Survey Report* for Fish and Seashells within a 20km radius of Fukushima Daiichi Nuclear Power Station

(Samples taken during the period between January and March 2015)

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*Except for the data obtained for fish and seashells inside the port of Fukushima Daiichi Nuclear Power Station.

1. Purpose for surveying fish and seashells within a 20 km radius of Fukushima Daiichi NPS

(1) Grasp radioactive cesium level of each fish species.

- Comparison with food product standards (the total of cesium: 100 Bq/kg)

(2) Grasp areal distribution of radioactive cesium levels in fish and seashells.

- Sampling at fixed surveying points (gillnet and trawler fisheries)

(3) Grasp the transition with time of radioactive cesium levels of fish and seashells.

- Recording and keeping the basic data to predict the transition.

2 - 1 Survey results (radioactive cesium levels by fish species)

○ **Radioactive levels of more than 99% of the samples taken fell below the standard value.**

Standard value: The total of radioactive cesium : 100 (Bq/kg)

	JAN – MAR 2015		OCT-DEC 2014	
No. of fish species	**34 (Of which, 2 sample exceeded the standard value)**	[Top 3 species with high levels] (Unit: Bq/kg) (1) Fox jacopever 113 (2) Microstomus achne 108 (3) Sea bass 82 [Below the detection limit value] (1) Lepidotrigla microptere (2) Yellow goosefish (3) Octopus dofleini (4) Crimson sea bream (5) Gurnard, and others.	**39 (Of which, 1 sample exceeded the standard value)**	**[Top 3 species with high levels]** **(Unit: Bq/kg)** **(1) Japanese angel shark 209** **(2) Common skete 88** **(3) Microstomus achne 72** **[Below the detection limit value]** **(1) Ovalipes punctatus** **(2) Salmon** **(3) Yellow goosefish** **(4) Japanese amberjack** **(5) Spear Squid, and others**
No. of measurements taken (total)	**236 (Of which, 3 sample exceeded the standard value)**		**286 (Of which, 1 sample exceeded the standard value)**	

[Note] Measured parts : Muscle: fishes(except for yellow goosefish) and octopus - kind.
Whole body: yellow goosefish, squids and crabs.

Species with a tendency to exceed the standard value: Microstomus achne
Species with a tendency to fall below the standard value: Flatfish, Pacific cod ,common skete, Littlemouth flounder, Ovalipes punctatus, and others.

2.2 Survey results (areal distribution of cesium)

○ The ratio of the samples which exceeded the standard value remains low for both gillnet surveying spots in the coastal area and trawl - net surveying spots in offshore. The detection value exceeds the standard value in rare cases at gillnet surveying spots in the coastal area

		JAN-MAR 2015			OCT – DEC 2014		
		No. of measurements	No. of results exceeding the standard value	Ratio (%)	No. of measurements	No. of results exceeding the standard value	Ratio (%)
Trawl-net	T-B１	40	0	0	38	0	0
	T-B2	36	0	0	52	0	0
	T-B3	21	0	0	32	0	0
	T-B4	23	0	0	37	0	0
Gillnet	T-S1	12	0	0	18	0	0
	T-S2	22	0	0	24	0	0
	T-S3	24	0	0	22	0	0
	T-S4	24	0	4	22	1	5
	T-S5	13	0	0	10	0	0
	T-S7	14	2	14	10	0	0
	T-S8	11	0	0	21	0	0

Note: Sampling has been ceased for T - B3 and B4 in February 2015 due to the bad weather.

2.3 Survey results (transition with time of radioactive cesium levels)

[Tendency observed for the area within a 20 km radius of Fukushima Daiichi NPS]

• The data obtained from the measurement within a 20 km radius of Fukushima Daiichi NPS were almost all within the range of the measurement results obtained by an independent measurement conducted by Fukushima prefecture for outside the radius, showing a decreasing tendency. (Ref :P5 Fig,1 and Fig,2)

[Tendency of radioactive cesium levels]

• Fish species with a decreasing tendency over time: Flatfish, Greenling and others.

• Fish species exceeding the standard value : Microstomus achne, Fox jacopever only

Note 1: Further data is to be collected for fish and seashells within a 20km radius of Fukushima Daiichi NPS.

Note 2: As for the transition with time, it is assumed that their respective living characteristic such as feed type, living environments (seawater and marine sediment, etc.) and the way of traveling may have affected to the transition, for which further study is necessary on the mechanism.

[Reference] Transition with time of cesium levels of flatfish and greenling

Figure 1: Measurement results of flatfish (Cs134+137)

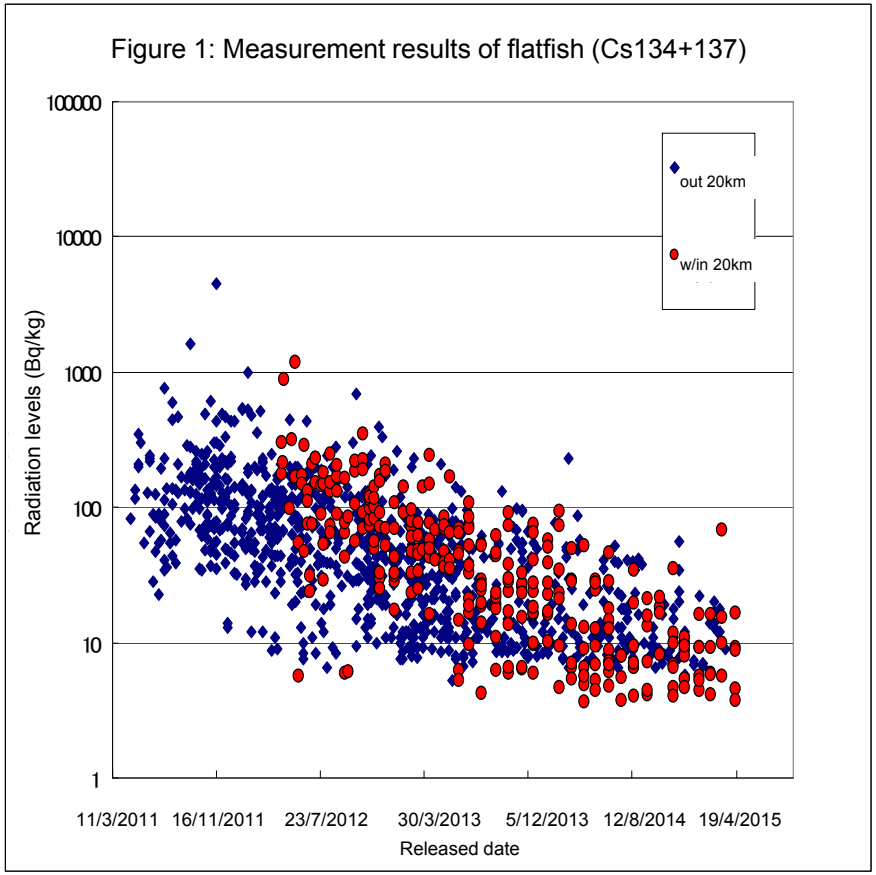
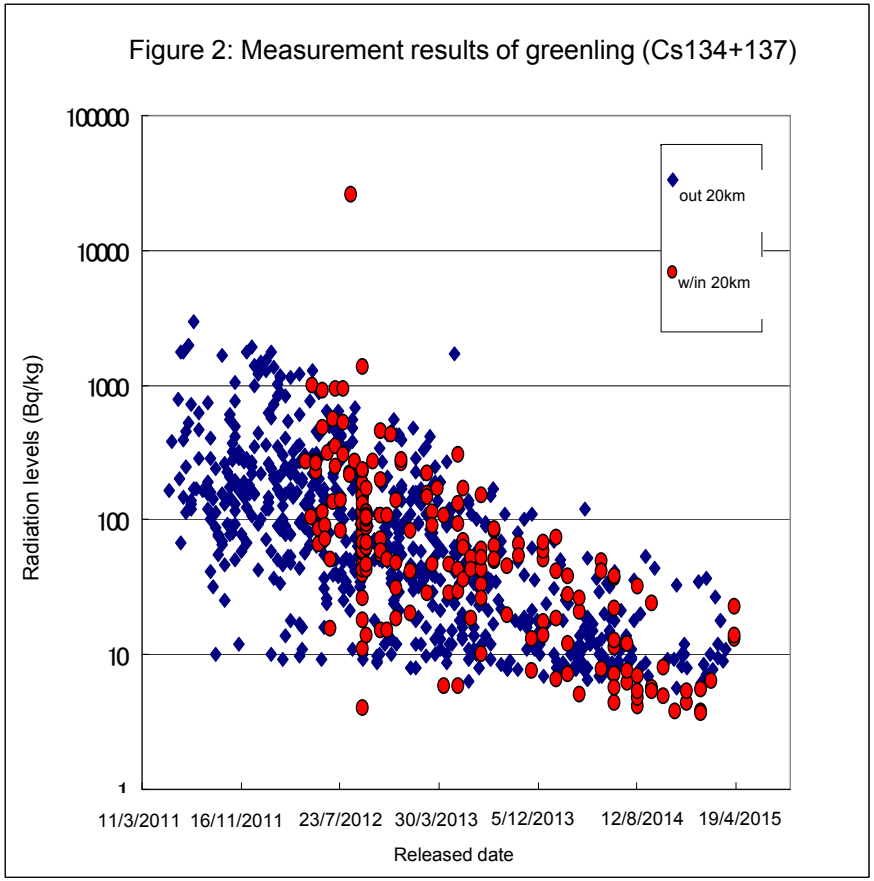


Figure 2: Measurement results of greenling (Cs134+137)



(Note) Measurement results for the area outside a 20 km radius of Fukushima Daiichi NPS were obtained from the website of the Fishery Agency and are converted into graph. Of note, the data remained below the detection limit value are not plotted.

2 - 4 Survey results for nuclides other than cesium

Unit: Bq/kg

Nuclide (half - life)	JAN-MAR 2015		OCT – DEC 2014	
	No. of samples	Result	No. of samples	Result
Ag - 110m (Approx. 250 days)	0	Max.:N/A Min.:N/A Ave.: N/A	0	Max.:N/A Min.:N/A Ave.: N/A
*1 Strontium 90 (Approx. 29 yrs)	5 (Microstomus achne:4, Fox jacopever:1)	Max.:0.67 Min.:0.29 Ave.: 0.45	5 (Common skete:3 Japanese angel shark:1 Microstomus achne:1)	Max.:0.43 Min.:0.46 Ave.: 0.21

*1 Top five fish samples with high cesium levels detected during the specified period for the sampling were selected and measured after ashing them.

- AG-110m: No detection recorded. (No detection has been confirmed since November 2013 when AG-110 was detected.)
- Strontium 90: The level is quite low at 1/100 to 1/200 compared with that of Cesium 137.
- Tritium (Sea water and Flatfish were taken as sample and measured once in a month at T-S8 during the period between Jan and Mar 2015) . The value of free water type tritium of flat fish was from 0.082 up to 0.092 (Bq/L), equal to that of sea water from 0.064 up to 0.076 (Bq/L) .

3 Survey plan

○ Survey for the following three items continue to be conducted to grasp:

(1) A tendency of radioactive cesium levels by fish species,

(2) Areal distribution of radioactive cesium levels of fish and seashells,

(3) Transition with time of radioactive cesium levels of fish and seashells.

○ For the time being, these sampling/ measurement activities are conducted on a monthly basis at the eleven sampling spots. (sampling may be ceased due to weather conditions.)

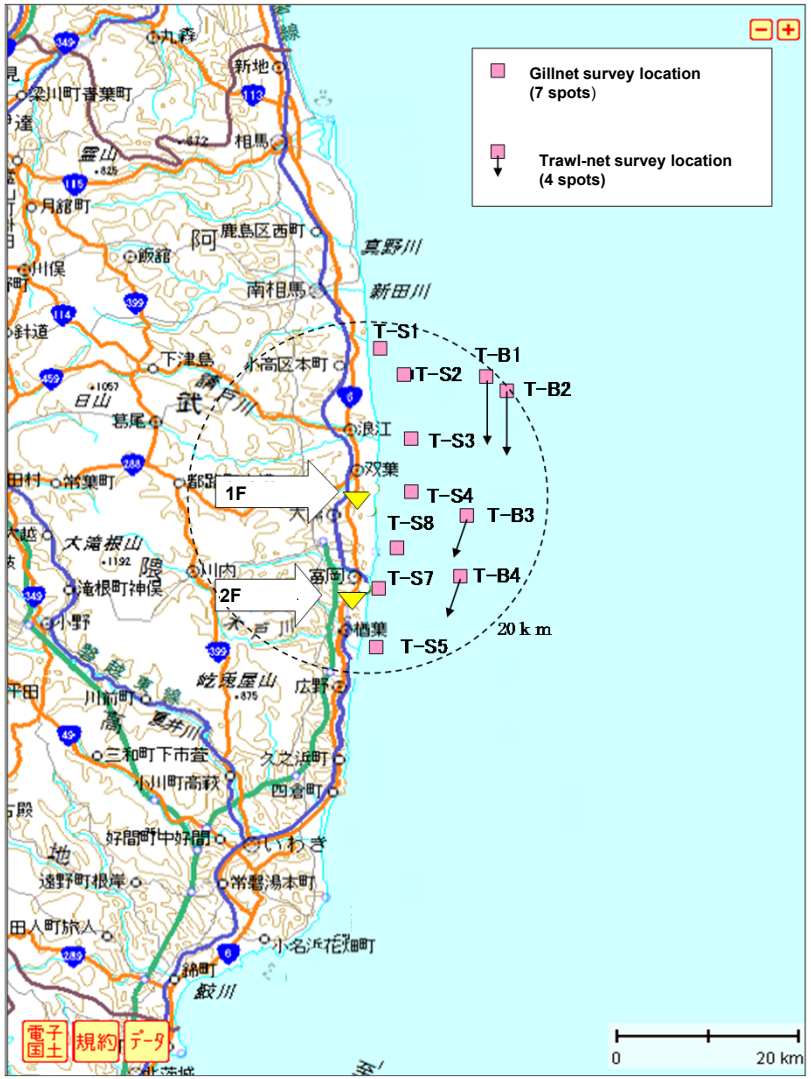


Figure 3: Survey locations for fish and seashells (Mar. 2015)