2013 6	FY2013 7	FY2013 8	FY2013 9	FY2013 10	FY2013 11	FY2013 12	FY2013 1	FY2013 2	FY2013 3	FY2014 4	FY2014 5	FY2014 6	FY2014 7	FY2014 8	FY2014 9	FY2014 10	FY2014 11	FY2014 12	FY2014 1	FY2014 2	FY2014 3	Changes	average (*2)	No.	coefficient of variation	Trends (*3)
54		970	1,630		1,140		3,280		1,590					1,930	1,490		1,990		43							1,493	54	0.54	Decreasing
55		660	650		1,040		950							1,440	2,450		130		2,500							1,054	55	0.79	Increasing
56		1,040	1,220	342	1,740	850	570	540	1,470					1,640	287	196	373	192	710	2,300	1,590					1,030	56	0.67	Varying
57		530	490	380	870	86	210	1,040	282					1,220	309	168	97	62	2,540	1,330	1,720					700	57	0.98	Varying
58		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					1,284	58	0.76	Varying
59		82	13,400		570		3,570							1,620	400		140		11							2,105	59	1.73	Varying
60			198	620	3,250		1,300								4,100	2,670	1,180		2,240							2,418	60	1.08	Varying
61		2,740	59		480		740		1,230					930	129		620		385							663	61	1.01	Varying
62		190	178	229	86	103	215	99	237	256	199			149	29	114	63	319	97	119	194	67	193			135	62	0.62	Varying
63		171	300		130		147		153	139				261	291		142		233		195	98				186	63	0.37	Unchanged
64		110	84		163		130		114	126				90	99		95		96		110	88				125	64	0.36	Unchanged
65		208	122		80		157		105	83				198	99		106		201		47	148				126	65	0.36	Unchanged
66		85	50		57		82		60	15				39	47		49		25		47	23				59	66	0.45	Decreasing
67		236	249	172	123	241	194	263	216	222	152			182	91	255	247	201	160	170	248	440	103			192	67	0.40	Unchanged
68		194	162		151		205		228					189	189		151		206		213	161				198	68	0.15	Unchanged
69		186	141		187		107		138	160				192	382		101		141		224	109				193	69	0.40	Unchanged
70		88	97		107		92		70					87	74		91		278		73	79				148	70	1.19	Varying
71		480	620		211		420		550	470				344	174		387		331		500	490				430	71	0.30	Unchanged
72		176	590		470		760		830	700				790	520		1,030		740		379	700				654	72	0.83	Varying
73		241	133	144	134	228	111	133	361	114	195			226	389	303	30	363	109	274	89	257	200			200	73	0.49	Unchanged
74		24	680		880		600		2,110					850	1,990		18		2,000		214					875	74	0.91	Varying
75		219	90		191		62		221					57	127		58		70		197					235	75	2.11	Varying
76		146	1,030		118		77		103					37	1,200		129		74		237					315	76	1.35	Varying
77		144	139		134		79		54					98	118		163		148		163					124	77	0.29	Unchanged
78		3,100	660		540		142		117					640	970		7,800		490							1,557	78	1.27	Varying
79		120	297		49		740		286	810				139	344		14		400		298	90				433	79	1.00	Decreasing
80		360	1,090		410		1,290							700	343		360			378						525	80	0.73	Increasing
81		0	70		12		28		39					0	0		0		30							35	81	1.99	Varying
82		175	630		1,000		420		740					550	870		333		980							469	82	0.69	Increasing
83			38	24	34	259	160	180							209	236	148	86	277	103						190	83	1.20	Decreasing
84			13	202	51	0	242 / 57								70	160	117	550 / 122	59							151	84	1.06	Varying

total number of samples	540	Detection times	527	average	590

*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 P.60 — Decreasing, Increasing, Unchanged, Varying

3) Ibaraki Prefecture

In Ibaraki Prefecture, surveys were conducted 8 to 14 times from September 2011 to February 2015 for lake sediment samples collected at 19 locations.

Regarding concentration levels of detected values, one location was categorized into Category C, four locations into Category D, and 14 locations into Category E (see Table 4.3-27 and Table 4.3-28).

Concentration levels were generally decreasing at 11 locations, generally unchanged or varying at seven locations, and generally increasing at one location.

Table 4.3-27 Categorization 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	4	No.12、No.14、No.15、No.16
E	Lower than upper 25 to 50 percentile (lower 50%)	14	No.1、No.2、No.3、No.4、No.5、No.6、No.7、No.8、No.9、No.10、No.11、No.17、No.18、No.19

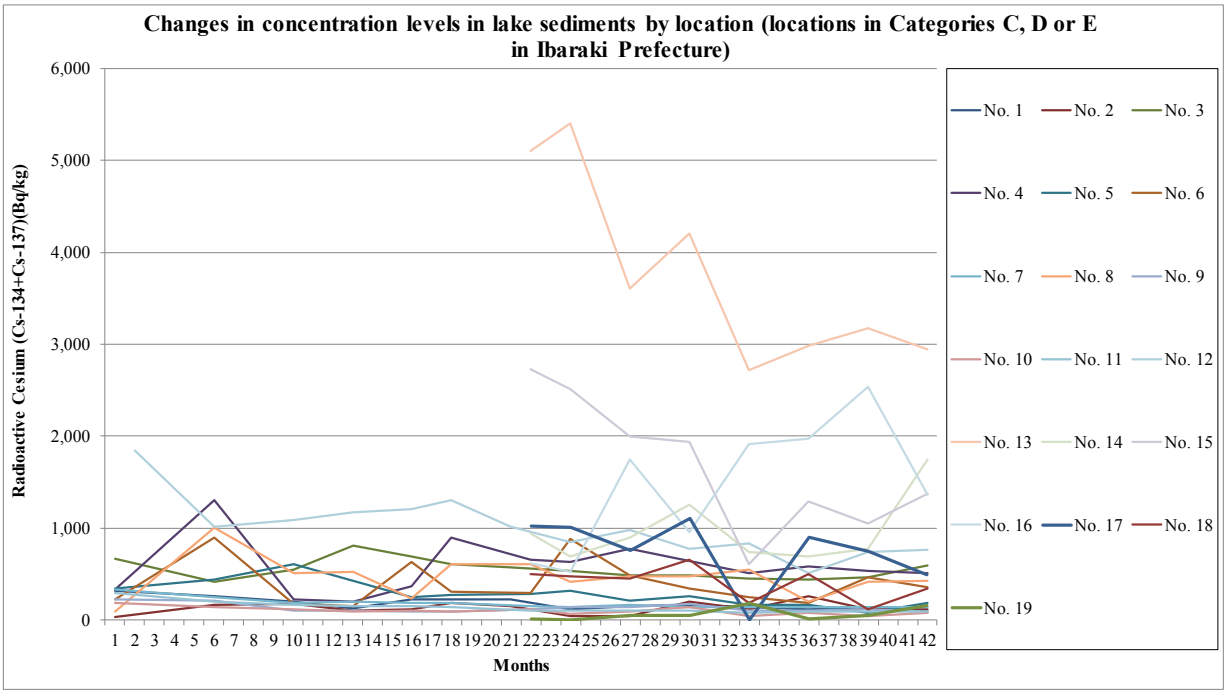


Figure 4.3-15 Changes in concentration levels over the years at respective locations
(Ibaraki Prefecture: lake sediments)

Table 4.3-28 Detection of radioactive cesium at respective locations (Ibaraki Prefecture: lake sediments)

Lake Sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)

No.	Location	Location	Municipality	FY2011 8	9	10	11	12	1	2	3	FY2012 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																				

No.	FY2013 4	5	6	7	8	9	10	11	12	1	2	3	FY2014 4	5	6	7	8	9	10	11	12	1	2	3	Changes	average (*2)	No.	coefficient of variation	Trends (*3)
1		221			114			155			165			136			111			136			94			177	1	0.36	Decreasing
2		146			49			49			204			119			264			120			119			132	2	0.50	Varying
3		570			540			490			490			450			442			460			590			556	3	0.21	Unchanged
4			650		630			770			640			510			580			540			510			582	4	0.51	Varying
5			280		320			208			257			165			168			78			182			286	5	0.49	Decreasing
6			300		880			490			340			242			192			460			360			404	6	0.63	Varying
7			150		139			164			138			143			134			139			138			177	7	0.32	Decreasing
8			610		410			470			470			550			203			416			429			466	8	0.48	Unchanged
9			121		136			139			172			99			107			115			86			129	9	0.34	Decreasing
10			113		66			91			141			49			76			42			79			99	10	0.40	Decreasing
11			104		102			108			98			74			97			95			91			134	11	0.44	Decreasing
12		1,010			850			980			770			840			510			740			760			1,006	12	0.32	Decreasing
13			5,100		5,400			3,600			4,200			2,720			2,980			3,170			2940			3,764	13	0.28	Decreasing
14			940		690			890			1,250			740			690			770			1750			965	14	0.21	Unchanged
15			2,730		2,520			2,000			1,940			610			1,290			1,050			1380			1,690	15	0.46	Decreasing
16			620		520			1,750			950			1,920			1,980			2,540			1360			1,455	16	0.53	Increasing
17			1,020		1,010			760			1,110			0			900			740			490			754	17	0.50	Decreasing
18			500		480			450			650			193			498			117			346			404	18	0.47	Decreasing
19			18		0			45			53			180			11			55			156			65	19	0.93	Varying

total number of samples	224	Detection times	222		average	697

*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 P.60 — Decreasing, Increasing, Unchanged, Varying

4) Tochigi Prefecture

In Tochigi Prefecture, surveys were conducted 10 to 14 times from October 2011 to December 2014 for lake sediment samples collected at eight locations.

Regarding 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 4.3-29 and Table 4.3-30).

Concentration levels were generally decreasing at one location, generally unchanged or varying at four locations, and generally increasing at three locations.

Table 4.3-29 Categorization 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	1	No.4
D	Upper 25 to 50 percentile	1	No.2
E	Lower than upper 25 to 50 percentile (lower 50%)	6	No.1、No.3、No.5、No.6、No.7、No.8

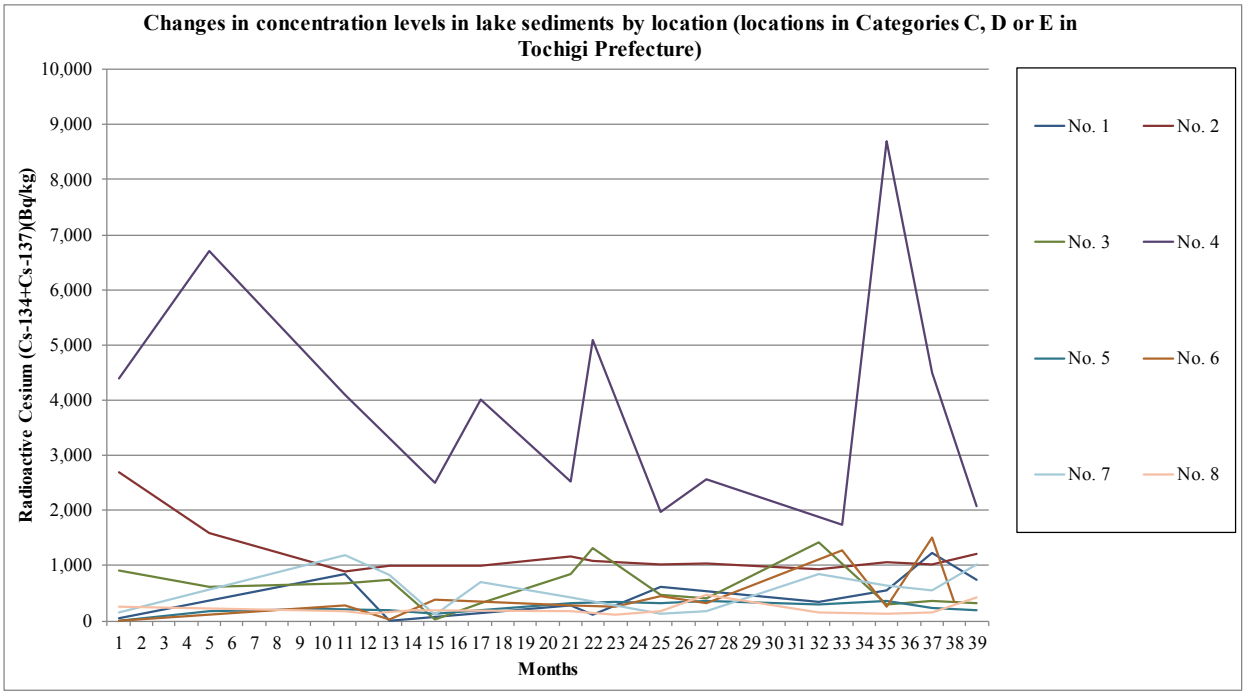


Figure 4.3-16 Changes in concentration levels over the years at respective locations
(Tochigi Prefecture: lake sediments)

Table 4.3-30 Detection of radioactive cesium at respective locations (Tochigi Prefecture: lake sediments)

Lake Sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)

No.	River System	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	Miyama Dam Reservoir	Center	Nasushiobara City			48										850		11					
2	Nakagawa River System	Shiobara Dam Reservoir	Center	Nasushiobara City			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	Kinugawa River System	Ikari Dam Reservoir	Center	Nikko City			4,400				6,700						4,100		3,300		2,500		4,000	
5	Kinugawa River System	Kawamata Dam Reservoir	Center	Nikko City			0				176					212			190		140			
6	Kinugawa River System	Lake Yuno	Center	Nikko City			0										270		28		390			
7	Kinugawa River System	Lake Chuzenji	Center	Nikko City			153										1,180		830		115		710	
8	Watarase River System	Watarase Reservoir	Center	Tochigi City			251										165	134		197				

No.	FY2013												FY2014												Changes	average (*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			284	106			610							343			560		1,230		740					478	1	0.82	Increasing
2			1,160	1,080			1,020		1,040					930			1,060		1,030		1,210					1,194	2	0.39	Decreasing
3			850	1,320			460		410					1,420			307		355		330					626	3	0.64	Varying
4			2,530	5,100			1,980		2,560						1,740		8,700		4,500		2,090					3,871	4	0.51	Varying
5			330		350		321		370					293			354		232		196					243	5	0.44	Increasing
6			286		248		440		320						1,270		250		1,500	339						445	6	1.03	Increasing
7			420		270		122		168					840			640		550		1,010					539	7	0.67	Varying
8			177		113		164		460					146			134		144		421					209	8	0.55	Varying

total number of samples	102	Detection times	100		951	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 P.60 — Decreasing, Increasing, Unchanged, Varying

5) Gunma Prefecture

In Gunma Prefecture, surveys were conducted 8 to 14 times from November 2011 to December 2014 for lake sediment samples collected at 24 locations.

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

Concentration levels were generally decreasing at four locations, generally unchanged or varying at 15 locations, and generally increasing at five locations.

Table 4.3-31 Categorization 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	11	No.1、No.2、No.5、No.7、No.9、No.10、No.12、No.14、No.15、No.20、No.24
E	Lower than upper 25 to 50 percentile (lower 50%)	13	No.3、No.4、No.6、No.8、No.11、No.13、No.16、No.17、No.18、No.19、No.21、No.22、No.23

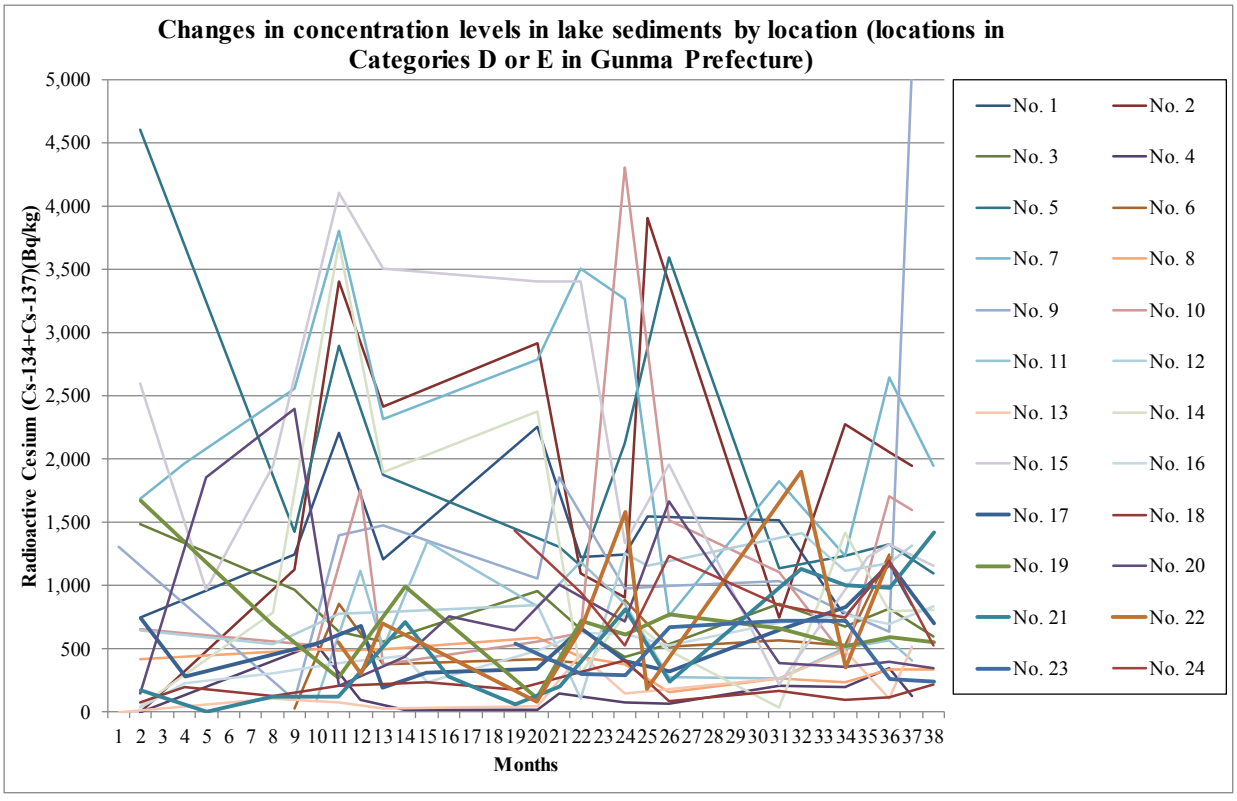


Figure 4.3-17 Changes in concentration levels over the years at respective locations
(Gunma Prefecture: lake sediments)

Table 4.3-32 Detection of radioactive cesium at respective locations (Gunma Prefecture: lake sediments)

Lake Sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)

No.	Water area	Location		Municipality	FY2011 8	9	10	11	12	1	2	3
1	Tonegawa River	Lake Okutone (Yagisawa Dam)	Center	Minakami Town					750			
2		Lake Naramata (Naramata Dam)	Center						0			
3		Lake Dogen (Sudagai Dam)	Center						1,490			
4		Lake Marunuma (Marunuma Dam)	Center	Katashina Village					0			
5		Lake Fujiwara (Fujiwara Dam)	Center	Minakami Town					4,600			
6		Lake Tanbara (Tanbara Dam)	Center	Numata City								
7		Lake Akaya (Aimata Dam)	Center	Minakami Town					1,690		1,970	
8		Lake Sonohara (Sonohara Dam)	Center	Numata City					420			
9		Lake Akagionuma	Center	Maebashi City				1,310				
10	Agatsuma River Area	Lake Okushima (Shimagawa Dam)	Center	Nakanojo Town					660			
11		Lake Shimako (Nakanojo Dam)	Center									
12		Lake Tashiro (Kazawa Dam)	Center	Tsumagoi Village					650			
13	Karasu River	Lake Haruna	Center	Takasaki City/Higashi-Agatsuma Town				0				
14		Lake Kirizumi (Kirizumi Dam)	Center	Annaka City					49			
15		Lake Usui (Sakamoto Dam)	Center						2,600			970
16		Lake Arafune (Dodairagawa Dam)	Center	Shimonita Town					37		233	
17		Lake Oshio (Oshio Dam)	Center	Tomioka City					740		280	
18		Lake Kanna (Shimokubo Dam)	Center	Fujioka City/Kamikawa Town					75		197	
19		Lake Hebikami (Shiozawa Dam)	Center	Kanna Town					1,670			
20	Watarase River Area	Lake Kusaki (Kusaki Dam)	Center	Midori City					147			1,860
21		Lake Umeda (Kiryugawa Dam)	Center	Kiryu City					179			0
22	Nakatsu River	Lake Nozori (Nozori Dam)	Center	Nakanojo Town								
23	Watarase River Area	Lake Jonuma	Center	Tatebayashi City								
24		Lake Tataranuma	Center									

No.	FY2012 4	5	6	7	8	9	10	11	12	1	2	3
1				1,250		2,210		1,210				
2				1,130		3,400		2,420				
3				970		640		560				
4					540		98		16			
5				1,430		2,900		1,880				
6				33		860		380				
7				2,560		3,800		2,320				
8					500	490		500				
9				104		1,400		1,480				
10					530		1,760	380				
11					94		1,120	510		1,350		
12			540			780			800			
13			114			76		30				
14			790			3,700		1,900				
15			1,950			4,100		3,500				
16			310			390			450	239		
17					540		680	196		310		
18			128			213			228	242		
19			690			270			990			
20				2,400		207			440		760	
21			123			129			710		280	
22						550	300	700				
23												
24												

No.	FY2013 4	5	6	7	8	9	10	11	12	1	2	3
1			2,260		1,230		1,250	1,550				
2			2,920		1,100		910	3,900				
3			960		660		440		540			
4			21	151			81		74			
5				1,310	1,160		2,130		3,590			
6			420		390		890		520			
7			2,790		3,500		3,260		760			
8			590		440		380		164			
9			1,060	1,860			980		1,000			
10			560		630		4,300		1,520			
11			840		1,190		860		278			
12			850		110		1,260	1,160				
13			47		460		148					
14			2,380		310		770		490			
15			3,400		3,400		1,340		1,960			
16			490		630		620		530			
17			340		660		400		320			
18		178			320		410		93			
19			111		720		610		770			
20		650		1,010			720		1,670			
21		62		203			810		245			
22			82		660		1,580	181				
23		540			301		291		670			
24		1,440			950		530		1,240			

No.	FY2014 4	5	6	7	8	9	10	11	12	1	2	3	Changes	average (*2)	No.	coefficient of variation	Trends (*3)
1		1,520			760		1,170	850						1,334	1	0.37	Unchanged
2		750			2,280		2,060	1,950						1,902	2	0.61	Increasing
3		860			680		820		600					768	3	0.37	Decreasing
4		211			201		349	127						156	4	1.00	Varying
5		1,140			1,240		1,330		1,100					1,984	5	0.57	Decreasing
6		570			530		1,250							584	6	0.58	Varying
7		1,830			1,240		2,650		1,950					2,332	7	0.38	Unchanged
8		266			237		342		336					389	8	0.32	Unchanged
9		1,040			790		640	5,100						1,397	9	0.89	Varying
10		1,110			438		1,710	1,600						1,267	10	0.86	Varying
11		266			510		570	410						667	11	0.60	Varying
12			1,420		1,120		1,180	1,320						933	12	0.41	Increasing
13		266			490		112	520						206	13	0.95	Increasing
14		38			1,420		800		810					1,121	14	0.96	Varying
15		215				1,230	1,330		1,160					2,089	15	0.57	Decreasing
16		710			770		700		840					496	16	0.47	Increasing
17		650			830		1,170		700					558	17	0.48	Unchanged
18		173			100		119		222					193	18	0.48	Unchanged
19		660			520		590		550					679	19	0.57	Decreasing
20		390			361		400		345					811	20	0.85	Varying
21			1,130		1,000		980		1,420					519	21	0.91	Increasing
22			1,900		358		1,220							753	22	0.82	Varying
23		720			720		260		241					468	23	0.46	Unchanged
24		850			750		1,200		530					936	24	0.36	Unchanged
														939	average		

total number of samples	287	Detection times	283

*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 P.60 — Decreasing, Increasing, Unchanged, Varying

6) Chiba Prefecture

In Chiba Prefecture, surveys were conducted 14 times from November 2011 to February 2015 for lake sediment samples collected at eight locations.

Regarding 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 six locations but were generally unchanged or varying at two locations.

Table 4.3-33 Categorization 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	Lower than upper 25 to 50 percentile (lower 50%)	6	No.1、No.2、No.5、No.6、No.7、No.8

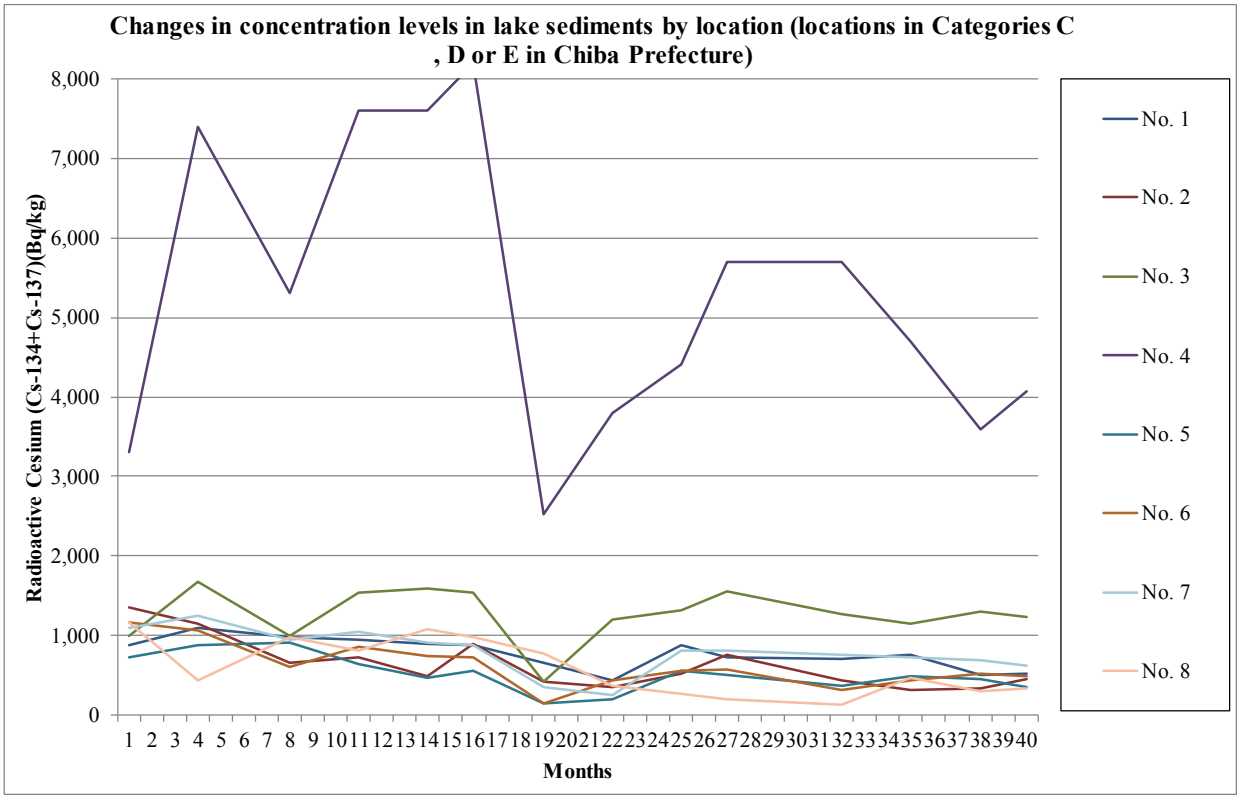


Figure 4.3-18 Changes in concentration levels over the years at respective locations
(Chiba Prefecture: lake sediments)

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

Location				Lake Sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																																																																																			
No.	Location		Municipality	FY2011								FY2012												FY2013												FY2014												Changes	average (*2)	No.	coefficient of variation	Trends (*3)
				8	9	10	11	12	1	2	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	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			660			440			880		730					710			750			500		520			775	1	0.25	↘
2		Shimoteganuma Chuo					1,350			1,140				650			720			490		900			420			349			520		760					440			320			325		443			631	2	0.50	↘
3		Teganuma Chuo	Abiko City/Kashiwa City				990			1,670				990			1,540			1,580		1,540			420			1,200			1,320		1,550					1,270			1,150			1,300		1,230			1,268	3	0.26	∿▲
4		Nedoshita					3,300			7,400				5,300			7,600			7,600		8,200			2,530			3,800			4,400		5,700					5,700			4,700			3,600		4,060			5,278	4	0.35	∿▲
5	Lake Inbanuma	Kita-Inbanuma Chuo	Inzai City/Narita City				730			880				910			630			460		560			151			195			550		500					360			480			450		350			515	5	0.43	↘
6		Ipponmatsushita	Inzai City				1,160			1,070				600			860			740		730			152			440			560		570					313			430			520		490			617	6	0.45	↘
7		Lower area of Josuido water intake	Sakura City				1,100			1,250				940			1,050			910		880			340			251			800		800					760			730			690		620			794	7	0.34	↘
8		Asobashi Bridge	Yachiyo City				1,160			440				980			800			1,080		970			770			360			266		202					121			460			304		338			589	8	0.60	↘
				total number of samples		112	Detection times		112																																								1,308	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 P.60 ↘ Decreasing ↗ Increasing ∿▲ Unchanged ⩘ Varying

(2)-3 Coastal areas

1) Iwate Prefecture

In Iwate Prefecture, surveys were conducted 7 times from January 2012 to November 2014 for coastal area sediment samples collected at two locations.

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

Concentration levels were generally unchanged or varying at these two locations.

Table 4.3-35 Categorization 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	Lower than upper 25 to 50 percentile (lower 50%)	2	No.1、No.2

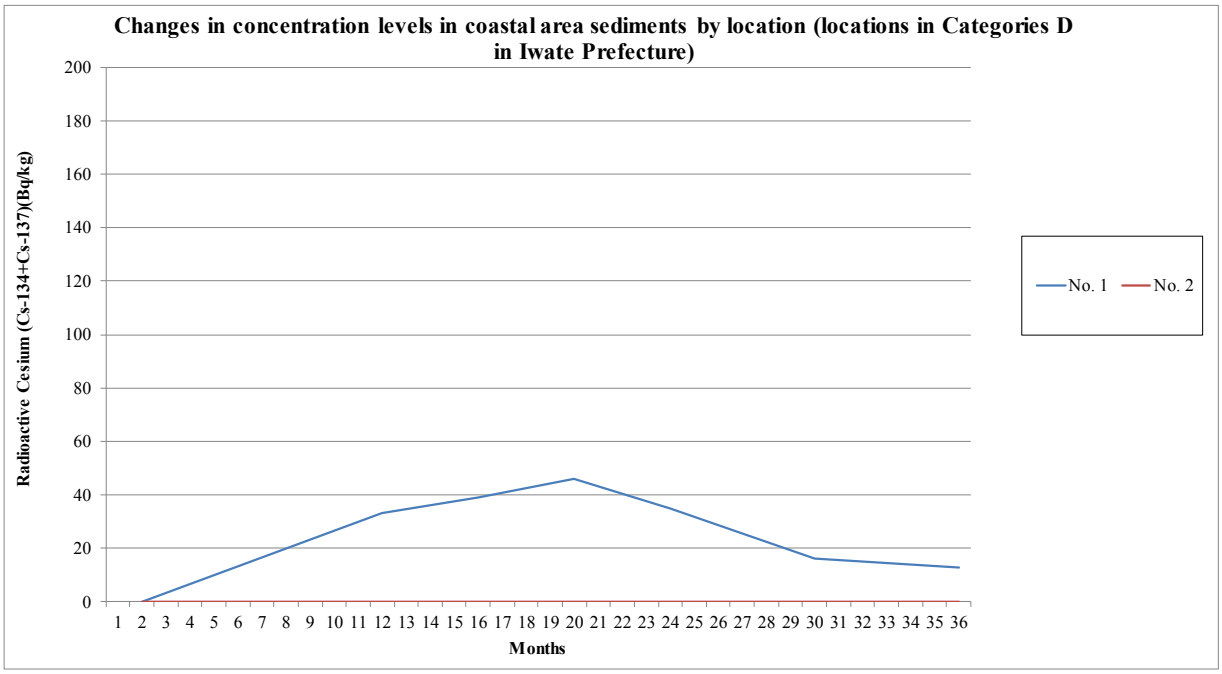


Figure 4.3-19 Changes in concentration levels over the years at respective locations
(Iwate Prefecture: coastal area sediments)

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)																																												average(*2)	No.	coefficient of variation	Trends(*3)
No.	Location	FY2011								FY2012												FY2013												FY2014												Changes				
		8	9	10	11	12	1	2	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	4	5	6	7	8	9	10	11	12	1	2	3					
1	Ofunato Bay (A)						0										33				39				46				35						16						13						26	1	0.64	
2	Hirota Bay						0										0			0					0				0						0						0						0	2	-	

total number of samples	14	Detection times	6

13	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 P.60 Decreasing Increasing Unchanged Varying

2) Miyagi Prefecture

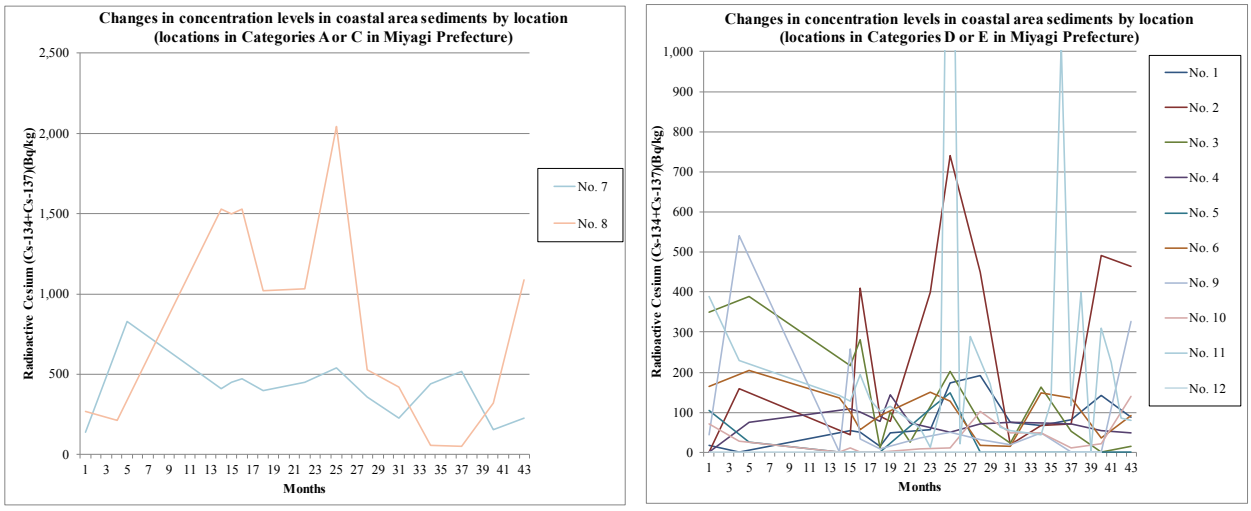
In Miyagi Prefecture, surveys were conducted 7 to 27 times from October 2011 to February 2015 for coastal area sediment samples collected at 12 locations.

Regarding concentration levels of detected values, one location was categorized into Category A, one location into Category C, five 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, generally unchanged or varying at eight locations, and generally increasing at one location.

Table 4.3-37 Categorization 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	0	(None)
C	Upper 10 to 25 percentile	1	No.7
D	Upper 25 to 50 percentile	5	No.2、No.3、No.6、No.9、No.11
E	Lower than upper 25 to 50 percentile (lower 50%)	5	No.1、No.4、No.5、No.10、No.12



(*) 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)

Location			Coastal area sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																																														average (*2)	No.	coefficient of variation	Trends (*3)
No.	Location		FY2011								FY2012													FY2013													FY2014												Changes				
			8	9	10	11	12	1	2	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	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				57		174			191			76			67			82			141			87			76	1	0.75	Increasing
2	Kesennuma Bay (C)	Offshore of Oshimakita			0			158											44	410		91	78				400		740			450			19			68			72			490			464			249	2	0.94	Varying
3	All other neighboring sea areas	Oppa Bay (Jyusanhama Beach)			350				390										216	281		12	101		26				203			76			23			163			52			0			15			136	3	0.97	Decreasing
4	Neighboring sea area of Ishinomaki (C)	Lake Mangokuura, M-6 (center)			0				75										109	101		77	145		74				51			71			76			74			71			54			48			73	4	0.45	Unchanged
5	Neighboring sea area of Ishinomaki (B-3)	Offshore of Kitakami River Estuary			105				25									0	0	0		0					109		148			0			0			0			0			0			0			28	5	1.87	Varying
6	Neighboring sea area of Ishinomaki (C)	Offshore of Naruse			165				205									136	101	56		93					151		128			17			16			149			136			36			93			106	6	0.54	Decreasing
7	Matsushima Bay (B)	Nishihama Beach			139				830									410	450	470		400				450			540			360			229			440			520			155			230			402	7	0.45	Decreasing
8	Neighboring sea area of Sendai Port (A)	Naiko Inner Port, 4-Nai			270			213										1,530	1,500	1,530		1,020				1,030			2,040			530			420			55			54			322			1,090			829	8	0.78	Varying
9	Neighboring sea area of Sendai Port (B)	Gamo-3			44			540										0	258	33		10				35			50			31			19			49			0			0			327			100	9	1.61	Varying
10	All other neighboring sea areas	Ido-5			71			28										0	12	0		0				10			12			102			48			49			11			21			140			36	10	1.18	Varying
11	Offshore of Abukuma River Estuary				390			230										142	128	193	131	103	115			61	13	108	2,030	21	290		170	62	55			45	126	1,020	118	400	0	311	226	86	80			246	11	1.66	Varying
12	Offshore of Tsuyagawa River Estuary				0														0			0					0					0						0						0						0	12	-	Unchanged

total number of samples	174	Detection times	146

average	190

*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 P.60 — Decreasing, Increasing, Unchanged, Varying

3) Fukushima Prefecture

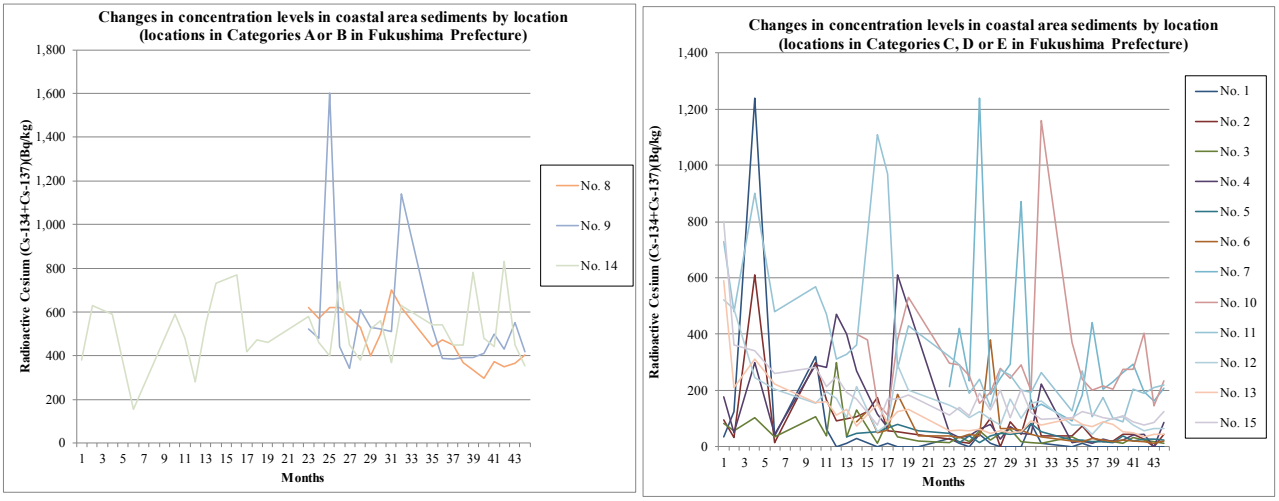
In Fukushima Prefecture, surveys were conducted 20 to 33 times from October 2011 to February 2015 for coastal area sediment samples collected at 15 locations (this analysis excludes the survey results at eight locations where the survey was conducted only once in 2011).

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

Concentration levels were generally decreasing at 11 locations but were generally unchanged or varying at four locations. There was no location where an increasing trend was observed.

Table 4.3-39 Categorization 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.9
B	Upper 5 to 10 percentile	2	No.8、No.14
C	Upper 10 to 25 percentile	3	No.7、No.10、No.11
D	Upper 25 to 50 percentile	5	No.2、No.4、No.12、No.13、No.15
E	Lower than upper 25 to 50 percentile (lower 50%)	4	No.1、No.3、No.5、No.6



(*) 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)

Coastal area sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)

No.	Location	Location	FY2011 8	9	10	11	12	1	2	3	FY2012 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	433	Detection times	413																		

No.	FY2013 4	5	6	7		8	9	10	11	12	1	2	3	FY2014 4	5	6	7	8	9	10	11	12	1	2	3	Changes	average (*2)	No.	coefficient of variation	Trends (*3)
1			28	12	0	44	10	0	0	0	81	11			0	12	0	0	0	0	0	0	0	0			63	1	3.50	Decreasing
2			26	18	11	48	101	0	89	45	164	39			38	73	32	17	19	43	45	26	0	44			83	2	1.36	Decreasing
3			15	36	17	55	23	48	61	16	13	11			35	18	17	20	17	10	31	24	17	12			47	3	1.18	Decreasing
4			51	33	38	61	79	27	70	48	43	221			13	20	12	27	18	22	41	43	0	85			126	4	1.21	Decreasing
5			47	14	38	15	38	47	44	51	81	54			24	22	18	17	15	38	21	26	26	24			37	5	0.50	Varying
6			38	31	44	39	380	64	64	59	45	35			20	18	28	22	18	22	21	16	10	21			59	6	1.28	Varying
7			214	420	234	1,240	187	243	294	870	133	152			90	182	440	205	230	263	293	194	163	206			313	7	0.88	Decreasing
8			620	570	620	620	580	530	400	500	700	620			440	470	450	368	333	297	374	350	365	403			481	8	0.25	Decreasing
9			520	480	1,600	440	340	610	530	520	510	1,140			530	388	385	390	390	410	500	430	550	417			554	9	0.54	Decreasing
10			295	290	251	154	191	278	243	290	198	1,160			370	240	201	215	203	274	275	404	144	234			303	10	0.66	Varying
11			320	290	190	241	143	272	254	202	192	262			127	268	105	173	100	88	205	188	209	219			347	11	0.73	Decreasing
12			149	131	102	125	96	75	167	100	155	161			75	76	43	84	101	105	76	55	64	65			149	12	0.74	Decreasing
13			55	60	55	63	47	57	49	53	90	76			101	80	70	89	78	54	50	35	45	44			113	13	0.93	Decreasing
14			580	460	400	740	450	380	520	560	370	630			540	540	450	450	780	480	440	830	449	354			512	14	0.29	Unchanged
15			112	139	108	189	129	200	104	205	122	98			104	124	114	102	96	108	88	75	84	125			178	15	0.75	Decreasing
																											224	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 P.60 — Decreasing, Increasing, Unchanged, Varying

4) Ibaraki Prefecture

In Ibaraki Prefecture, surveys were conducted 15 to 17 times from October 2011 to February 2015 for coastal area sediment samples collected at five locations.

Regarding 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 four locations but were generally varying at one location.

Table 4.3-41 Categorization 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	Lower than upper 25 to 50 percentile (lower 50%)	5	No.1、No.2、No.3、No.4、No.5

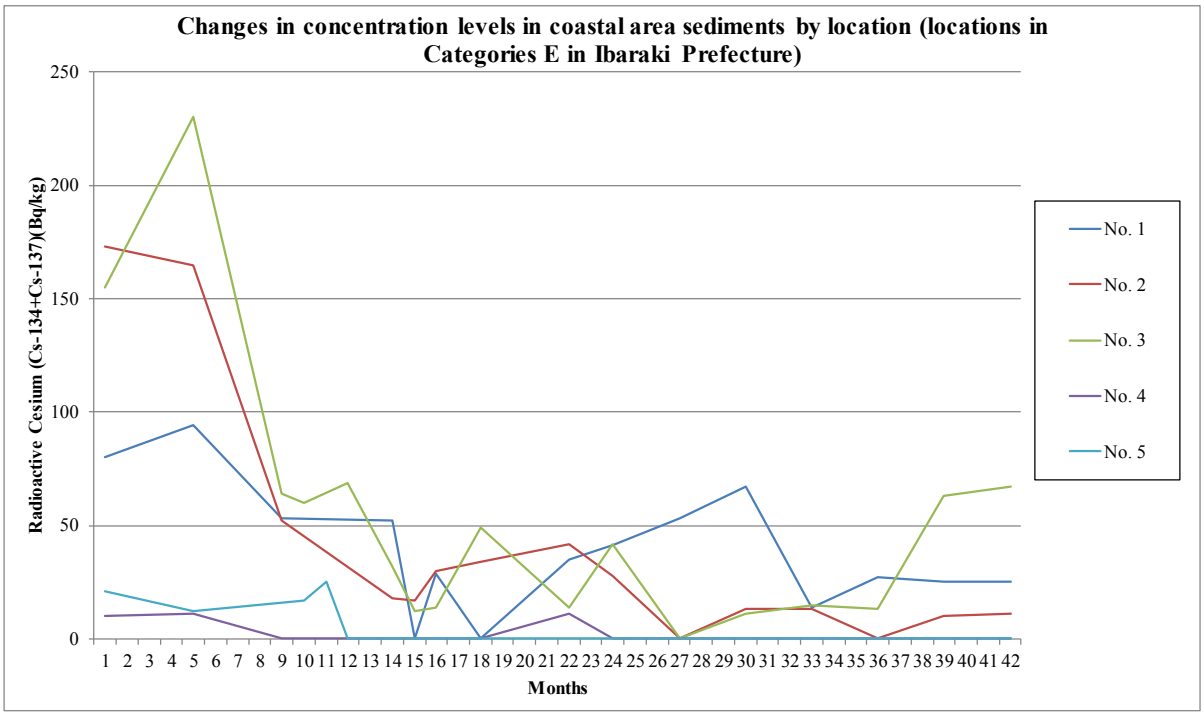


Figure 4.3-22 Changes in concentration levels over the years at respective locations
(Ibaraki Prefecture: coastal area sediments)

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

Location		Coastal area sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)																																														average (*2)	No.	coefficient of variation	Trends (*3)
No.	Location	FY2011								FY2012													FY2013												FY2014												Changes				
		8	9	10	11	12	1	2	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	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				35		41			53			67			14			27			25			25			40	1	0.69	↘
2	Offshore of Okita River Estuary			173				165				52					18	17	30		34				42		28			0			13			13			0			10			11			40	2	1.34	↘
3	Offshore of Momiya River/Kujigawa River Estuaries			155				230				64	60		69		32	12	14		49				14		42			0			11			15			13			63			67			54	3	1.10	↘
4	Neighboring water body of Ken-o Offshore of Nakagawa River			10				11				0	0		0		0	0	0		0				11		0			0			0			0			0			0			0			2	4	2.23	Varying
5	Offshore of Tonegawa River Estuary			21				12					17	25	0		0	0	0			0			0		0			0			0			0			0			0			0			4	5	1.94	↘

total number of samples	81	Detection times	49

average	28

*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 P.60

↘ Decreasing ↗ Increasing Unchanged Varying

5) Chiba Prefecture and Tokyo Metropolis

In Chiba Prefecture and Tokyo Metropolis, surveys were conducted 13 to 22 times from May 2012 to February 2015 for coastal area sediment samples collected at eight locations in total.

Regarding concentration levels of detected values, two locations were categorized into Category C and six locations were categorized into Category E (see Table 4.3-43 and Table 4.3-44).

Concentration levels were generally decreasing at two locations but were generally unchanged or varying at six locations.

Table 4.3-43 Categorization 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	2	No.6、No.7
D	Upper 25 to 50 percentile	0	(None)
E	Lower than upper 25 to 50 percentile (lower 50%)	6	No.1、No.2、No.3、No.4、No.5、No.8

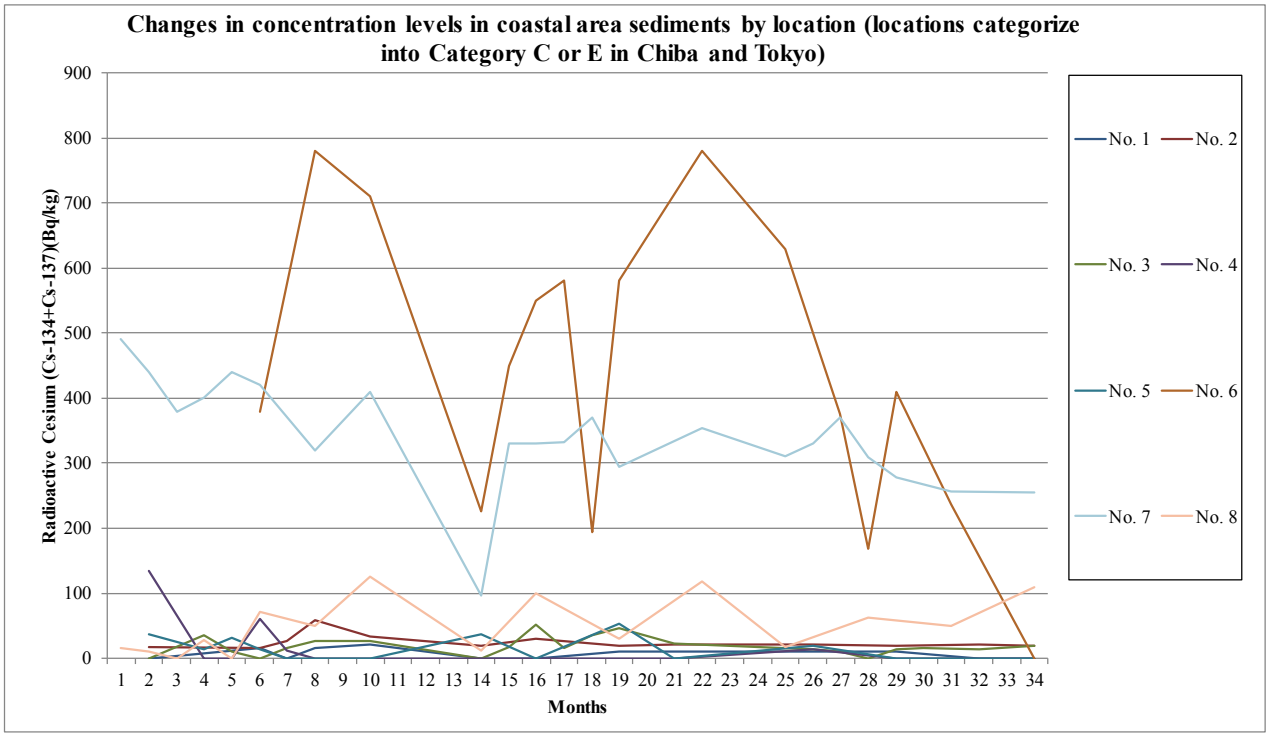


Figure 4.3-23 Changes in concentration levels over the years at respective locations
(Chiba Prefecture and Tokyo Metropolis: coastal area sediments)

Table 4.3-44 Detection of radioactive cesium at respective locations (Chiba Prefecture and Tokyo Metropolis: coastal area sediments)

Coastal area sediments/Radioactive Cesium (Cs-134＋Cs-137)/Concentration(Bq/kg)(*1)

Location				FY2011								FY2012											
No.	Prefecture	Location		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	

No.	FY2013												FY2014												Changes	average (*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			0		0			11		11					11			11			0		0			7	1	1.03	Varying
2			19		30			19		21					21			20			21		20			25	2	0.46	Unchanged
3			0	17	52	15	36	47		23					14	11	0	14	16		14		19			19	3	0.78	Varying
4			0		0			0		0					13			0			0		0			15	4	2.50	Decreasing
5			38		0			54		0					19			0			0		0			14	5	1.32	Varying
6			226	450	550	580	193	580			780			630	500	375	168	409		237			0			444	6	0.51	Varying
7			97	330	330	332	370	294			354			311	330	370	309	278		257			255			342	7	0.24	Decreasing
8			12		100			30			118			18			62			49			109			50	8	0.86	Varying

total number of samples	132	Detection times	100	average	114

*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 P.60 — Decreasing, Increasing, Unchanged, Varying

(3) Conclusion

Concentration levels of detected values for sediment samples from public water areas (rivers, lakes, and coastal areas) 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

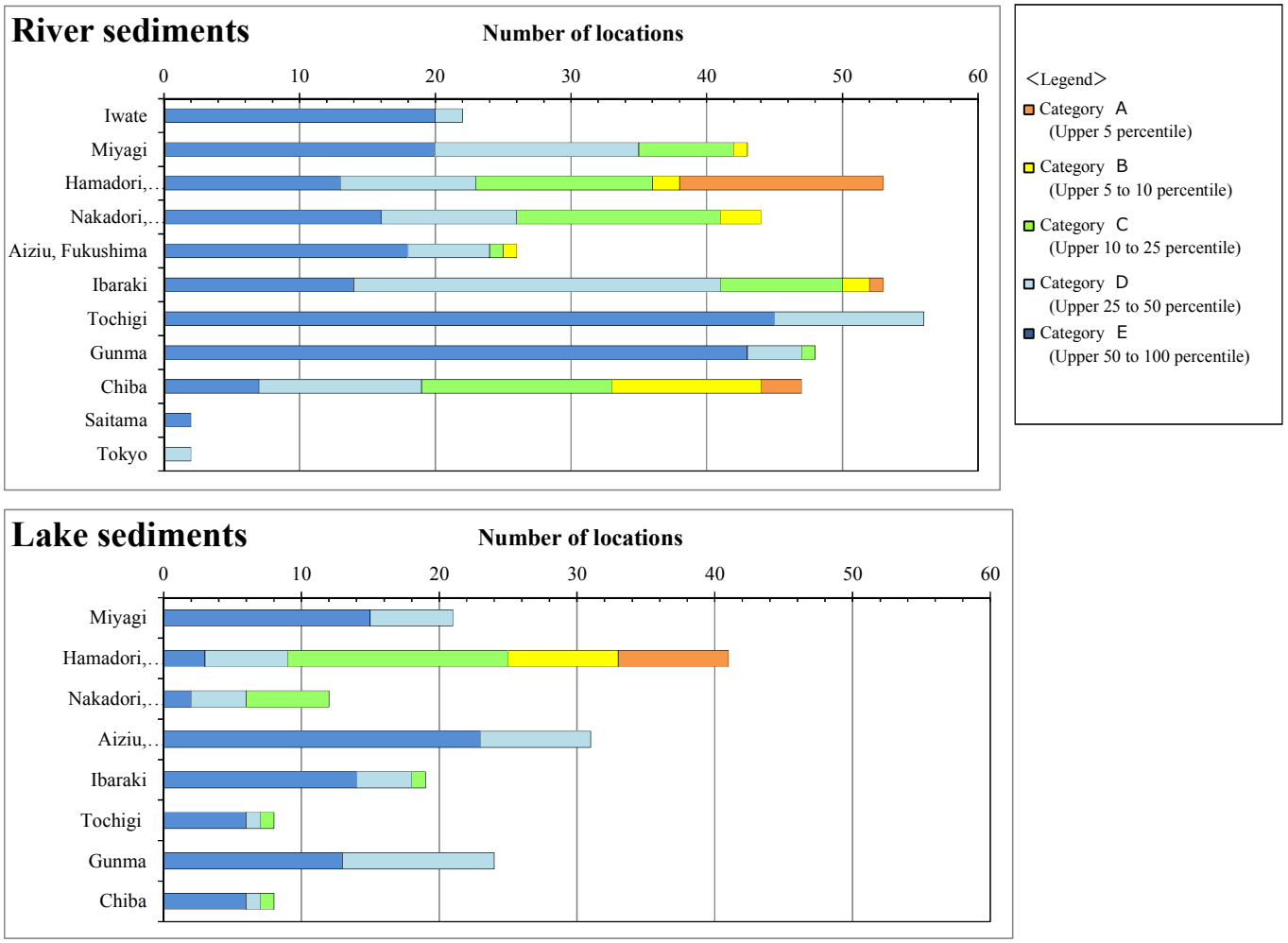
Within all surveyed locations (396 locations in total), the number of locations categorized into Category A or B, which fall under the upper 10%, was the largest in Hamadori in Fukushima Prefecture (17 locations). Such locations were also found in Miyagi Prefecture, Nakadori and Aizu in Fukushima Prefecture, Ibaraki Prefecture and Chiba Prefecture.

・Lakes

Locations categorized into Category A or B were found in Hamadori in Fukushima Prefecture.

・Coastal areas

Locations categorized into Category A or B were found in Miyagi and Fukushima Prefectures.



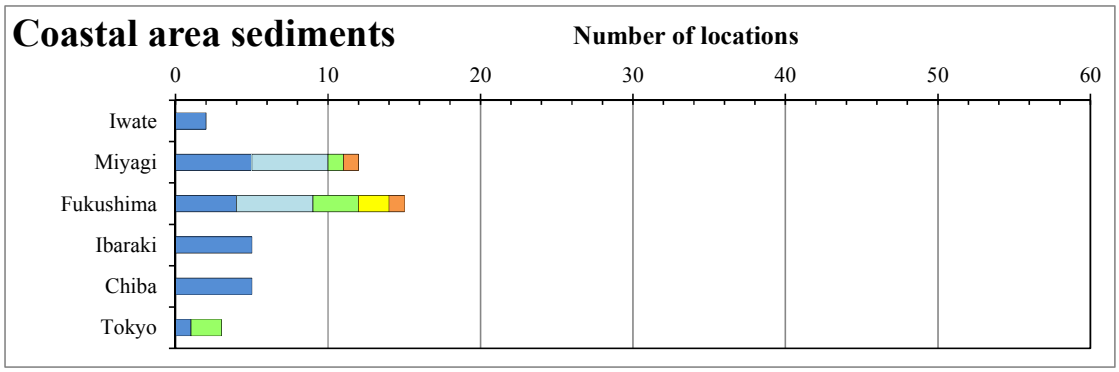


Figure 4.3-24 Categorization by concentration levels of detected values for sediment samples (upper: rivers; middle: lakes; lower: coastal areas)

(* 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 except for some locations showing fluctuations. An increasing trend was also observed at several locations.

・Coastal areas

A decreasing trend was observed at most locations except for 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 Area	Nakadori Area	Aizu							Number of locations	Percentage
Decreasing	17	34	41	40	18	45	38	33	34	2	1	303	76.5
Unchanged	0	1	2	1	4	4	1	1	6	0	1	21	5.3
Varying	5	8	10	3	4	4	17	14	7	0	0	72	18.2
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 Area	Nakadori Area	Aizu					Number of locations	Percentage
Decreasing	12	21	4	4	11	1	4	6	63	38.4
Unchanged	2	4	1	9	3	0	7	2	28	17.1
Varying	7	13	5	15	4	4	8	0	56	34.1
Increasing	0	3	2	3	1	3	5	0	17	10.4
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	11	4	1	1	20	47.6
Unchanged	1	2	1	0	1	0	5	11.9
Varying	1	6	3	1	3	2	16	38.1
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

- Surveyed locations for rivers were all categorized into Category D or E. Concentration levels were relatively low as a whole, and a decreasing trend was observed at most locations.
- Surveyed locations for coastal areas were all categorized into Category E. Concentration levels were relatively low as a whole, and were generally unchanged or varying at all locations.

ii. Miyagi Prefecture

- Over 80% of surveyed locations for rivers were categorized into Category D or E, and concentration levels were relatively low as a whole. Some locations in the lower reaches were categorized into Category B or C. A decreasing trend was observed at most locations.
- Surveyed locations for lakes were all categorized into Category D or E, and concentration levels were relatively low as a whole. A decreasing trend was observed at most locations except for several locations showing fluctuations.
- Over 80% of surveyed locations for coastal areas were categorized into Category D or E, and concentration levels were relatively low as a whole. There was a location categorized into Category A in the Sendai Port. Concentration levels were generally decreasing or unchanged at most locations except for several locations showing fluctuations.

iii. Hamadori, Fukushima Prefecture

- Approximately 60% of surveyed locations for rivers were categorized into Category A, B, or C, and concentration levels were relatively high as a whole. Locations categorized into Category A or B were found in the north and northwest of the Fukushima Daiichi NPS, and locations categorized into Category C were in the northern part and in the southern part of the prefecture. A decreasing trend was observed at most locations.
- Approximately 80% of surveyed locations for lakes were categorized into Category A, B, or C, and concentration levels were relatively high as a whole. Locations categorized into Category A or B were found in the northwest of the Fukushima Daiichi NPS. A decreasing trend was observed generally at most locations except for several locations showing fluctuations.
- 60% of surveyed locations for coastal areas were categorized into Category D or E and the rest were categorized into Category A, B, or C. Locations categorized into Category A or B were found in coastal areas within 10 km from the Fukushima Daiichi NPS and off the Onahama Port located in the southern part of the prefecture. Concentration levels were mostly decreasing with some fluctuations.

iv. Nakadori, Fukushima Prefecture

- Approximately 60% of surveyed locations for rivers were categorized into Category D or E and the rest were categorized into Category B or C. Locations categorized into Category B or C were found from the center of the Abukuma River to the northern part of its tributaries. A decreasing trend was observed at

most locations.

・50% of surveyed locations for lakes were categorized into Category D or E and the rest were categorized into Category C. Locations categorized into Category C were found from the upper to the lower reaches of the Abukuma River. Concentration levels were generally increasing at two locations and were generally decreasing or unchanged at five other locations with some fluctuations observed at several locations.

v. Aizu, Fukushima Prefecture

・Over 90% of surveyed locations for rivers were categorized into Category D or E, and concentration levels were relatively low as a whole. A location categorized into Category B was found in the northwestern part of the prefecture. Concentration levels were mostly decreasing with some fluctuations.

・Surveyed locations for lakes were all categorized into Category D or E, and concentration levels were relatively low as a whole. Many locations showed fluctuations, but concentration levels were generally increasing at three locations and were generally unchanged or decreasing at 13 other locations.

vi. Ibaraki Prefecture

・Over 70% of surveyed locations for rivers were categorized into Category D or E and the rest were categorized into Category A, B, or C. Locations categorized into Category A or B were found in rivers flowing into Lake Kasumigaura. A decreasing trend was observed at most locations.

・Over 90% of surveyed locations for lakes were categorized into Category D or E, and concentration levels were relatively low as a whole. A location categorized into Category C was found in the northern part of the prefecture. Concentration levels were mostly decreasing or unchanged with some fluctuations.

・Surveyed locations for coastal areas were all categorized into Category E, and concentration levels were relatively low as a whole. A decreasing trend was observed at most locations.

vii. Tochigi Prefecture

・Surveyed locations for rivers were all categorized into Category D or E, and concentration levels were relatively low as a whole. Concentration levels were mostly decreasing with some fluctuations.

・Over 80% of surveyed locations for lakes were categorized into Category D or E, and concentration levels were relatively low as a whole. A location categorized into Category C was found in the northern part of the prefecture. Concentration levels were generally increasing at three locations and were generally decreasing at one location with some fluctuations observed at several locations.

viii. Gunma Prefecture

・Over 90% of surveyed locations for rivers were categorized into Category D or E, and concentration levels were relatively low as a whole. A location categorized into Category C was found in the lower reaches of the Watarase River area. Concentration levels were mostly decreasing with some fluctuations observed at several locations.

・Surveyed locations for lakes were all categorized into Category D or E, and concentration levels were relatively low as a whole. Concentration levels were generally increasing at five locations and were generally unchanged or decreasing at 11 locations with some fluctuations observed at several locations.

ix. Chiba and Saitama Prefectures and Tokyo Metropolis

・Over 50% of surveyed locations for rivers were categorized into Category A, B, or C, and concentration levels were relatively high as a whole. Locations categorized into Category A or B were found in rivers flowing into Lake Teganuma or Lake Inbanuma and in part of the tributaries to the Edogawa River. Concentration levels were mostly decreasing with some fluctuations.

・Over 80% of surveyed locations for lakes were categorized into Category D or E, and concentration levels were relatively low as a whole. A location categorized into Category C was found in Lake Teganuma. A decreasing trend was observed at most locations.

・Over 70% of surveyed locations for coastal areas were categorized into Category E and the rest were categorized into Category C. Locations categorized into Category C were found off the mouths of the Arakawa River, Kyuedogawa River, and Sumida River. Concentration levels were generally decreasing or unchanged at most locations except for several locations showing fluctuations.

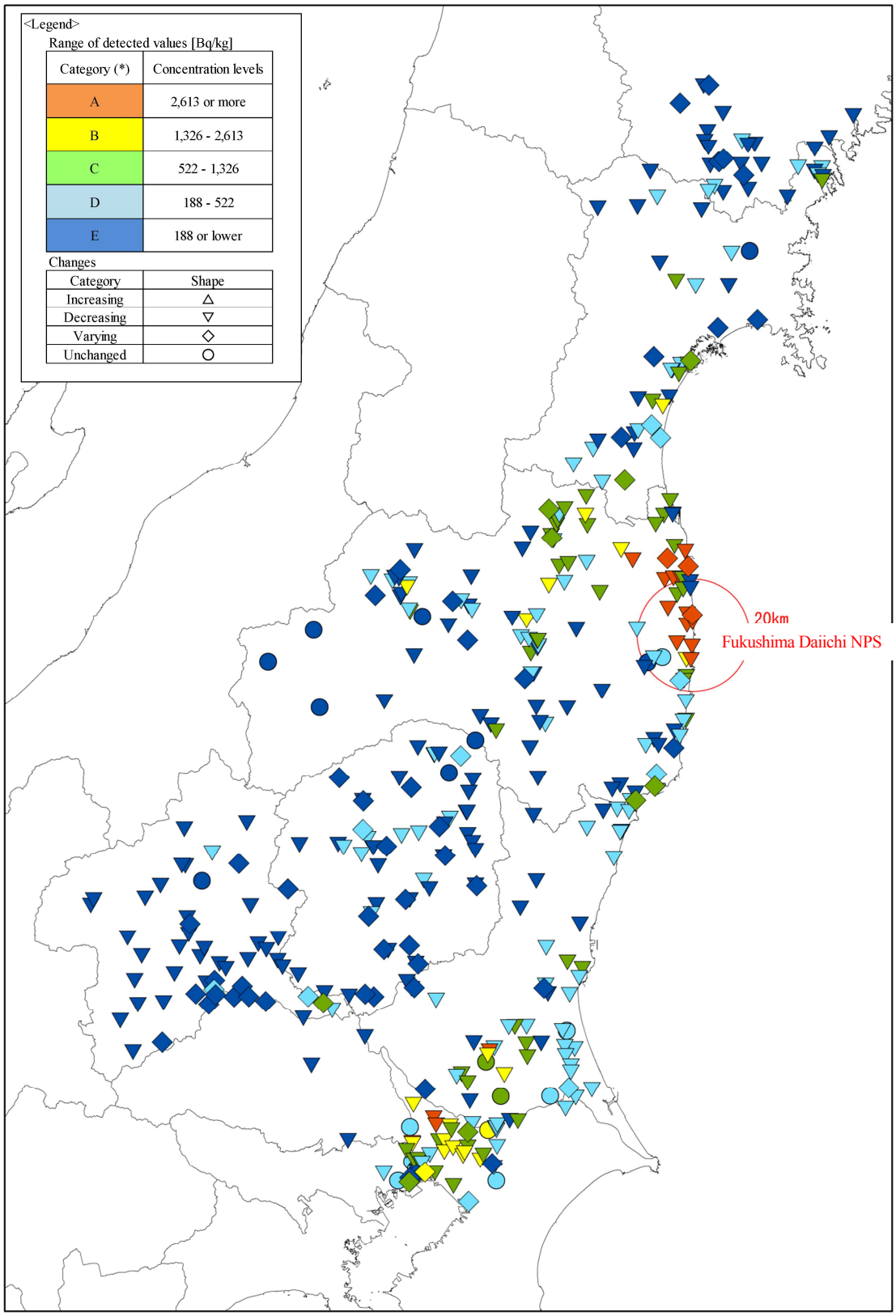


Figure 4.3-25 Categorization of and changes in concentration levels for river sediment samples from public water areas

(*) 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.

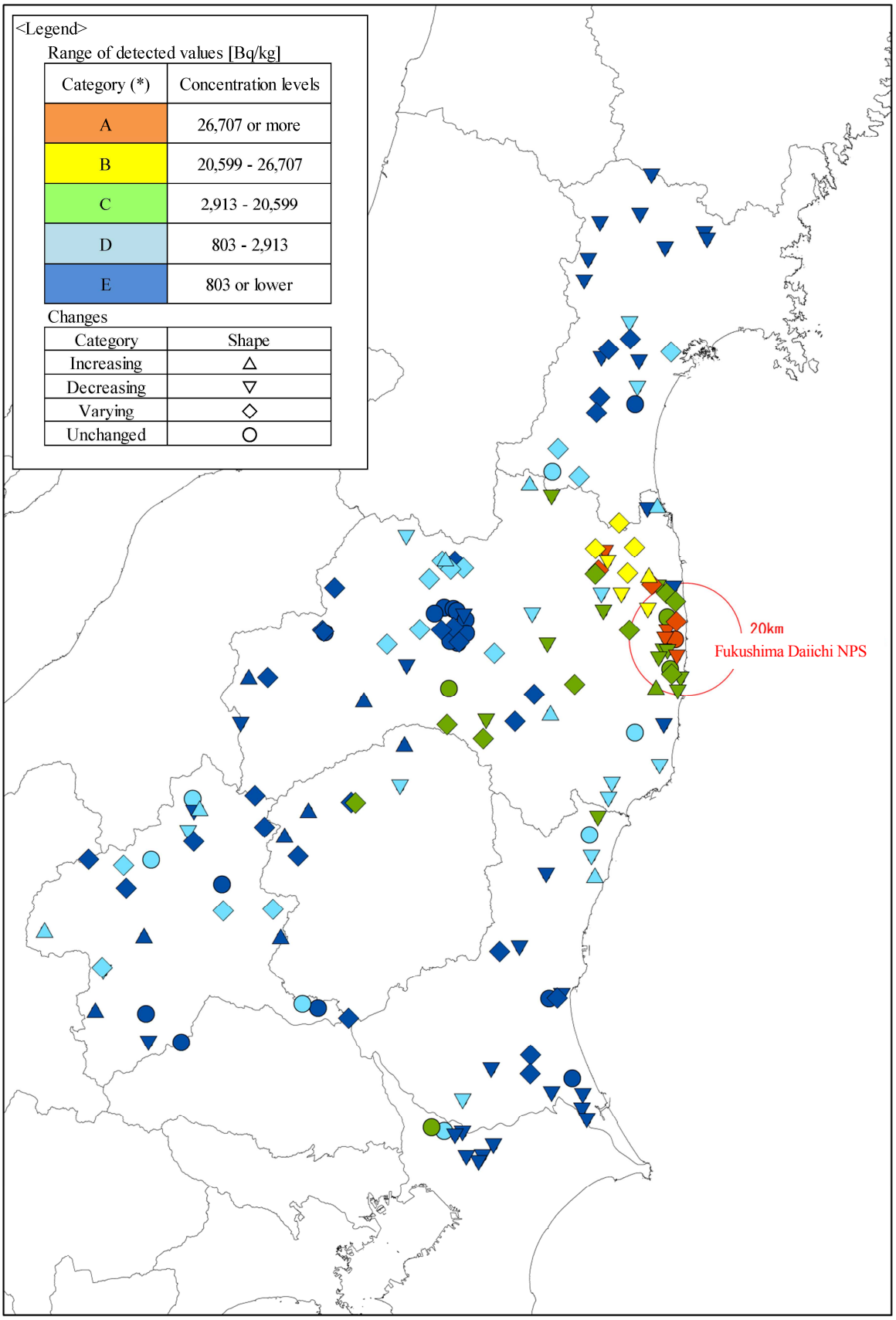


Figure 4.3-26 Categorization of and changes in concentration levels for lake sediment samples from public water areas

(*) 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.

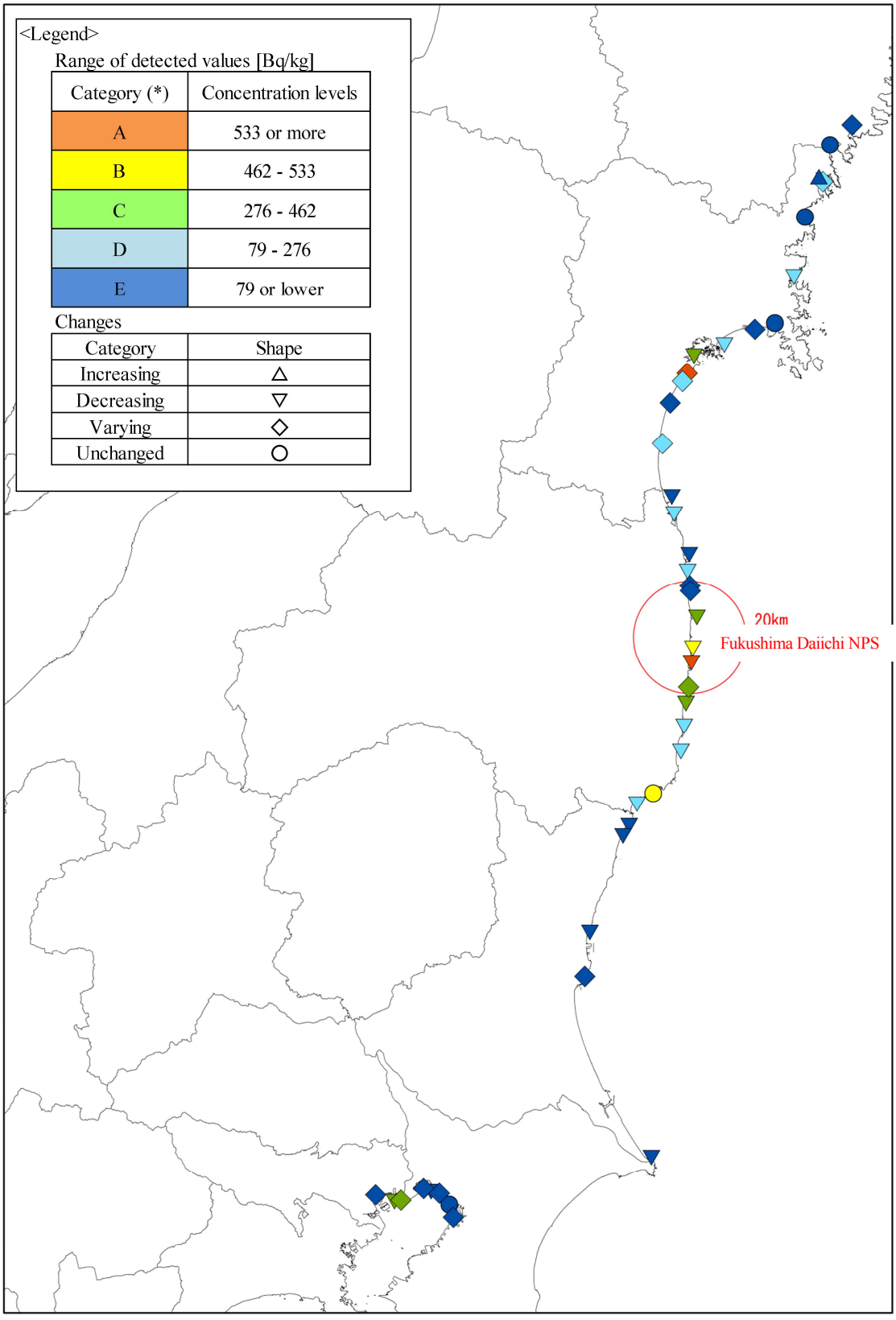


Figure 4.3-27 Categorization of and changes in concentration levels for coastal area sediment samples from public water areas

(*) 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 iodine (I-131)

(1) Water

1) Public water areas

Detection of radioactive iodine (I-131) in water samples from public water areas (rivers, lakes, and coastal areas) were as shown in Table 5.1-1.

Surveys were conducted for public water areas with regard to approx. 3,000 river water samples, approx. 1,400 lake water samples, and approx. 700 coastal area water samples in total in FY2011 and FY2012, but I-131 was not detectable at any surveyed locations (detection limit: 1 Bq/L).

2) Groundwater

Detection of radioactive iodine (I-131) in groundwater samples was as shown in Table 5.1-2.

Surveys were conducted with regard to approx. 3,800 groundwater samples from FY2011 to FY2014, but I-131 was not detectable at any surveyed locations (detection limit: 1 Bq/L).

(2) Sediments

Detection of radioactive iodine (I-131) in sediment samples from public water areas (rivers, lakes, and coastal areas) were as shown in Table 5.1-3.

Surveys were conducted for public water areas with regard to approx. 3,000 river sediment samples, approx. 900 lake sediment samples, and approx. 400 coastal area sediment samples in total in FY2011 and FY2012, but I-131 was not detectable at any surveyed locations (detection limit: 10 Bq/kg).

Table 5.1-1 Detection of I-131 in water samples from public water areas (rivers, lakes, and coastal areas)

Property	Prefecture	FY2011		FY2012		Total	
		Number of samples	Detection times	Number of samples	Detection times	Number of samples	Detection times
Rivers	Iwate	18	0	64	0	82	0
	Miyagi	114	0	204	0	318	0
	Yamagata	10	0	0	-	10	0
	Fukushima	452	0	854	0	1,306	0
	Ibaraki	128	0	214	0	342	0
	Tochigi	161	0	277	0	438	0
	Gunma	90	0	216	0	306	0
	Saitama	2	0	8	0	10	0
	Chiba	82	0	202	0	284	0
	Tokyo	3	0	12	0	15	0
	Total	1,060	0	2,051	0	3,111	0
Lakes	Miyagi	34	0	90	0	124	0
	Yamagata	4	0	0	-	4	0
	Fukushima	211	0	581	0	792	0
	Ibaraki	48	0	93	0	141	0
	Tochigi	24	0	54	0	78	0
	Gunma	51	0	144	0	195	0
	Chiba	32	0	50	0	82	0
	Total	404	0	1,012	0	1,416	0
Coastal areas	Iwate	5	0	8	0	13	0
	Miyagi	94	0	96	0	190	0
	Fukushima	116	0	189	0	305	0
	Ibaraki	45	0	62	0	107	0
	Chiba	0	-	62	0	62	0
	Tokyo	0	-	38	0	38	0
	Total	260	0	455	0	715	0

Table 5.1-2 Detection of I-131 in groundwater samples

Prefecture	FY2011		FY2012		FY2013		FY2014		Total	
	Number of samples	Detection times	Number of samples	Detection times	Number of samples	Detection times	Number of samples	Detection times	Number of samples	Detection times
Iwate	42	0	44	0	44	0	22	0	152	0
Miyagi	79	0	44	0	48	0	24	0	195	0
Yamagata	79	0	0	0	0	0	0	0	79	0
Fukushima	540	0	543	0	766	0	771	0	2620	0
Ibaraki	89	0	54	0	54	0	27	0	224	0
Tochigi	76	0	54	0	54	0	27	0	211	0
Gunma	40	0	40	0	42	0	21	0	143	0
Chiba	54	0	46	0	46	0	23	0	169	0
Total	999	0	825	0	1054	0	915	0	3793	0

Table 5.1-3 Detection of I-131 in sediment samples from public water areas (rivers, lakes, and coastal areas)

Property	Prefecture	FY2011		FY2012		Total	
		Number of samples	Detection times	Number of samples	Detection times	Number of samples	Detection times
Rivers	Iwate	18	0	64	0	82	0
	Miyagi	113	0	199	0	312	0
	Yamagata	10	0	0	-	10	0
	Fukushima	441	0	847	0	1,288	0
	Ibaraki	128	0	214	0	342	0
	Tochigi	159	0	275	0	434	0
	Gunma	88	0	211	0	299	0
	Saitama	2	0	8	0	10	0
	Chiba	83	0	199	0	282	0
	Tokyo	2	0	12	0	14	0
	Total	1,044	0	2,029	0	3,073	0
Lakes	Miyagi	24	0	58	0	82	0
	Yamagata	2	0	0	-	2	0
	Fukushima	147	0	389	0	536	0
	Ibaraki	24	0	48	0	72	0
	Tochigi	12	0	27	0	39	0
	Gunma	26	0	72	0	98	0
	Chiba	16	0	32	0	48	0
	Total	251	0	626	0	877	0
Coastal areas	Iwate	3	0	4	0	7	0
	Miyagi	52	0	48	0	100	0
	Fukushima	80	0	97	0	177	0
	Ibaraki	28	0	31	0	59	0
	Chiba	0	-	31	0	31	0
	Tokyo	0	-	19	0	19	0
	Total	163	0	230	0	393	0

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

(1) Public water areas

1) Outline

Regarding radioactive strontium, surveys of Sr-90 were conducted with regard to sediment samples from public water areas (rivers, lakes, and coastal areas) from FY2011 to FY2014, while a survey of Sr-89 was conducted with regard to sediment samples from public water areas (rivers and lakes) in FY2011. Details and results of these surveys are as shown in Table 5.2-1 (detection limit: approx. 1 Bq/kg (dry) for Sr-90 and approx. 2 Bq/kg (dry) for Sr-89).

Sr-90 was detected as detailed below.

A survey of Sr-89 was conducted with regard to 22 samples (13 river sediment samples and nine lake sediment samples) only in FY2011 but Sr-89 was not detectable in any of these samples.

2) Detection of Sr-90 in sediment samples

i. River sediments

Surveys of Sr-90 were conducted with regard to approx. 120 river sediment samples in four years and Sr-90 was detected in 67 samples (detection rate: approx. 55%).

The detection rate was high for Fukushima Prefecture and was also relatively high for other prefectures. Detected values in FY2014 were below 1 Bq/kg (dry) except for Fukushima Prefecture (see Table 5.2-1).

Sr-90 was continuously detected since FY2011 at some locations in the Ota River and the Ukedo River in Fukushima Prefecture, but detected values gradually decreased to fall below 2 Bq/kg (dry) in FY2014 (see Figure 5.2-1).

ii. Lake sediments

Surveys of Sr-90 were conducted with regard to approx. 180 lake sediment samples in four years and Sr-90 was detected in 168 samples (detection rate: approx. 90%) (see Table 5.2-1).

Sr-90 was continuously detected in all surveyed prefectures until FY2014.

In agricultural reservoirs in the Soso district in Fukushima Prefecture, Sr-90 was detected at levels exceeding 40 Bq/kg (dry) at the maximum. However, detected values were gradually decreasing (see Figure 5.2-1).

iii. Coastal area sediments

Surveys of Sr-90 were conducted with regard to approx. 80 coastal area sediment samples in four years and Sr-90 was detected three times in Fukushima Prefecture (see Table 5.2-1). Detected values were from 0.3 to 0.6 Bq/kg (dry): lower than in the cases of river sediment samples and lake sediment samples.

Table 5.2-1 Detection of Sr-90 and Sr-89 in river sediment samples, lake sediment samples, and coastal area sediment samples

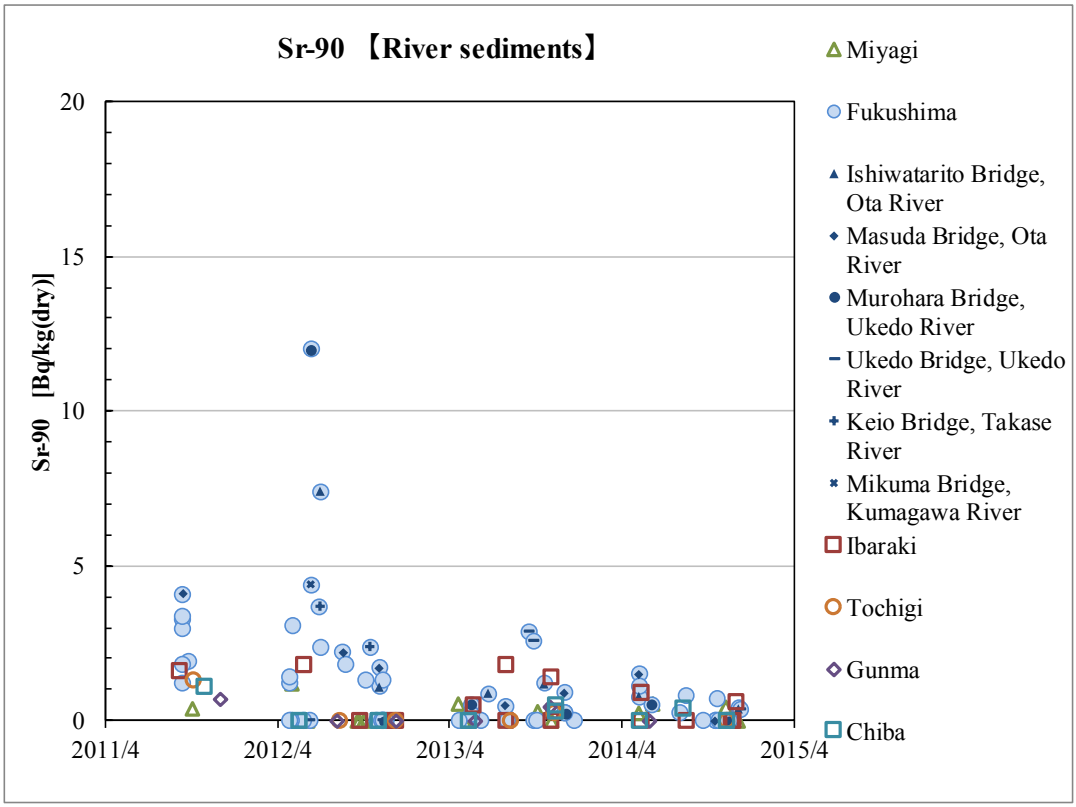
○ Sr-90

Property	Prefecture	FY2011				FY2012				FY2013				FY2014				Total			
		Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values [Bq/kg(dry)]	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values [Bq/kg(dry)]	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values [Bq/kg(dry)]	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values [Bq/kg(dry)]	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values [Bq/kg(dry)]
Rivers	Miyagi	2	2	100.0	0.40 - 1.1	7	1	14.3	ND - 1.2	5	3	60.0	ND - 0.56	4	3	75.0	ND - 0.52	18	9	50.0	ND - 1.2
	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	62	41	66.1	ND - 12
	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	17	8	47.1	ND - 1.8
	Tochigi	1	1	100.0	1.3 - 1.3	2	0	0.0	-	2	1	50.0	ND - 0.23	2	1	50.0	ND - 0.53	7	3	42.9	ND - 1.3
	Gunma	1	1	100.0	0.70 - 0.70	2	0	0.0	-	2	1	50.0	ND - 0.44	1	0	0.0	-	6	2	33.3	ND - 0.70
	Chiba	1	1	100.0	1.1 - 1.1	4	0	0.0	-	4	2	50.0	ND - 0.49	4	1	25.0	ND - 0.40	13	4	30.8	ND - 1.1
	Total	13	13	100.0	0.4 - 4.1	44	17	38.6	ND - 12	35	21	60.0	ND - 2.9	31	16	51.6	ND - 1.5	123	67	54.5	ND - 12
Lakes	Miyagi	1	1	100.0	1.6 - 1.6	3	2	66.7	ND - 2.1	5	5	100.0	0.3 - 2.2	6	5	83.3	ND - 0.96	15	13	86.7	ND - 2.2
	Fukushima	3	3	100.0	3.3 - 6.8	41	41	100.0	2.1 - 93	40	40	100.0	0.7 - 55	39	39	100.0	0.70 - 50	123	123	100.0	0.7 - 93
	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	20	14	70.0	ND - 7.0
	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	7	6	85.7	ND - 1.6
	Gunma	1	1	100.0	2.0 - 2	2	2	100.0	1.9 - 2.2	2	1	50.0	ND - 1.7	2	2	100.0	1.5 - 1.7	7	6	85.7	ND - 2.2
	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	11	6	54.5	ND - 4.4
	Total	9	9	100.0	0.7 - 6.8	58	48	82.8	ND - 93	57	54	94.7	ND - 55	59	57	96.6	ND - 50	183	168	91.8	ND - 93
Coastal areas	Miyagi	0	0	-	-	2	0	0.0	-	4	0	0.0	-	2	0	0.0	-	8	0	0.0	-
	Fukushima	0	0	-	-	21	0	0.0	-	30	1	3.3	ND - 0.33	30	2	6.7	ND - 0.58	81	3	3.7	ND - 0.58
	Tokyo Metropolis	0	0	-	-	2	0	0.0	-	0	0	-	-	0	0	-	-	2	0	0.0	-
	Total	0	0	-	-	25	0	0.0	-	34	1	2.9	ND - 0.33	32	2	6.3	ND - 0.58	81	3	3.7	ND - 0.58

ND = Not detectable

○ Sr-89 (FY2011)

Prefecture	Rivers		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



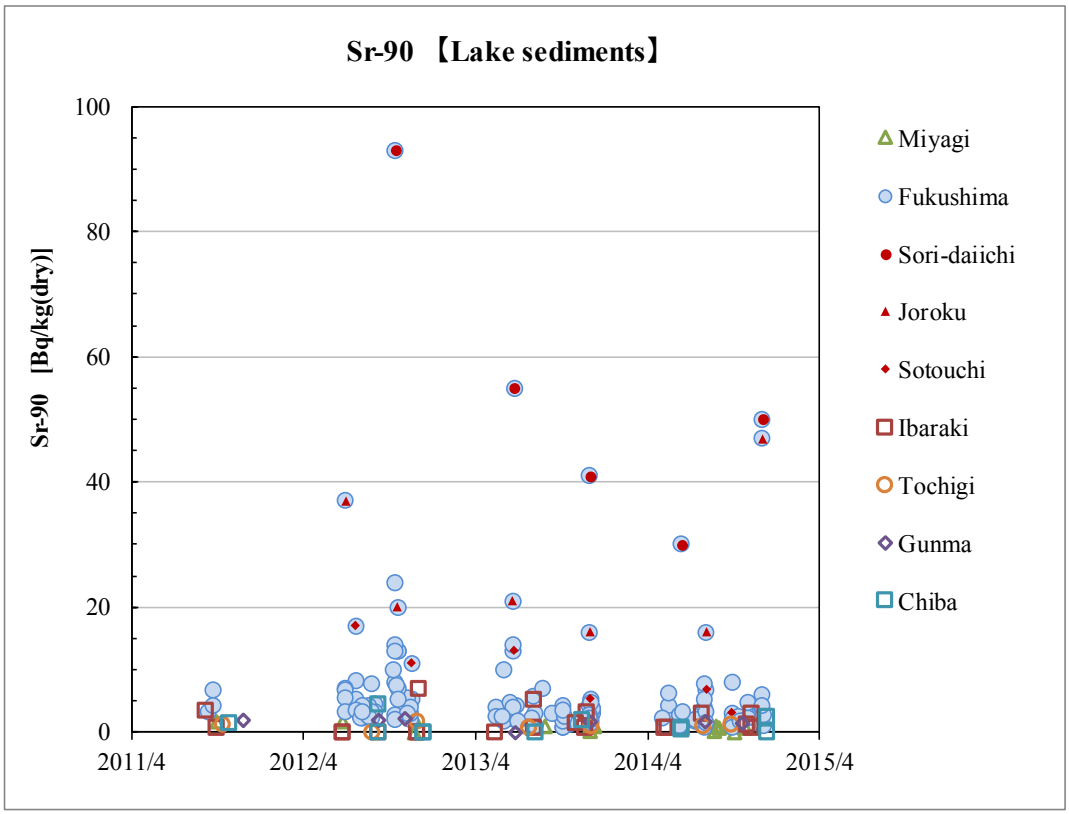


Figure 5.2-1 Detection of Sr-90 in sediment samples from public water areas (upper: rivers; lower: lakes)

(2) Groundwater

Surveys of Sr-89 and Sr-90 were conducted with regard to approx. 190 groundwater samples collected in Fukushima Prefecture from January 2012 to January 2015.

The outline of the results of these surveys is as shown in Table 5.2-2. Detected values of Sr-89 and Sr-90 were all below the detection limit (1 Bq/L).

The detection limit for Sr-90 was set at 0.0002 Bq/L for the FY2011 survey (for calendar year 2012) and Sr-90 was detected in all of the eight samples at levels between 0.0004 and 0.0029 Bq/L. The detection limit for Sr-89 was set at 0.001 Bq/L for the FY2011 survey (for calendar year 2012) and detected values for all of the eight samples were below the detection limit.

Table 5.2-2 Detection of Sr-89 and Sr-90 in groundwater samples (all collected in Fukushima Prefecture)

Financial year	Sr-90				Sr-89			
	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values [Bq/L](*1)	Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values [Bq/L](*1)
FY2011	8	0	0.0	-	8	0	0.0	-
FY2012	60	0	0.0	-	60	0	0.0	-
FY2013	77	0	0.0	-	77	0	0.0	-
FY2014	48	0	0.0	-	48	0	0.0	-
Total	193	0	0.0	-	193	0	0.0	-

*1: Results were compiled by setting the detection limit at 1 Bq/L.
In reality, the detection limit was set at 0.0002 Bq/L and at 0.001 Bq/L for Sr-90 and Sr-89, respectively, for the FY2011 survey, and was set at 1 Bq/L for both Sr-90 and Sr-89 for surveys in FY2012 onward (see the main text).

5.3 Other γ-ray emitting radionuclides

Apart from the aforementioned radionuclides (Cs-134, Cs-137, I-131, Sr-89, and Sr-90), measurement results for water samples and sediment samples using a germanium semiconductor detector were analyzed from 2011 to 2013 to obtain activity concentrations of accident-derived radionuclides (Ag-110m, Te-129m, Nb-95, Sb-125, and Ce-144, etc.) and major naturally occurring radionuclides such as K-40.

The outline of the analysis results are as shown in Table 5.3-1. Artificial radionuclides were not detectable in water samples, but Ag-110m and Sb-125 were detected in sediment samples at detection rates as low as below 1%. In 2013, neither of these two types of radionuclides were detectable.

Six types of naturally occurring radionuclides (K-40, Pb-212, Pb214, Tl-208, Ac-228, and Bi-214) were detected as shown in Table 5.3-1. However, K-40 is a naturally occurring radionuclide first incorporated at the time of the formation of the earth, and the other five are all uranium or thorium series naturally occurring radionuclides existing widely within the earth's crust.

On the other hand, Ag-110m and Sb-125 are artificial radionuclides that are generated at nuclear power stations, etc. Therefore, their emitting sources are examined below.

Table 5.3-1 Detection of other radionuclides

<Water>

Fiscal year	Number of samples	Major detected artificial radionuclide		Major detected naturally occurring radionuclide	
		Type	Detection rate and detected values	Type	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%

<Sediments> (detection limits: 7 - 180 Bq/kg for Ag-110m and 130 - 330 Bq/kg for Sb-125)

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

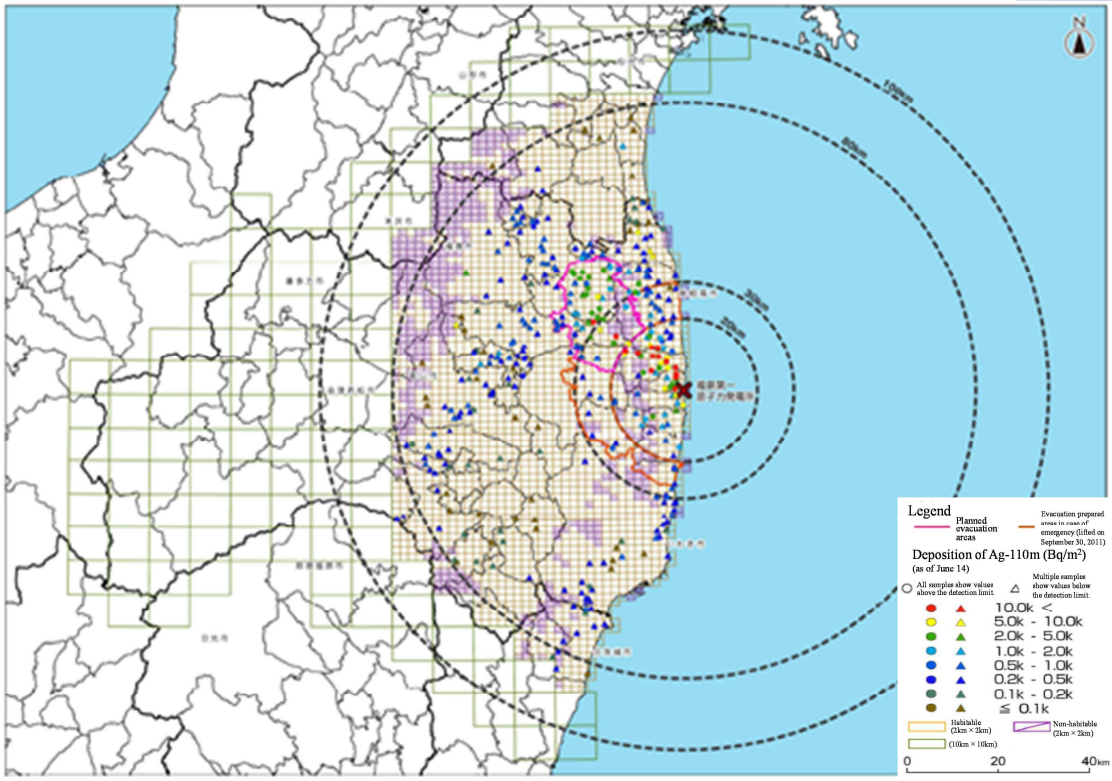
The two types of detected artificial radionuclides (Ag-110m and Sb-125) were not included in the publicized reference materials concerning the amount of radioactive materials discharged due to the Fukushima NPS Accident,[12] but the Distribution Maps of Radiation Doses, etc. prepared in October 2011 include a detailed map showing activity concentrations in soil which contains data for Ag-110m (see Figure 5.3-1). Sb-125 was also detected in Niigata after the accident.[13]

The monitoring results revealed that Ag-110m was frequently detected in FY2012 at locations northwest of the Fukushima Daiichi NPS, which coincides with the distribution of Ag-110m as observed in the map showing activity concentrations in soil (Figure 5.3-1). Ag-110m was detected at high concentration levels at two locations (Joroku and Sori-daiichi (both are agricultural reservoirs)) within 10 km northwest of the power station. Sb-125 was detected only at Joroku (agricultural reservoir).

Ag-110m is produced as a result of activation of Ag-109 in a reactor, while Sb-125 is a radioisotope produced as a result of nuclear fission.

Therefore, in light of the distribution of the detected artificial radionuclides and their production processes, they are considered to have been derived from the Fukushima NPS Accident.

Annex 2-2



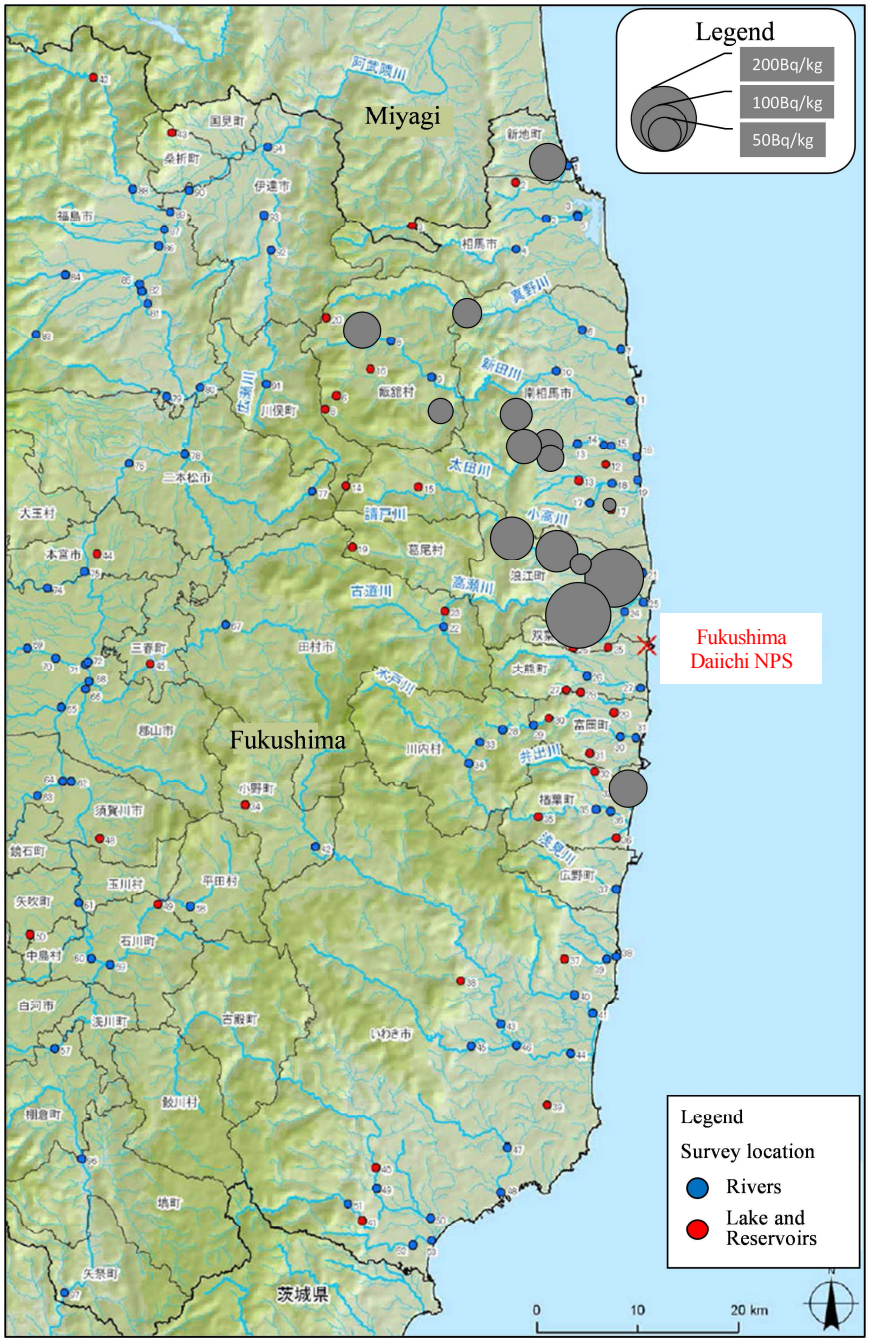
(*) Reference: Website of the Ministry of Education, Culture, Sports, Science and Technology[14]

Figure 5.3-1 Map showing concentrations of Ag-110m in soil

[12] Errors in the Released Data on the Amount of Radioactive Materials (October 20, 2011; Nuclear and Industrial Safety Agency) http://www.meti.go.jp/press/2011/10/20111020001/20111020001.pdf

[13] Artificial Radionuclides Detected in Niigata Prefecture After the Accident at the Fukushima Daiichi NPS, by Ono, et al.; Annual Report of the Niigata Prefectural Institute of Environmental Radiation Monitoring, vol. 9, 19-29.

[14] Preparation of Distribution Maps of Radiation Doses, etc. (Te-129m and Ag-110m) by MEXT: http://radioactivity.nsr.go.jp/ja/contents/6000/5050/24/5600_111031_rev130701.pdf



(*) Average of detected values; Ag-110m was not detectable at any other time, or at any unmarked locations.

(*) Sb-125 was detected only at Joroku (agricultural reservoir) (approx. 10 km northwest of the Fukushima Daiichi NPS) at levels of 140 to 420 Bq/kg during the period from July to November 2012.

Figure 5.3-2 Detection of Ag-110m in sediment samples from public water areas (average of data from September 2011 to March 2013)

Part 3: Other Radioactive Material Monitoring Conducted Nationwide (FY2014)

1. Outline of the Monitoring

1.1 Covered monitoring

As other radioactive material monitoring activity conducted nationwide, the results of the Monitoring of Environmental Radioactivity Levels, which has been conducted by the Nuclear Regulation Authority for the purpose of clarifying the existence or nonexistence of the influence of nuclear facilities, etc. nationwide, are compiled here.

Monitoring locations are as shown in Table 1.1-1 and Figure 1.1-1. See the relevant website for more details. (http://www.env.go.jp/air/rmcm/result/nsr.html)

1.2 Compilation methods

Measurement data are available on the website[15] of the Japan Chemical Analysis Center.

Data for this report were collected from this website under the following search criteria.

i. Period: April 2014 to March 2015 (Accessed February 8, 2016)
ii. Coverage: Nationwide
iii. Targets: All radionuclides
iv. Targeted samples: Inland water (river water, lake water, freshwater), seawater, sediments (river sediments, lake sediments, sea sediments)

[15] http://search.kankyo-hoshano.go.jp/servlet/search.top [Accessed February 8, 2016]

Table 1.1-1 Locations for the Monitoring of Environmental Radioactivity Levels (30 in total)

No.	Prefecture	Property	Sampling locations	Water	Sediments
1	Hokkaido	Lake	Oyafuru, Ishikari City (Lake Barato)	○	—
2		Coastal area	Yoichi Town, Yoichi County (Yoichi Bay)	○	○
3	Aomori	Coastal area	Fukaura Town, Nishitsugaru County (off Kasose)	○	○
4		Coastal area	Hiranai Town, Higashitsugaru County (Mutsu Bay)	○	○
5	Iwate	Coastal area	Hirono Town, Kunohe County (off Taneichi)	○	○
6	Akita	River	Asahikawa, Akita City	○	—
7	Fukushima	Coastal area	Soma City (off Haragama Beach)	○	○
8		River	Zainiwasaka, Fukushima City	○	—
9	Ibaraki	Lake	Kasumigaura	○	—
10		Coastal area	Tokai Village, Naka County (off the NPS)	○	○
11	Chiba	Coastal area	Tokyo Bay (off Sodegaura City)	○	○
12	Kanagawa	Coastal area	Yokosuka City (Odawa Bay)	○	○
13	Niigata	Lake	Shichikuyama, Chuo Ward, Niigata City	○	—
14		Coastal area	off Niigata Port	○	○
15	Fukui	Lake	Inogaike Pond, Tsuruga City	○	—
16	Nagano	Lake	Lake Suwa	○	—
17	Aichi	Coastal area	Tokoname City (off Kosugaya)	○	○
18	Mie	River	Seki Town, Kameyama City (Suzuka River)	○	—
19	Kyoto	Freshwater	Tenno, Ogura Town, Uji City	○	—
20	Osaka	Coastal area	Osaka City (Entrance to Osaka Port)	○	○
21	Tottori	River	Katamo (Katamo River System)	○	○
22		River	Kawakami (Kawakami River System)	○	○
23		River	Hotani (Iwakura River System)	○	○
24		River	Bessho (Katamo River System)	○	—
25		River	Kannokura (Oshika River System)	○	○
26	Hiroshima	River	Kawate Town, Shobara City (Saijo River)	○	—
27	Yamaguchi	Coastal area	Ajisu, Yamaguchi City (Yamaguchi Bay)	○	○
28	Fukuoka	Coastal area	Higashiminato Town, Moji Ward, Kitakyushu City (off Chichisaki)	○	○
29	Kagoshima	Coastal area	Minamisatsuma City (off the mouth of Manose River)	○	○
30	Okinawa	Coastal area	Katsuren White Beach, Uruma City	○	○

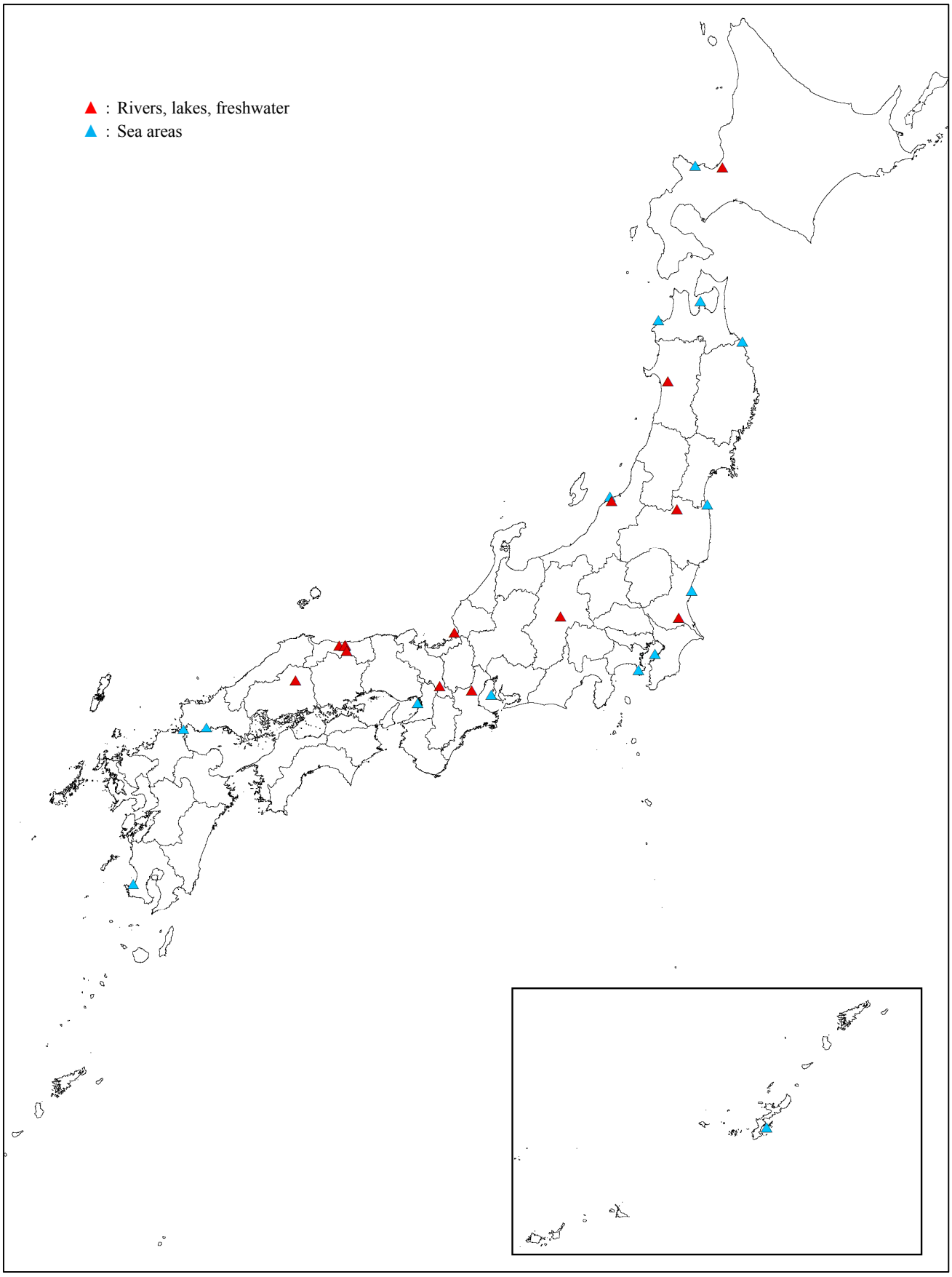


Figure 1.1-1 Locations for the Monitoring of Environmental Radioactivity Levels

2. Results

2.1 Water

(1) Inland water[16]

The Monitoring of Environmental Radioactivity Levels surveyed nine types of radionuclides in inland water samples in FY2014. As a result, eight types of radionuclides as shown in Table 2.1-1 were detected.

A comparison with the results of the Monitoring of Environmental Radioactivity Levels for the last twenty years (excluding data for March 11, 2011 to March 10, 2012) revealed that detected values for all these radionuclides were within the past measurement trends (see Figure 2.1-1).

Table 2.1-1 Detection of radionuclides in the Monitoring of Environmental Radioactivity Levels [inland water]

Nuclides		Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values [Bq/L]	Range of past measurement records (*1) [Bq/L]
Naturally occurring radionuclides	Be-7	7	5	71.4	ND - 0.017	ND - 0.021
	K-40	10	10	100.0	0.013 - 0.18	0.0067 - 0.30
	U-234	10	10	100.0	0.0015 - 0.0056	ND - 0.015
	U-238	10	10	100.0	0.00071 - 0.0036	ND - 0.013
Artificial radionuclides	Cs-134	9	2	22.2	ND - 0.015	ND - 0.041
	Cs-137	9	4	44.4	ND - 0.041	ND - 0.084
	I-131	7	1	14.3	ND - 0.0078	ND - 0.016
	Sr-90	10	8	80.0	ND - 0.0028	ND - 0.0050

ND = Not detectable

(*1) Results of the Monitoring of Environmental Radioactivity Levels from FY1994 to FY2013 (excluding data for March 11, 2011 to March 10, 2012)

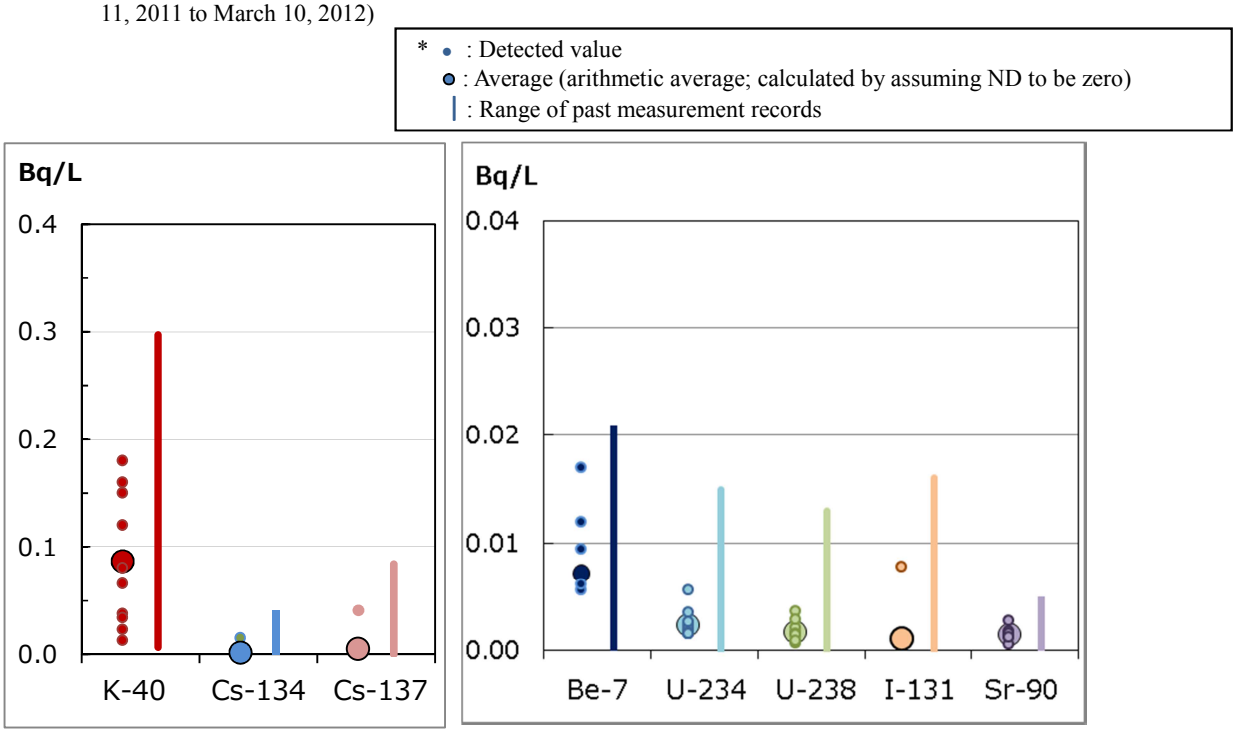


Figure 2.1-1 Detection of radionuclides in the Monitoring of Environmental Radioactivity Levels [inland water]

[16] This report only covers data for river water, lake water, and freshwater in the Monitoring of Environmental Radioactivity Levels.

(2) Seawater

The Monitoring of Environmental Radioactivity Levels surveyed six types of radionuclides in seawater samples in FY2014. As a result, two types of radionuclides as shown in Table 2.1-2 were detected.

A comparison with the results of the Monitoring of Environmental Radioactivity Levels for the last twenty years (excluding data for March 11, 2011 to March 10, 2012) revealed that detected values for both of these radionuclides were within the past measurement trends (see Figure 2.1-2).

Nuclides		Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values [Bq/L]	The range of past measurement records [Bq/L] (*1)
Naturally occurring radionuclides	K-40	16	16	100.0	0.86 – 13	0.078 - 14
Artificial radionuclides	Sr-90	15	15	100.0	0.00055 - 0.0014	ND - 0.0084

Table 2.1-2 Detection of radionuclides in the Monitoring of Environmental Radioactivity Levels [seawater]

ND = Not detectable

(*1) Results of the Monitoring of Environmental Radioactivity Levels from FY1994 to FY2013 (excluding data for March 11, 2011 to March 10, 2012)

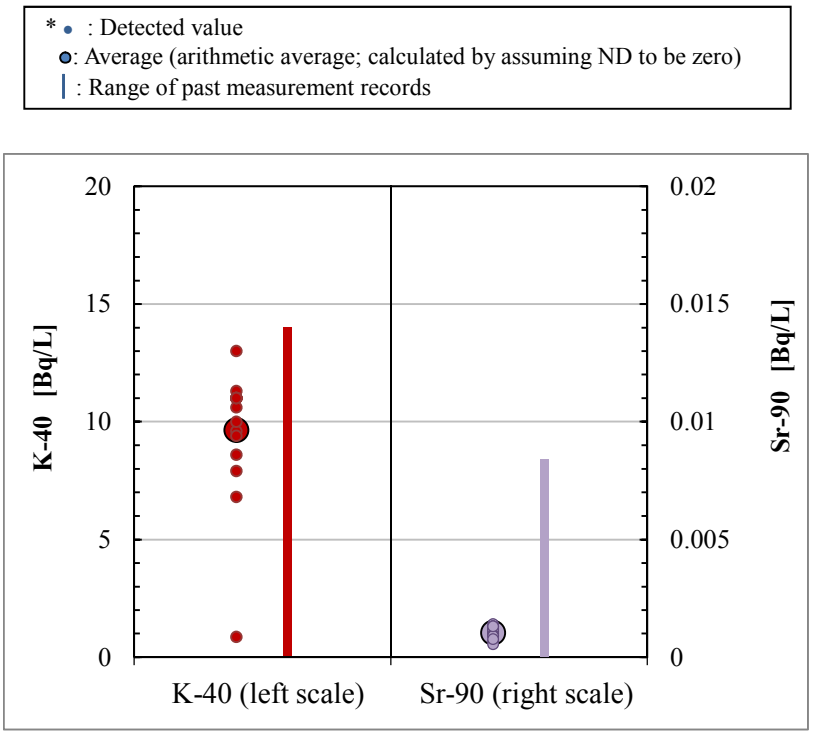


Figure 2.1-2 Detection of radionuclides in the Monitoring of Environmental Radioactivity Levels [seawater]

2.2 Sediments

(1) Inland water sediments (river sediments and lake sediments)

The Monitoring of Environmental Radioactivity Levels surveyed three types of radionuclides in inland water sediment samples (river and lake sediments) in FY2014. As a result, three types of radionuclides as shown in Table 2.2-1 were detected.

A comparison with the results of the Monitoring of Environmental Radioactivity Levels for the last twenty years (excluding data for March 11, 2011 to March 10, 2012) revealed that detected values for all these radionuclides were within the past measurement trends (see Figure 2.2-1).

Table 2.2-1 Detection of radionuclides in the Monitoring of Environmental Radioactivity Levels [Inland water sediments (river and lake sediments)]

Nuclides		Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values [Bq/kg(dry)]			The range of past measurement records [Bq/kg(dry)](*1)		
Naturally occurring radionuclides	U-234	5	5	100.0	13	-	35	6.5	-	76
	U-235	5	5	100.0	0.42	-	1.4	0.20	-	3.4
	U-238	5	5	100.0	14	-	41	0.50	-	94

(*1) Results of the Monitoring of Environmental Radioactivity Levels from FY1994 to FY2013 (excluding data for March 11, 2011 to March 10, 2012)

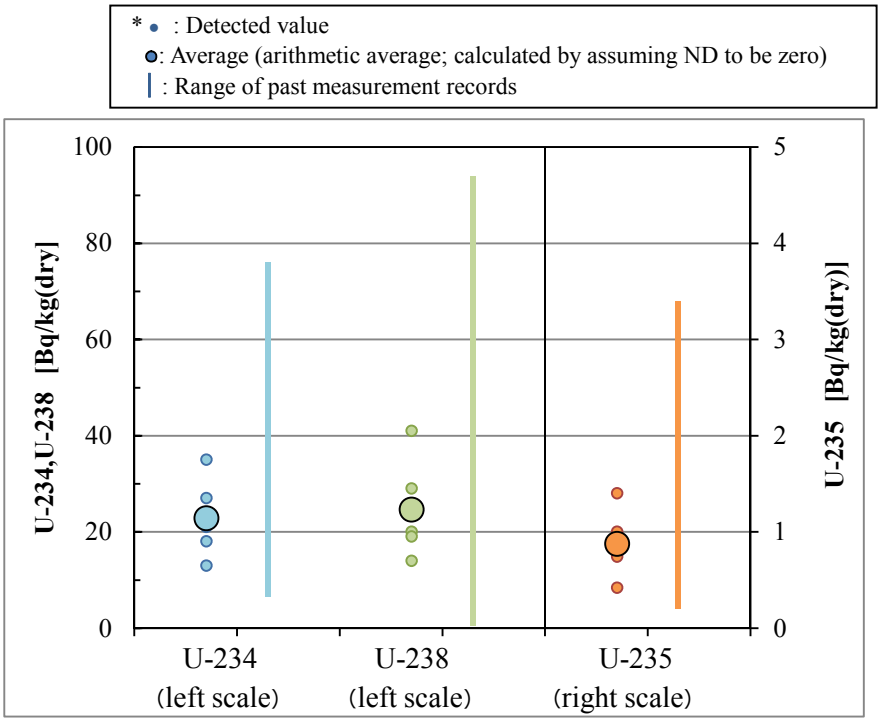


Figure 2.2-1 Detection of radionuclides in the Monitoring of Environmental Radioactivity Levels [Inland water sediments (river and lake sediments)]

(2) Sea sediments

The Monitoring of Environmental Radioactivity Levels surveyed eight types of radionuclides in sea sediments in FY2014. As a result, five types of radionuclides as shown in Table 2.2-2 were detected.

A comparison with the results of the Monitoring of Environmental Radioactivity Levels for the last twenty years (excluding data for March 11, 2011 to March 10, 2012) revealed that detected values for all these radionuclides were within the past measurement trends (see Figure 2.2-2).

Table 2.2-2 Detection of radionuclides in the Monitoring of Environmental Radioactivity Levels [Sea sediments]

Nuclides		Number of samples [A]	Number of detections [B]	Detection rate (B/A) (%)	Range of measured values [Bq/kg(dry)]	The range of past measurement records [Bq/kg(dry)](*1)
Naturally occurring radionuclides	Ac-228	1	1	100.0	42 - 42	20 - 53
	Bi-214	1	1	100.0	26 - 26	4.8 - 31
	K-40	15	15	100.0	97 - 700	33 - 720
Artificial radionuclides	Cs-134	15	3	20.0	ND - 4.4	ND - 35
	Cs-137	15	9	60.0	ND - 13	ND - 76

ND = Not detectable

(*1) Results of the Monitoring of Environmental Radioactivity Levels from FY1994 to FY2013 (excluding data for March 11, 2011 to March 10, 2012)

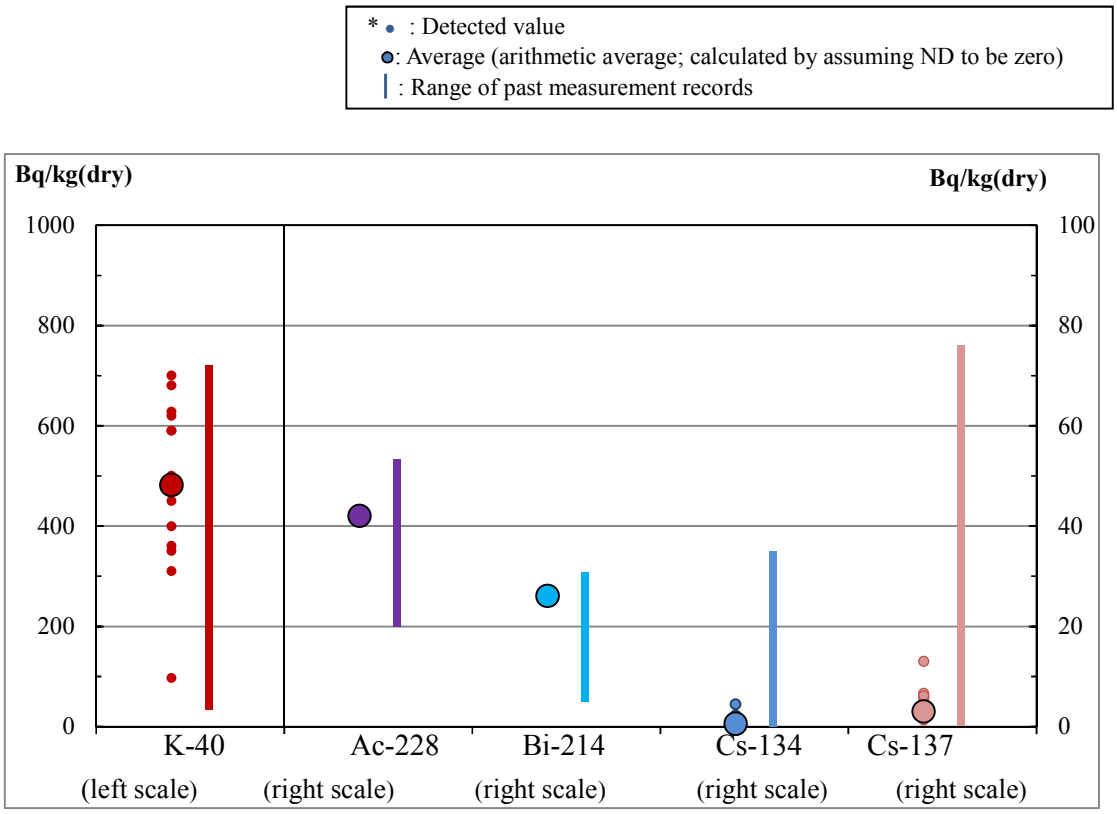


Figure 2.2-2 Detection of radionuclides in the Monitoring of Environmental Radioactivity Levels [Sea sediments]