

**Investigation Report of Fish and Shellfish  
Sampled in the Ocean Area Within  
20km Radius of Fukushima Daiichi NPS\***  
(Sampling period: October – December, 2012)

February 28, 2013

# 1. Purpose of the Investigation

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## **(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. Ratio of the results below the standard value is tend to increasing.**

	Sampling period: October – December, 2012		Sampling period: July – September, 2012	
Number of fish species	48	[Top 3 Density Levels] (Unit: Bq/kg (Raw))	49	[Top 3 Density Levels] (Unit: Bq/kg (Raw))
Fish species with cesium exceeding the standard value	15	1, Marbled sole 1,690 2, Schlegel's black rockfish 1,470	19	1, Greenling 25,800 2, Barfin flounder 1,670 3, Sebastes cheni 1,630
Number of measurements	342	3, Common skete 780 [Samples below the detection limit (measured more than once)]	293	[Samples below the detection limit (measured more than once)]
Number of measurement results exceeding the standard value	87	1, Loliginid 2, Snailfish 3, Octopus dofleini	113	1, Zenopsis nebulosa 2, Enteroctopus dofleini

(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, Sea raven, etc.
- **Samples with tendency to fall below the standard value:**  
Sea robin, Dory, Drumfish, Pagrus major, Littlemouth flounder, 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). **Following the second quarter, the number of samples obtained at T-B1 and T-B2 exceeding the standard value was low.**

		Sampling period: October – December, 2012		Sampling period: July – September, 2012	
		Number of measurements	Number of measurement results exceeding the standard value	Number of measurements	Number of measurement results exceeding the standard value
Trawl Net	T-B1	44	2	6	0
	T-B2	54	1	8	0
	T-B3	26	8	26	6
	T-B4	29	7	29	8
Gill Net	T-S1	20	8	77	29
	T-S2	27	6	30	7
	T-S3	31	10	28	13
	T-S4	35	10	25	13
	T-S5	17	12	22	14
	T-S6				
	T-S7	20	10	24	12
	T-S8	39	13	18	11

## 2-3. Investigation Results

### **(Change of Radioactive Cesium Density of Fish and Shellfish Over Time)**

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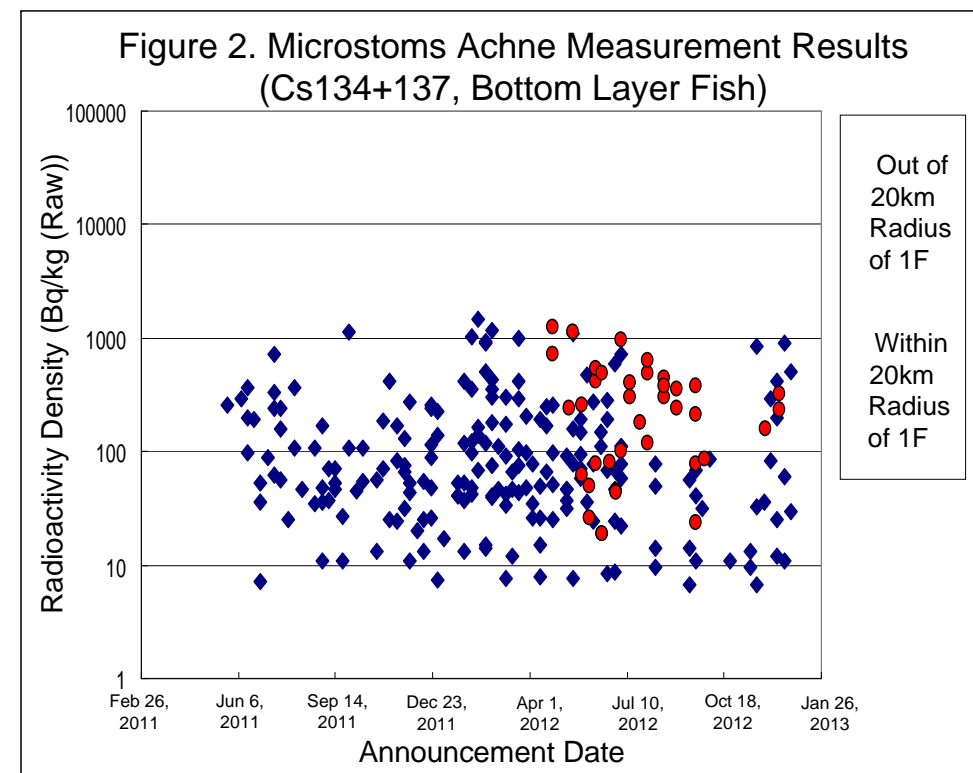
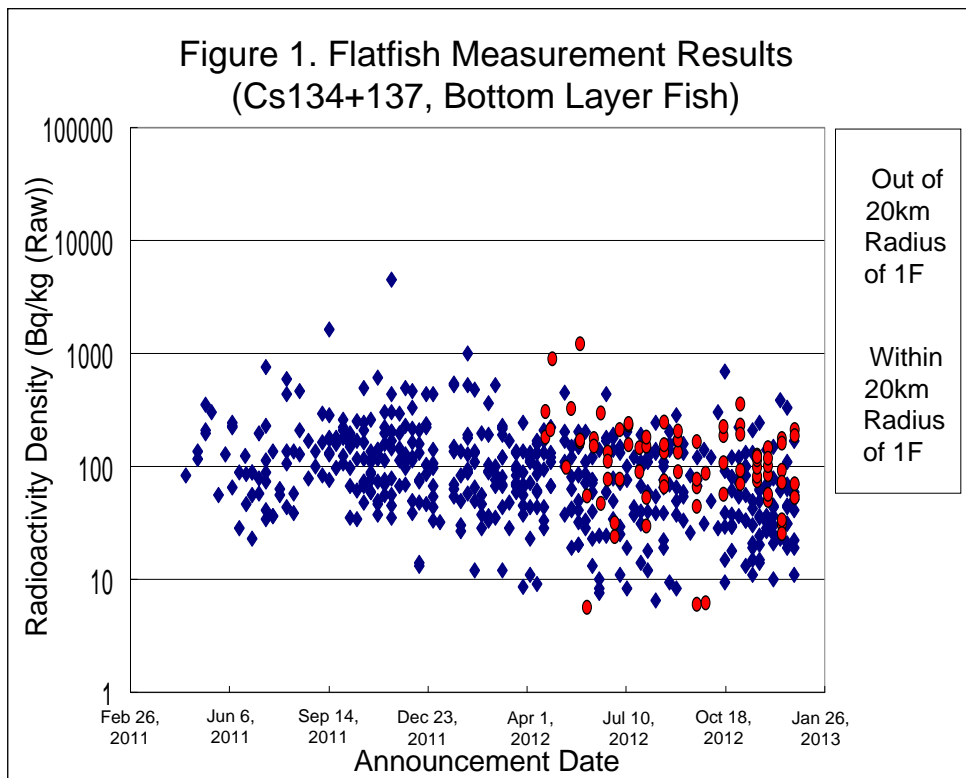
#### **[Tendency of Radioactive Cesium Level of Fish and Shellfish Sampled within a 20km Radius of Fukushima Daiichi NPS]**

- 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 conducted 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, etc.
- Fish species whose radioactive cesium levels have not been decreasing over time: Microstoms achne, 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



(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
<sup>*1</sup> Ag-110m (Approx. 250 days)	16 (Blue crab: 11 Ovalipes unctatus: 5)	Maximum: 21 Minimum: 5.5 Average: 11	18 (Blue crab: 12 Ovalipes unctatus: 6)	Maximum: 43 Minimum: 10 Average: 21
<sup>*2</sup> Sr-90 (Approx. 29 years)	1 <sup>*3</sup> (Schlegel's black rockfish: 1)	Maximum: 1.2 Minimum: - Average: -	3 (Sebastes cheni: 1 Barfin flounder: 1 Banded dogfish <sup>*4</sup> : 1)	Maximum: 0.82 Minimum: 0.61 Average: 0.75

- The density ratio of Ag-110m is tend to declining.
- The density ratio of Sr-90 was extremely lower than that of Cs-137.

<sup>\*1</sup> 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: 14.8 Bq/kg (raw)).

<sup>\*2</sup> As for the samples with cesium exceeding 1,000 Bq/kg (raw), measurement was done after processing the whole fish into ash.

<sup>\*3</sup> A marbled sole sampled at T-S4 on December 13, 2012 is currently being measured (the result will be reported next time).

<sup>\*4</sup> 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.

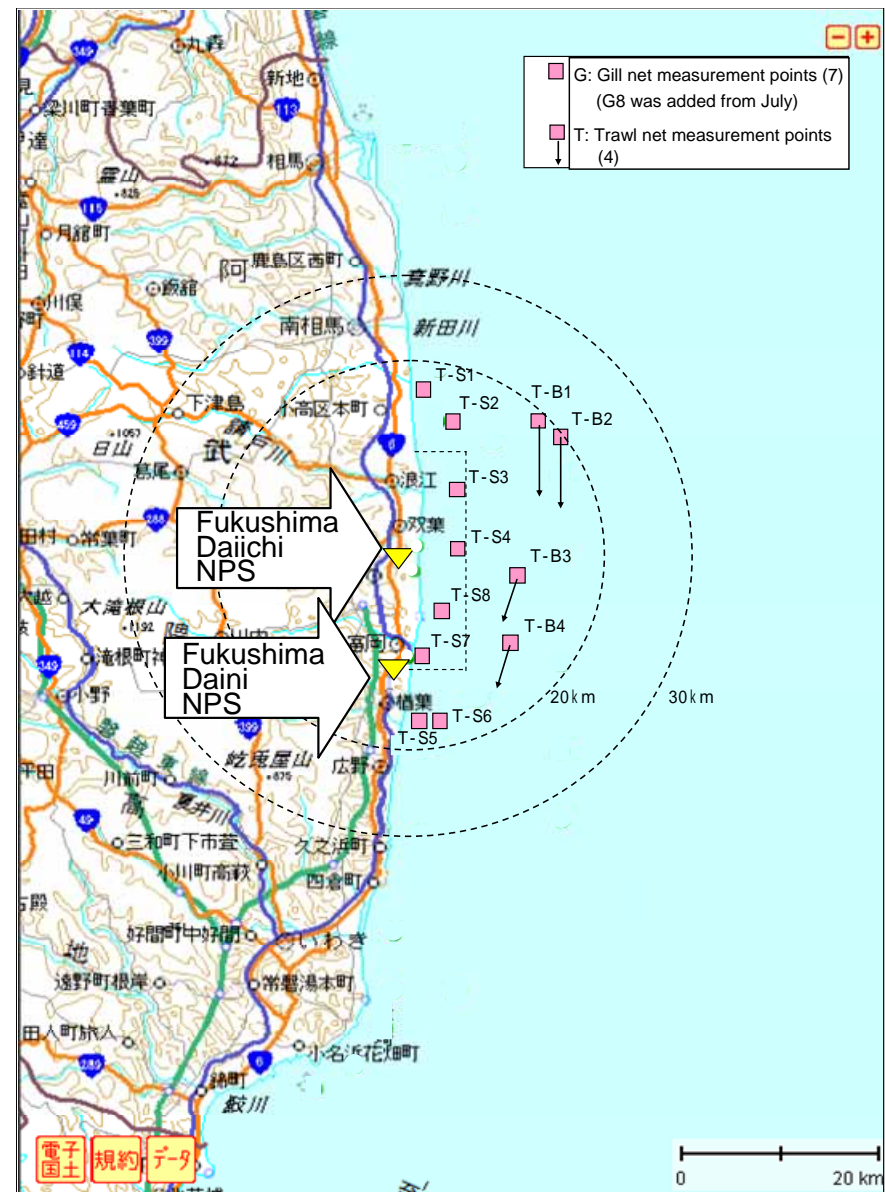


Figure 3. Fish and Shellfish Measurement Points (As of December 2012)

\* Sampling at T-S7 has been substituted by that at T-S6 since July 2012.