<Reference>
May 31, 2013
Tokyo Electric Power Company

Nuclide Analysis Results of Fish and Shellfish
(The Ocean Area Within 20km Radius of Fukushima Daiichi NPS) < 1/3 >
(Exclude in the Port of Fukushima Daiichi NPS)

(Data summarized on May 31)

Name of Sample (Region)	Place of Sampling (Place No.)	Date of Sampling	Radioactivity Density [Bq/kg (Raw)] (Half-life)		
			Cs-134 (Approx. 2 years)	Cs-137 (Approx. 30 years)	Total
Greenling (Muscle)	Around 1km Offshore of Ota River (T-S1)	May 10, 2013	10	26	36
Northern dogfish (Muscle)	Around 1km Offshore of Ota River (T-S1)	May 10, 2013	ND	ND	ND
Blue crab (Whole)	Around 1km Offshore of Ota River (T-S1)	May 10, 2013	ND	ND	ND
Schlegel's black rockfish (Muscle)	Around 1km Offshore of Ota River (T-S1)	May 10, 2013	12	24	36
Common skete (Muscle)	Around 1km Offshore of Ota River (T-S1)	May 10, 2013	49	100	149
Banded dogfish (Muscle)	Around 1km Offshore of Ota River (T-S1)	May 10, 2013	ND	4.7	4.7
Microstoms achne (Muscle)	Around 1km Offshore of Ota River (T-S1)	May 10, 2013	17	34	51
Flatfish (Muscle)	Around 1km Offshore of Ota River (T-S1)	May 10, 2013	11	30	41
Marbled sole (Muscle)	Around 1km Offshore of Ota River (T-S1)	May 10, 2013	19	40	59
Greenling (Muscle)	Around 3km Offshore of Odaka Ward (T-S2)	May 10, 2013	19	50	69

* When the measurement value is below the detection limit, "ND" is marked. The detection limits are as follows.
Cs-134: Approx. 4.3Bq/kg (Raw), Cs-137: Approx. 4.0Bq/kg (Raw)
As the detection limit may vary depending on the detectors and sample properties, there are cases where nuclides below the detection limit are detected.

* Standard Value (after April 1, 2012) Cs-134+Cs-137: 100Bq/kg

* Analyzed by Tokyo Electric Power Environmental Engineering Co., Inc.

Nuclide Analysis Results of Fish and Shellfish
(The Ocean Area Within 20km Radius of Fukushima Daiichi NPS) < 2/3 >
(Exclude in the Port of Fukushima Daiichi NPS)

(Data summarized on May 31)

Name of Sample (Region)	Place of Sampling (Place No.)	Date of Sampling	Radioactivity Density [Bq/kg (Raw)] (Half-life)		
			Cs-134 (Approx. 2 years)	Cs-137 (Approx. 30 years)	Total
Northern dogfish (Muscle)	Around 3km Offshore of Odaka Ward (T-S2)	May 10, 2013	ND	3.7	3.7
Common skete (Muscle)	Around 3km Offshore of Odaka Ward (T-S2)	May 10, 2013	37	98	135
Sebastes cheni (Muscle)	Around 3km Offshore of Odaka Ward (T-S2)	May 10, 2013	80	150	230
Microstoms achne (Muscle)	Around 3km Offshore of Odaka Ward (T-S2)	May 10, 2013	27	64	91
Flatfish (Muscle)	Around 3km Offshore of Odaka Ward (T-S2)	May 10, 2013	12	23	35
Greenling (Muscle)	Around 2km Offshore of Kido River (T-S5)	May 18, 2013	18	44	62
Stone flounder (Muscle)	Around 2km Offshore of Kido River (T-S5)	May 18, 2013	8.7	21	29.7
Sea raven (Muscle)	Around 2km Offshore of Kido River (T-S5)	May 18, 2013	4.1	11	15.1
Common skete (Muscle)	Around 2km Offshore of Kido River (T-S5)	May 18, 2013	88	190	278
Banded dogfish (Muscle)	Around 2km Offshore of Kido River (T-S5)	May 18, 2013	ND	7.8	7.8

* When the measurement value is below the detection limit, "ND" is marked. The detection limits are as follows.

Cs-134: Approx. 4.4Bq/kg (Raw)

As the detection limit may vary depending on the detectors and sample properties, there are cases where nuclides below the detection limit are detected.

* Standard Value (after April 1, 2012) Cs-134+Cs-137: 100Bq/kg

* Analyzed by Tokyo Electric Power Environmental Engineering Co., Inc.

Nuclide Analysis Results of Fish and Shellfish
(The Ocean Area Within 20km Radius of Fukushima Daiichi NPS) < 3/3 >
(Exclude in the Port of Fukushima Daiichi NPS)

(Data summarized on May 31)

Name of Sample (Region)	Place of Sampling (Place No.)	Date of Sampling	Radioactivity Density [Bq/kg (Raw)] (Half-life)		
			Cs-134 (Approx. 2 years)	Cs-137 (Approx. 30 years)	Total
Drumfish (Muscle)	Around 2km Offshore of Kido River (T-S5)	May 18, 2013	5.7	12	17.7
Microstoms achne (Muscle)	Around 2km Offshore of Kido River (T-S5)	May 18, 2013	82	160	242
Flatfish (Muscle)	Around 2km Offshore of Kido River (T-S5)	May 18, 2013	24	40	64
Greenling (Muscle)	Around 2km Offshore of Fukushima Daini NPS (T-S7)	May 18, 2013	59	110	169
Northern dogfish (Muscle)	Around 2km Offshore of Fukushima Daini NPS (T-S7)	May 18, 2013	4.2	9.4	13.6
Common skete (Muscle)	Around 2km Offshore of Fukushima Daini NPS (T-S7)	May 18, 2013	95	210	305
Drumfish (Muscle)	Around 2km Offshore of Fukushima Daini NPS (T-S7)	May 18, 2013	ND	7.1	7.1
Microstoms achne (Muscle)	Around 2km Offshore of Fukushima Daini NPS (T-S7)	May 18, 2013	120	230	350
Flatfish (Muscle)	Around 2km Offshore of Fukushima Daini NPS (T-S7)	May 18, 2013	56	110	166

* When the measurement value is below the detection limit, "ND" is marked. The detection limits are as follows.

Cs-134: Approx. 3.9Bq/kg (Raw)

As the detection limit may vary depending on the detectors and sample properties, there are cases where nuclides below the detection limit are detected.

* Standard Value (after April 1, 2012) Cs-134+Cs-137: 100Bq/kg

* Analyzed by Tokyo Electric Power Environmental Engineering Co., Inc.

<Reference>
May 31, 2013
Tokyo Electric Power Company

Nuclide Analysis Results of Fish and Shellfish
(In the Port of Fukushima Daiichi NPS) < 1/4 >

(Data summarized on May 31)

Name of Sample (Region)	Place of Sampling （Place No.）	Date of Sampling	Radioactivity Density [Bq/kg (Raw)] (Half-life)		
			Cs-134 (Approx. 2 years)	Cs-137 (Approx. 30 years)	Total
Brown hakeling (Muscle) No.1	In the Port of Fukushima Daiichi NPS (Around the East Seawall Break)	May 9, 2013	330	720	1050
Brown hakeling (Muscle) No.2	In the Port of Fukushima Daiichi NPS (Around the South Breakwater)	May 9, 2013	270	550	820
Brown hakeling (Muscle) No.3	In the Port of Fukushima Daiichi NPS (Around the North Breakwater)	May 9, 2013	820	1500	2320
Spotbelly rockfish (Muscle) No.1	In the Port of Fukushima Daiichi NPS (Around the North Breakwater)	May 9, 2013	30000	59000	89000
Greenling (Muscle) No.1	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	May 9, 2013	24000	47000	71000
Stingray (Muscle) No.1	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	May 9, 2013	7900	16000	23900
Northern dogfish (Muscle) No.1	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	May 9, 2013	180	440	620
Common skete (Muscle)	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	May 9, 2013	360	750	1110
Flatfish (Muscle) No.1	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	May 9, 2013	2800	5500	8300
Marbled sole (Muscle)	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	May 9, 2013	7900	16000	23900

* Standard Value (after April 1, 2012) Cs-134+Cs-137: 100Bq/kg

Nuclide Analysis Results of Fish and Shellfish
(In the Port of Fukushima Daiichi NPS) < 2/4 >

(Data summarized on May 31)

Name of Sample (Region)	Place of Sampling （Place No.）	Date of Sampling	Radioactivity Density [Bq/kg (Raw)] (Half-life)		
			Cs-134 (Approx. 2 years)	Cs-137 (Approx. 30 years)	Total
Spotbelly rockfish (Muscle) No.2	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	May 9, 2013	12000	23000	35000
Greenling (Muscle) No.2	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	May 10, 2013	1000	2100	3100
Greenling (Muscle) No.3	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	May 10, 2013	25000	49000	74000
Scorpion fish (Muscle)	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	May 10, 2013	33000	64000	97000
Schlegel's black rockfish (Muscle)	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	May 10, 2013	7200	14000	21200
Sea bass (Muscle)	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	May 10, 2013	220	430	650
Flatfish (Muscle) No.2	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	May 10, 2013	290	500	790
Spotbelly rockfish (Muscle) No.3	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	May 10, 2013	21000	41000	62000
Stingray (Muscle) No.2	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	May 16, 2013	11000	21000	32000
Northern dogfish (Muscle) No.2	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	May 16, 2013	43	47	90

* Standard Value (after April 1, 2012) Cs-134+Cs-137: 100Bq/kg

Nuclide Analysis Results of Fish and Shellfish
(In the Port of Fukushima Daiichi NPS) < 3/4 >

(Data summarized on May 31)

Name of Sample (Region)	Place of Sampling （Place No.）	Date of Sampling	Radioactivity Density [Bq/kg (Raw)] (Half-life)		
			Cs-134 (Approx. 2 years)	Cs-137 (Approx. 30 years)	Total
Acanthopagrus schlegeli (Muscle) No.1	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	May 16, 2013	180	440	620
Acanthopagrus schlegeli (Muscle) No.2	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	May 16, 2013	83	160	243
Sebastes cheni (Muscle) No.1	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	May 16, 2013	5800	12000	17800
Sebastes cheni (Muscle) No.2	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	May 16, 2013	21000	41000	62000
Tribolodon brandtii (Muscle)	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	May 16, 2013	190	340	530
Spotbelly rockfish (Muscle) No.4	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	May 16, 2013	52000	100000	152000
Greenling (Muscle) No.4	In the Port of Fukushima Daiichi NPS (Around the center of the port)	May 14, 2013	43000	84000	127000
Embiotocidae (Muscle)	In the Port of Fukushima Daiichi NPS (Around the center of the port)	May 14, 2013	94	190	284
Gizzard shad (Muscle)	In the Port of Fukushima Daiichi NPS (Around the center of the port)	May 14, 2013	80	120	200
Sebastes cheni (Muscle) No.3	In the Port of Fukushima Daiichi NPS (Around the center of the port)	May 14, 2013	480	850	1330

* Standard Value (after April 1, 2012) Cs-134+Cs-137: 100Bq/kg

Nuclide Analysis Results of Fish and Shellfish
(In the Port of Fukushima Daiichi NPS) < 4/4 >

(Data summarized on May 31)

Name of Sample (Region)	Place of Sampling （Place No.）	Date of Sampling	Radioactivity Density [Bq/kg (Raw)] (Half-life)		
			Cs-134 (Approx. 2 years)	Cs-137 (Approx. 30 years)	Total
Drumfish (Muscle)	In the Port of Fukushima Daiichi NPS (Around the center of the port)	May 14, 2013	43	67	110
Flatfish (Muscle) No.3	In the Port of Fukushima Daiichi NPS (Around the center of the port)	May 14, 2013	430	750	1180
Tribolodon brandtii (Muscle)	In the Port of Fukushima Daiichi NPS (Around the center of the port)	May 14, 2013	190	360	550
Spotbelly rockfish (Muscle) No.5	In the Port of Fukushima Daiichi NPS (Around the center of the port)	May 14, 2013	2000	4000	6000

* Standard Value (after April 1, 2012) Cs-134+Cs-137: 100Bq/kg

<Reference>
May 31, 2013
Tokyo Electric Power Company

Nuclide Analysis Results of Fish and Shellfish
(The Ocean Area Within 20km Radius of Fukushima Daiichi NPS)

[Measurement result of fish and selfish where radioactive materials other than Cs were detected]

(Data summarized on May 31)

Name of Sample (Region)	Place of Sampling （Place No.）	Date of Sampling	Radioactivity Density [Bq/kg (Raw)] (Half-life)		
			Ag-110m (Approx. 250 days)	Sr-90 * (Approx. 29 years)	Reference (Cs-134+Cs-137)
Ovalipes unctatus (Whole)	Around 1km Offshore of Ota River (T-S1)	January 31, 2013	9.2	-	23.5
Ovalipes unctatus (Whole)	Around 3km Offshore of Odaka Ward (T-S2)	March 8, 2013	6.6	-	ND
Sea bass (Muscle)	Around 3km Offshore of Ukedo River (T-S3)	February 20, 2013	ND	0.87	880
Ovalipes unctatus (Whole)	Around 3km Offshore of Ukedo River (T-S3)	February 20, 2013	14	-	6.8
Ovalipes unctatus (Whole)	Around 3km Offshore of Ukedo River (T-S3)	March 27, 2013	9.6	-	4.8
Marbled sole (Muscle)	Around 3km Offshore of Fukushima Daiichi NPS (T-S4)	December 13, 2012	ND	6.0	1690
Ovalipes unctatus (Whole)	Around 3km Offshore of Fukushima Daiichi NPS (T-S4)	February 20, 2013	13	-	17.3
Schlegel's black rockfish (Muscle)	Around 2km Offshore of Fukushima Daini NPS (T-S7)	February 28, 2013	ND	1.0	780
Blue crab (Whole)	Around 4km Offshore of Kumagawa (T-S8)	February 10, 2013	11	-	13.3
Ovalipes unctatus (Whole)	Around 4km Offshore of Kumagawa (T-S8)	March 26, 2013	14	-	6.6

- " - " : Out of scope.
- When the measurement value is below the detection limit, "ND" is marked. The detection limits are as follows.
  Ag-110: Approx. 9.5Bq/kg (Raw), Cs-134: Approx. 4.4Bq/kg (Raw), Cs-137: Approx. 4.0Bq/kg (Raw)
  As the detection limit may vary depending on the detectors and sample properties, there are cases where nuclides below the detection limit are detected.
- Standard Value (after April 1, 2012) Cs-134+Cs-137: 100Bq/kg
- Ag-110m: Analyzed by Tokyo Electric Power Environmental Engineering Co., Inc., Sr-90: Analyzed by General Environmental Technos Co. Ltd.

* Measurement conducted by using a whole fish.

Investigation Report of Fish and Shellfish Sampled in the Ocean Area Within 20km Radius of Fukushima Daiichi NPS*

(Sampling period: January - March, 2012)

May 31, 2013

TEPCO

* Exclude the data obtained in the port of Fukushima Daiichi NPS

1. Purpose of the Investigation

(1) To understand radioactive cesium density by fish species

- Comparison with the food standard value (total cesium amount: 100Bq/kg)

(2) To understand the geographical distribution of radioactive cesium density of fish and shellfish

- Sampling at fixed measurement points (gill net fishing, trawl net fishing)

(3) To understand the change of radioactive cesium density of fish and shellfish over time

- Accumulating basic data in order to forecast trends

2-1. Investigation Results (Radioactive Cesium Density by Fish Species)

- **Approx. 70% of all the fish species and measurement results was below the standard value.**

	Sampling period: January - March, 2013		Sampling period: October - December, 2012	
Number of fish species	34	[Top 3 Density Levels] (Unit: Bq/kg (Raw) 1, Sea bass 880 2, Schlegel's black rockfish 780 3, Common skete 650	48	[Top 3 Density Levels] (Unit: Bq/kg (Raw) 1, Marbled sole 1,690 2, Schlegel's black rockfish 1,470 3, Common skete 780
Fish species with cesium exceeding the standard value	13		15	
Number of measurements	253	[Samples below the detection limit (measured more than once)] 1, Octopus dofleini 2, Loliginid 3, Snailfish 4, Crimson sea bream 5, Andrea cuttlefish 6, Loligo bleekeri	342	[Samples below the detection limit (measured more than once)] 1, Loliginid 2, Snailfish 3, Octopus dofleini 4, Chum salmon 5, Loligo bleekeri
Number of measurement results exceeding the standard value	75		87	

(Remark) Sampling region of fish and octopuses (except for salangichthys ishikawae, sand eel and lophius litilon): Muscle, Others: Whole

- **Samples with tendency to exceed the standard value:**
  Common skete, Microstoms achne, Schlegel's black rockfish, etc.
- **Samples with tendency to fall below the standard value:**
  Lepidotrigla microptera, Roundnose flounder, Littlemouth flounder, Ovalipes unctatus, etc.

2-2. Investigation Results

(Geographical Distribution of Radioactive Cesium Density of Fish and Shellfish)

- **The proportion of samples obtained at the trawl net measurement points (offshore) exceeding the standard value was lower than that of samples obtained at the gill net measurement points (coast). However, there are some points at the gill net measurement points (coast) with the proportion exceeding the standard value is low, such as T-S2.**

		Sampling period: January - March, 2013			Sampling period: October - December, 2012		
		Number of measurements	Number of measurement results exceeding the standard value	Proportion (%)	Number of measurements	Number of measurement results exceeding the standard value	Proportion (%)
Trawl Net	T-B1	35	4	11	44	2	5
	T-B2	37	3	8	54	1	2
	T-B3	34	5	15	26	8	31
	T-B4	33	4	12	29	7	24
Gill Net	T-S1	11	5	45	20	8	40
	T-S2	10	1	10	27	6	22
	T-S3	24	11	46	31	10	32
	T-S4	22	12	55	35	10	29
	T-S5	16	14	88	17	12	71
	T-S7	14	8	57	20	10	50
	T-S8	17	8	47	39	13	33

2-3. Investigation Results
(Change of Radioactive Cesium Density of Fish and Shellfish Over Time)

[Tendency of Radioactive Cesium Level of Fish and Shellfish Sampled within a 20km Radius of Fukushima Daiichi NPS]

- The radioactive cesium levels of fish and shellfish sampled in 20km radius of Fukushima Daiichi NPS were almost similar to those sampled outside of 20km radius (measurement performed by Fukushima Prefecture), however they tend to be slightly higher. Some of the radioactive cesium levels of samples have been decreasing.

[Tendency of Radioactive Cesium Density]

- Fish species whose radioactive cesium levels have been decreasing over time: Flatfish, Greenling, etc.

*** Further accumulation of the measurement results of fish and shellfish sampled within a 20km radius of Fukushima Daiichi NPS is needed.**

*** Though the cause of change in the radioactive cesium levels of fish and shellfish over time is estimated to be related to food, environment (seawater, marine soil, etc.) and ecological characteristics, the mechanism of the change needs to be clarified.**

(Reference) Change of Radioactive Cesium Density of Flatfish and Microstoms Achne Over Time

Figure 1. Flatfish Measurement Results
(Cs134+137, Bottom Layer Fish)

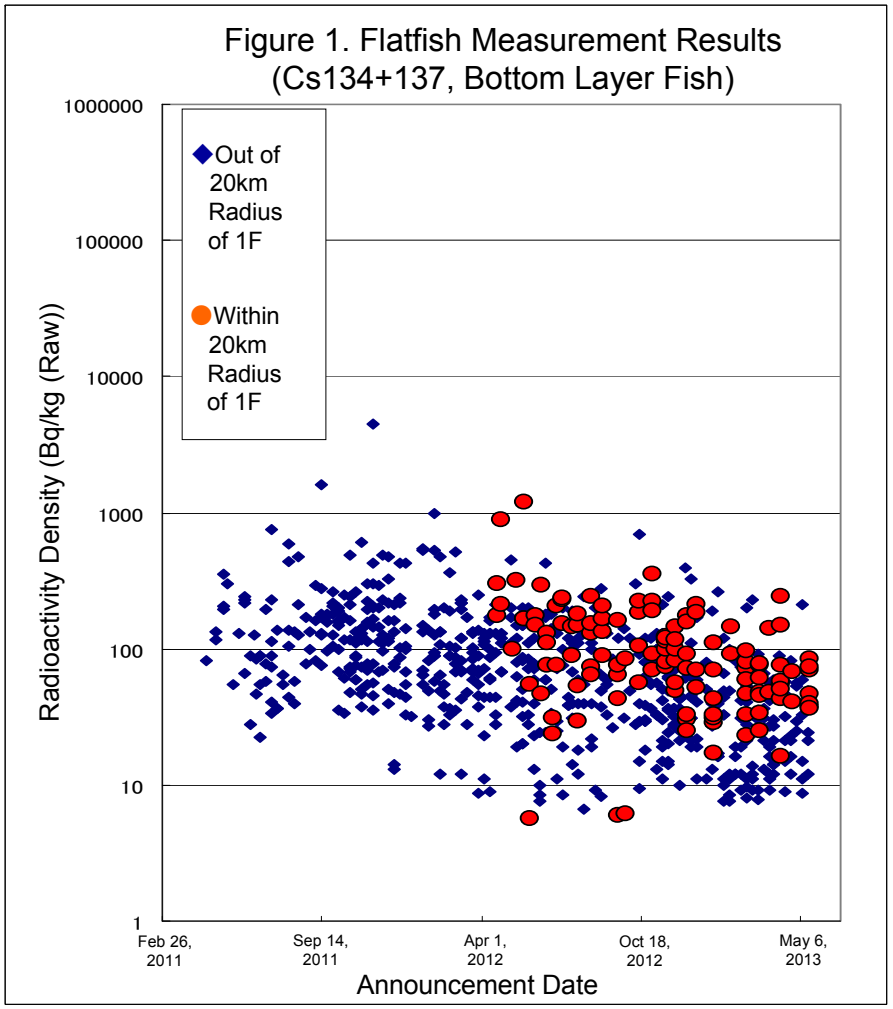
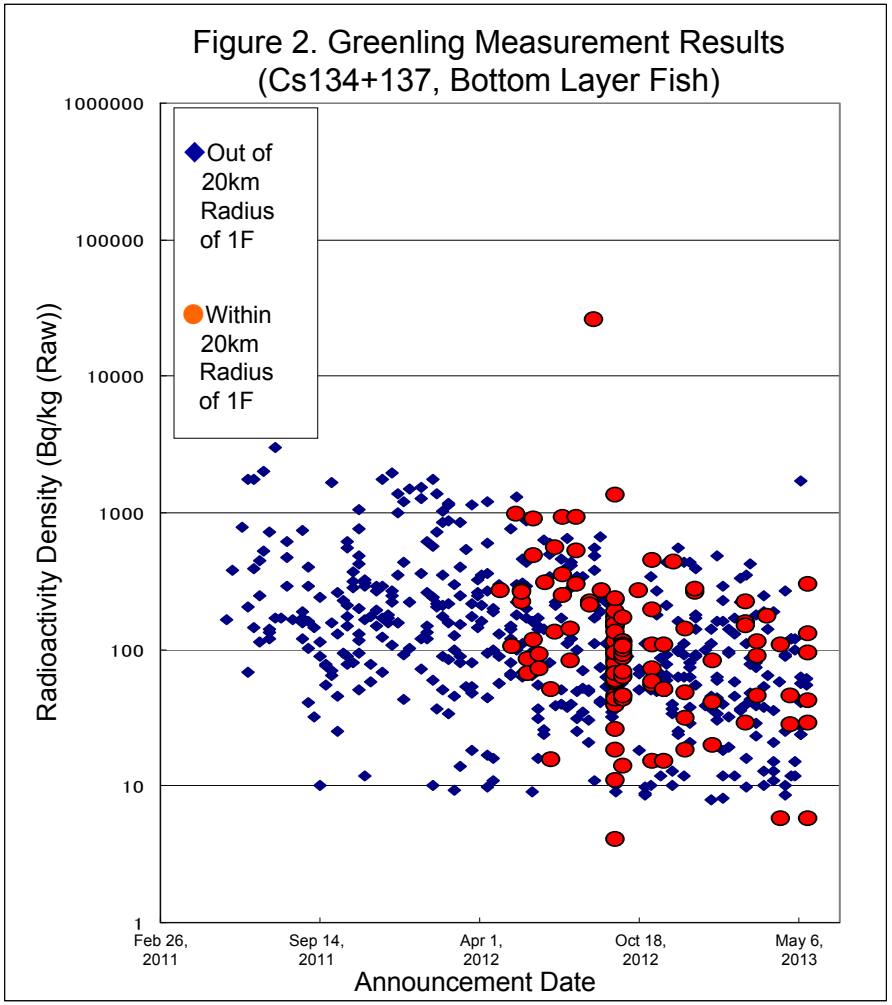


Figure 2. Greenling Measurement Results
(Cs134+137, Bottom Layer Fish)



(Remark) The measurement results of "Out of 20km radius of 1F" were obtained from the Japan Meteorological Agency website.
The measurement values below the detection limit are not plotted in these graphs.

2-4. Radioactive Density Measurement Results of Nuclide Other Than Cesium

Unit: Bq/kg (Raw)

Nuclide (Half-life)	Sampling period: October – December, 2012		Sampling period: July – September, 2012	
	Number of samples	Measurement results	Number of samples	Measurement results
*1 Ag-110m (Approx. 250 days)	7 (Blue crab: 1 Ovalipes unctatus: 6)	Maximum: 14 Minimum: 6.6 Average: 11	16 (Blue crab: 11 Ovalipes unctatus: 5)	Maximum: 21 Minimum: 5.5 Average: 11
*2 Sr-90 (Approx. 29 years)	2 (Sea bass: 1 Schlegel's black rockfish: 1)	Maximum: 1.0 Minimum: 0.87 Average: 0.94	2 (Schlegel's black rockfish: 1 Marbled sole *3: 1)	Maximum: 6.0 Minimum: 1.2 Average: 3.6

- The number of samples in which Ag-110m was detected and the density ratio of Ag-110m are tend to declining.
- The density ratio of Sr-90 was extremely lower than that of Cs-137.

*1 Whole body measurement was done on the samples in which Ag-110m was detected, and all the results were below the food standard value (maximum radioactive cesium density: 17.3 Bq/kg (raw)).

*2 As for the samples with top 2 density levels, measurement was done after processing the whole fish into ash in the relevant sampling period.

*3 The result is provided in this report since the sample was being measured at the time of the previous report.

3. Future Investigation Plans

- Investigation will be continued in order to achieve the following 3 goals.

  (1) Understanding of radioactive cesium density by fish species
  (2) Understanding of the geographical distribution of radioactive cesium density of fish and shellfish
  (3) Understanding of the change of radioactive cesium density of fish and shellfish over time

- Sampling and measurement of fish and shellfish will be conducted once a month at 11 sampling points for the time being.

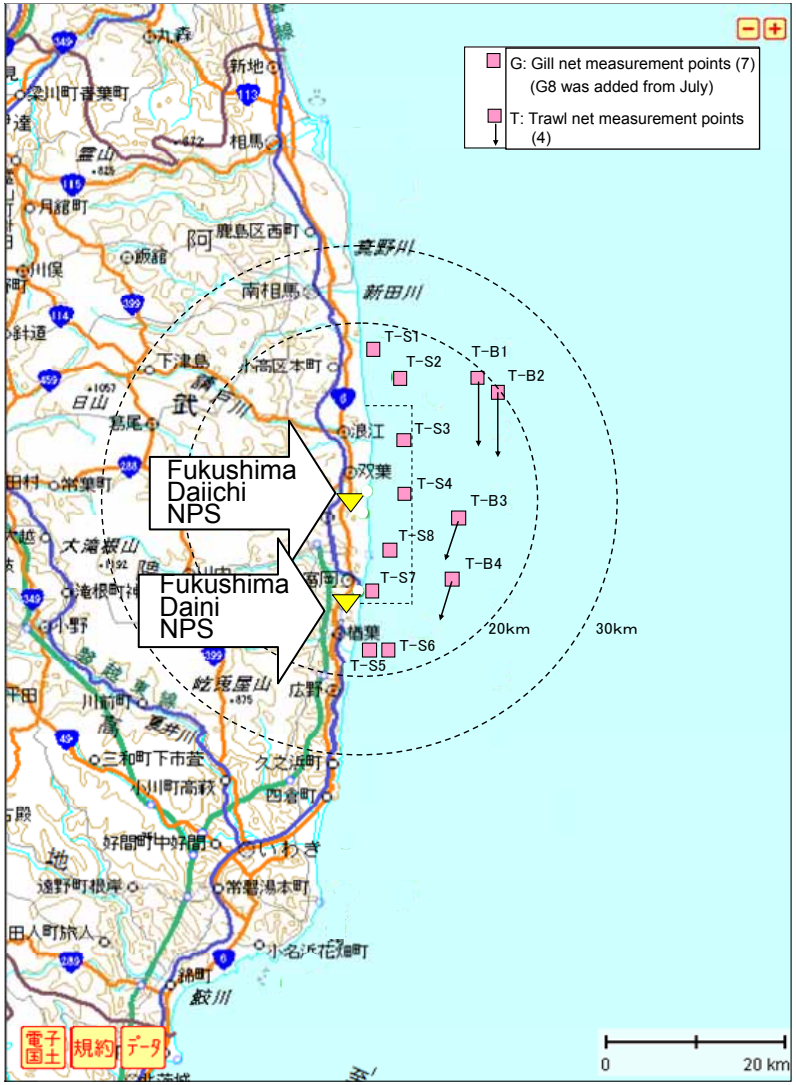


Figure 3. Fish and Shellfish Measurement Points (As of March 2013)