

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

[Categorized by the radioactive cesium level (by fish species, March - September)]

Total amount of radioactive cesium 134 and 137
Unit: Bq/kg (Raw)

Sampling period: March 29 - September 19, 2012

Guideline value (April 1, 2012 and later): 100Bq/kg

| Fish | Maximum | Minimum | Number of measurements (Measurement results exceeding the guideline value) | Fish | Maximum | Minimum | Number of measurements |
|------------------------------|---------|---------|---|---------------------------------|----------------|----------------|-------------------------------|
| Greenling | 25800 | ND | 86(44) | Chub mackerel | 14.3 | ND | 2 |
| Sebastes cheni | 1880 | 540 | 6 (6) | Sand eel | 12.9 | ND | 4 |
| Barfin flounder | 1670 | 690 | 2 (2) | Balloonfish | 10.2 | ND | 2 |
| Sea bass | 1610 | 33 | 17 (11) | Pointhead flounder | 8.3 | 4.1 | 2 |
| Banded dogfish | 1430 | 4.4 | 9(3) | Yellowtail | 6.5 | ND | 5 |
| Microstomus achne | 1260 | ND | 36 (22) | Pelagic thresher | 6 | — | 1 |
| Flatfish | 1190 | 5.6 | 51 (30) | Korean flounder | 4.8 | ND | 2 |
| Common Skete | 1000 | 168 | 47 (47) | Flathead flounder | 4.1 | — | 1 |
| Marbled sole | 920 | 21.3 | 42 (23) | Zenopsis nebulosa | ND | — | 2 |
| Spotbelly rockfish | 830 | — | 1 (1) | Alaska pollack | ND | — | 1 |
| Starry flounder | 810 | 580 | 2 (2) | Japanese butterfish | ND | — | 1 |
| Sea raven | 670 | 25 | 7 (5) | | | | |
| Schlegel's black rockfish | 620 | 410 | 4 (4) | Squids | Maximum | Minimum | Number of measurements |
| Stingray | 460 | 55 | 7(5) | Andrea cuttlefish | ND | — | 5 |
| Stone flounder | 390 | 29 | 10 (4) | Loliginid | ND | — | 9 |
| Angel shark | 222 | 66 | 4(3) | Loligo bleekeri | ND | — | 3 |
| Dasyatis matsubarae | 205 | ND | 10 (2) | | | | |
| Flathead (Platycephalus sp.) | 187 | 140 | 3 (3) | Octopuses | Maximum | Minimum | Number of measurements |
| Smooth dogfish | 169 | 4.7 | 10(2) | Chestnutoctopus | 9.1 | ND | 6 |
| Acanthopagrus schlegeli | 160 | 94 | 2(1) | Octopus (Enteroctopus) doffeiri | 7.7 | ND | 13 |
| Drumfish | 127 | 38 | 15(4) | Common Octopus | ND | — | 1 |
| Sea robin | 107 | 19.9 | 6(1) | | | | |
| Pacific cod | 107 | 16.7 | 11 (1) | Crustacea | Maximum | Minimum | Number of measurements |
| Littlemouth flounder | 103 | 10 | 8 (1) | Blue crab | 40 | ND | 16 |
| Carcharhinus | 93 | 4.6 | 8 | Ovalipes punctatus | 26 | ND | 16 |
| Pennahia argentata | 69 | 15 | 7 | | | | |
| Common Japanese conger | 66 | 21.4 | 2 | | | | |
| Dory | 63 | 12.5 | 11 | | | | |
| Roundnose flounder | 57 | 4.5 | 8 | | | | |
| Lepidotrigla microptera | 53 | 6.4 | 21 | | | | |
| Ridged-eye flounder | 53 | — | 1 | | | | |
| Northern dogfish | 50 | ND | 15 | | | | |
| Long shanny | 47 | 16.4 | 3 | | | | |
| Lophius litilon | 42 | ND | 17 | | | | |
| Common horse mackerel | 38 | 10.7 | 5 | | | | |
| Pagrus major | 38 | ND | 8 | | | | |
| Slippery sole | 36 | 21.6 | 4 | | | | |
| Crimson sea bream | 26 | ND | 4 | | | | |
| Salangichthys ishikawae | 23 | — | 1 | | | | |
| Shark-skin flounder | 17 | ND | 2 | | | | |

| | |
|--|-----------|
| Number of samples | 59 |
| Samples with cesium exceeding 100Bq/kg | 24 (41%) |
| Number of measurements | 605 |
| Number of measurement results exceeding 100Bq/kg | 227 (38%) |

* Figures in parenthesis are ratios over 100 Bq/kg.

(Remark) ND for Cs134: approx. 3.1Bq/kg, Cs137: approx. 3.3Bq/kg

[Table 1 - 1. Results obtained at Each Measurement Point (1)]

| Measurement Point (Date of Sampling) | Samples (Sample names in blue letters: 100Bq/kg or less) |
|---|--|
| T1 (May 17) | Marbled sole, Greenling, Pacific cod, Littlemouth flounder, Microstomus achne, Long shanny, Sea bass, Lepidotrigla microptera, Flatfish, Lophius litilon, Roundnose flounder, Northern dogfish, Andrea cuttlefish, Loliginid, octopus (Enteroctopus) dofleini, Chestnutoctopus, Loligo bleekeri, Stone flounder |
| T1 (May 30) | Pacific cod, Greenling, Flatfish, Marbled sole, Common horse mackerel, Microstomus achne, Lepidotrigla microptera, Pennahia argentata, Dory, Lophius litilon, Chestnutoctopus, Loliginid, Andrea cuttlefish, Littlemouth flounder, Stone flounder, Common Skete |
| T1 (June 14) | Greenling, Microstomus achne, Lophius litilon, Flatfish, Lepidotrigla microptera, Common horse mackerel, octopus (Enteroctopus) dofleini, Chestnutoctopus |
| T1 (August 28) | Stone flounder, Marbled sole, Microstomus achne, Lepidotrigla microptera, Dory, Crimson sea bream |
| T2 (May 17) | Greenling, Flatfish, Northern dogfish, marbled sole, Littlemouth flounder, Slippery sole, microstomus achne, sea raven, Pacific cod, Common Japanese conger, Long shanny, Roundnose flounder, Lepidotrigla microptera, Chestnutoctopus, Korean flounder, Lophius litilon, Flathead flounder, Pointhead flounder, Loliginid, octopus (Enteroctopus) dofleini, Loligo bleekeri |
| T2 (May 30) | Pacific cod, Greenling, Long shanny, Lepidotrigla microptera, Marbled sole, Slippery sole, Microstomus achne, Lophius litilon, Common horse mackerel, Pointhead flounder, octopus (Enteroctopus) dofleini, Loliginid, Korean flounder, Chestnutoctopus, Common Octopus, Andrea cuttlefish |
| T2 (June 14) | Sea raven, Microstomus achne, Flatfish, Lepidotrigla microptera, Greenling, Lophius litilon, Littlemouth flounder, Common horse mackerel, Loliginid, Chestnutoctopus, Marbled sole |
| T2 (August 28) | Dory, Marbled sole, Crimson sea bream, Lepidotrigla microptera, Smooth dogfish, Balloonfish, Littlemouth flounder, Greenling |
| T3 (June 4) | Dasyatis matsubarae, Microstomus achne, Stone flounder, Marbled sole, Roundnose flounder, Lepidotrigla microptera, Lophius litilon, Pagrus major, octopus (Enteroctopus) dofleini, Greenling, Common Skete, Flatfish |
| T3 (July 9) | Marbled sole, Stone flounder, Littlemouth flounder, Slippery sole, Dory, Lepidotrigla microptera, Lophius litilon, octopus (Enteroctopus) dofleini, Greenling, Common Skete, Flatfish, Microstomus achne |
| T3 (August 20) | Microstomus achne, Stone flounder, Greenling, Lepidotrigla microptera, Dory, Lophius litilon, Flatfish, Common Skete |
| T3 (September 10) | Microstomus achne, Marbled sole, Dory, Lepidotrigla microptera, Flatfish, Common Skete |
| T4 (June 18) | Flatfish, Lepidotrigla microptera, Crimson sea bream, Dory, Lophius litilon, Roundnose flounder, octopus (Enteroctopus) dofleini, Loliginid, Northern dogfish, Andrea cuttlefish, Common Skete, Greenling, Marbled sole, Microstomus achne |
| T4 (July 9) | Littlemouth flounder, Flatfish, Slippery sole, Lepidotrigla microptera, Common Skete, Marbled sole |
| T4 (August 20) | Marbled sole, Dory, Flatfish, Stone flounder, Lepidotrigla microptera, Smooth dogfish, Zenopsis nebulosa, Lophius litilon, Pagrus major, Common Skete, Greenling, Microstomus achne |
| T4 (September 10) | Flatfish, Dory, Roundnose flounder, Smooth dogfish, Lepidotrigla microptera, Crimson sea bream, Zenopsis nebulosa, Pagrus major, Common Skete, Stone flounder, Marbled sole |
| G1 (June 6) | Acanthopagrus schlegeli, Flatfish, Drumfish, Banded dogfish, Ovalipes punctatus, Blue crab, Sea bass, Schlegel's black rockfish, Stingray, Common Skete |
| G1 (July 4) | Greenling, Marbled sole, Drumfish, Stingray, Pennahia argentata, Banded dogfish, Yellowtail, Sea bass, Common Skete, Acanthopagrus schlegeli, Flatfish |
| G1 (August 1) | Drumfish, Flatfish, Sea bass, Carcharhinus, Blue crab, Greenling, Common Skete, Stingray |
| G1 (September 5) | Flatfish, Drumfish, Blue crab, Common Skete, Stingray, Angel shark |

[Table 1 - 2. Results obtained at Each Measurement Point (2)]

| Measurement Point (Date of Sampling) | Samples (Sample names in blue letters: 100Bq/kg or less) |
|---|---|
| G2 (June 6) | Drumfish, Marbled sole, Northern dogfish, Lophius litilon, Blue crab, Ovalipes punctatus, Starry flounder, Sea bass, Common Skete, Flatfish |
| G2 (July 4) | Flatfish, Marbled sole, Common horse mackerel, Pagrus major, Ovalipes punctatus, Yellowtail, octopus (Enteroctopus) dofleini, Common Skete, Microstomus achne, Greenling |
| G2 (August 1) | Dasyatis matsubarae, Pagrus major, Smooth dogfish, Northern dogfish, Banded dogfish, Marbled sole, Ovalipes punctatus, Blue crab, Common Skete, Flatfish |
| G2 (September 5) | Dasyatis matsubarae, Flatfish, Drumfish, Dory, Carcharhinus, Ovalipes punctatus, Blue crab, Chub mackerel, Sebastes cheni, Common Skete |
| G3 (June 27) | Drumfish, Ovalipes punctatus, Smooth dogfish, Greenling, Microstomus achne, Common Skete, Marbled sole, Flatfish, Sea bass |
| G3 (July 18) | Marbled sole, Pagrus major, Blue crab, Ovalipes punctatus, Yellowtail, Northern dogfish, Dasyatis matsubarae, Schlegel's black rockfish, Microstomus achne, Common Skete, Flatfish, Greenling |
| G3 (August 8) | Drumfish, Pagrus major, Smooth dogfish, Blue crab, Carcharhinus, Microstomus achne, Common Skete, Flatfish, Sea bass |
| G3 (September 19) | Carcharhinus, Banded dogfish, Blue crab, Common Skete, Greenling, Flatfish, Marbled sole |
| G4 (June 27) | Sea robin, Dory, Ovalipes punctatus, octopus (Enteroctopus) dofleini, Yellowtail, Lophius litilon, Japanese butterflyfish, Microstomus achne, Common Skete, Greenling, Flatfish, Marbled sole, Sea bass |
| G4 (July 18) | Dasyatis matsubarae, Flatfish, Sea robin, Northern dogfish, Microstomus achne, Common Skete, Marbled sole, Sea bass, Greenling |
| G4 (August 8) | Chub mackerel, Pagrus major, Ovalipes punctatus, Sebastes cheni, Microstomus achne, Greenling, Banded dogfish, Flatfish, Dasyatis matsubarae |
| G4 (September 19) | Marbled sole, Drumfish, Flatfish, Carcharhinus, Dasyatis matsubarae, Stingray, Common Skete |
| G5 (June 16) | Pennahia argentata, Common Skete, Microstomus achne, Marbled sole, Greenling, Flatfish |
| G5 (July 15) | Pennahia argentata, Banded dogfish, Sebastes cheni, Greenling, Common Skete, Microstomus achne, Flatfish, Marbled sole |
| G5 (August 11) | Ovalipes punctatus, Blue crab, Pelagic thresher, Carcharhinus, Common Skete, Angel shark, Flatfish |
| G5 (September 15) | Drumfish, Blue crab, Common Skete, Stingray, Angel shark, Flathead (Platycephalus sp.), Flatfish |
| G6 (March 29) | Sand eel |
| G6 (April 7) | Northern dogfish, Pacific cod, Shark-skin flounder, Flatfish, Marbled sole, Sea raven |
| G6 (April 11) | Northern dogfish, Marbled sole, Microstomus achne, Common Skete, Pacific cod |
| G7 (June 25) | Sea bass, Greenling, Marbled sole, Common Skete, Flatfish, Smooth dogfish, Drumfish |
| G7 (July 15) | Sea bass, Flatfish, Blue crab, Banded dogfish, Dasyatis matsubarae, Barfin flounder, Greenling, Common Skete, Microstomus achne, Marbled sole, Drumfish |
| G7 (August 11) | Flatfish, Angel shark, Blue crab, Ovalipes punctatus, Common Skete, Sea bass, Smooth dogfish |
| G7 (September 15) | Drumfish, Carcharhinus, Blue crab, Banded dogfish, Common Skete, Flatfish |
| G8 (July 23) | Smooth dogfish, Yellowtail, Northern dogfish, Dasyatis matsubarae, Common Skete, Microstomus achne, Marbled sole, Flathead (Platycephalus sp.), Flatfish, Sea robin |
| G8 (August 25) | Carcharhinus, Smooth dogfish, Sea robin, Common Skete, Microstomus achne, Marbled sole, Flatfish, Flathead (Platycephalus sp.) |

[Additional sampling of greenling (G1)] Total number sampled: 57
 August 29 - October 10 Below the guideline value: 37, Above the guideline value: 20

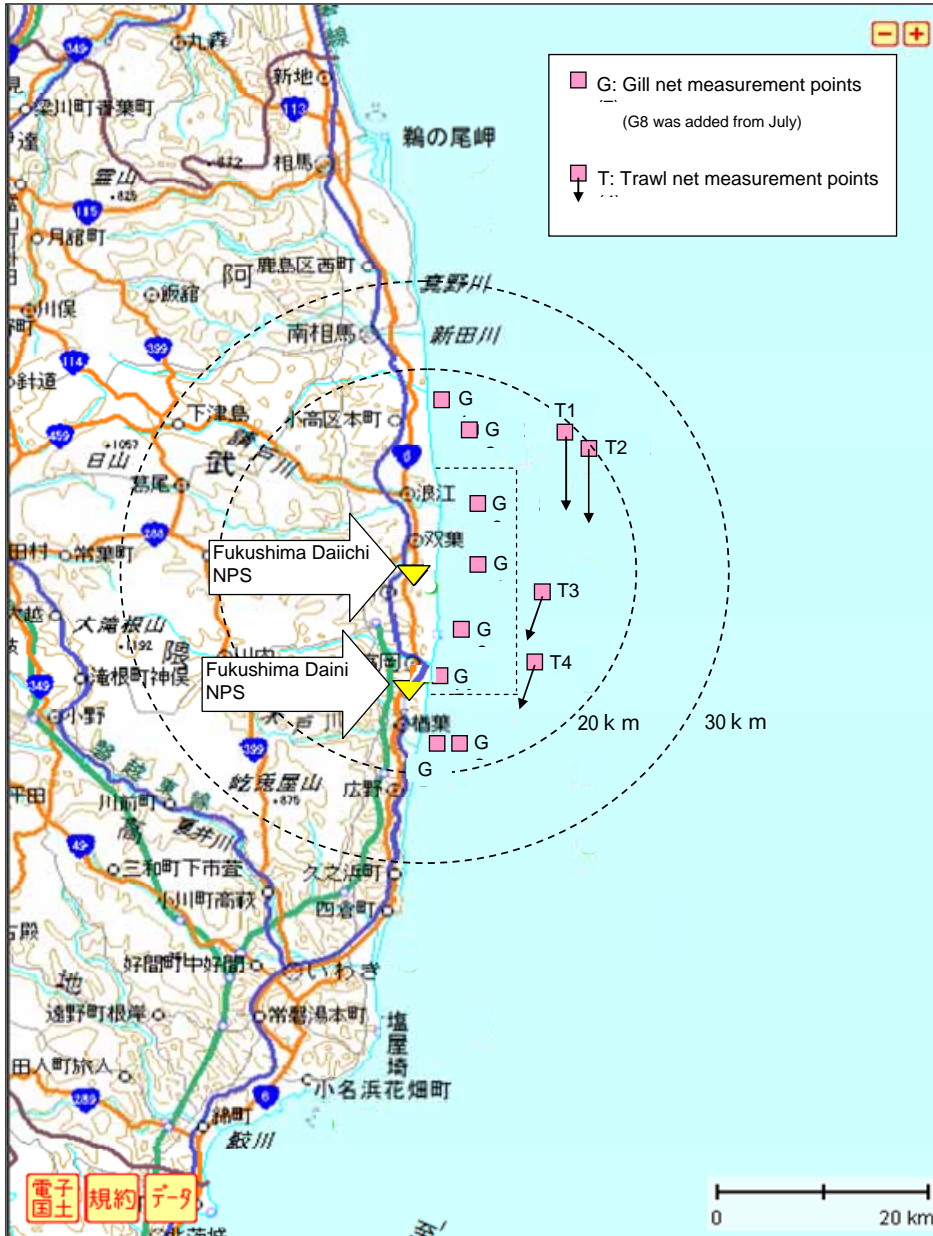
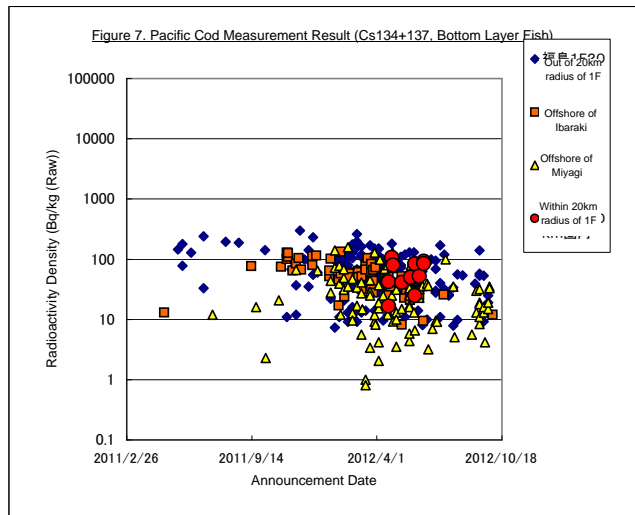
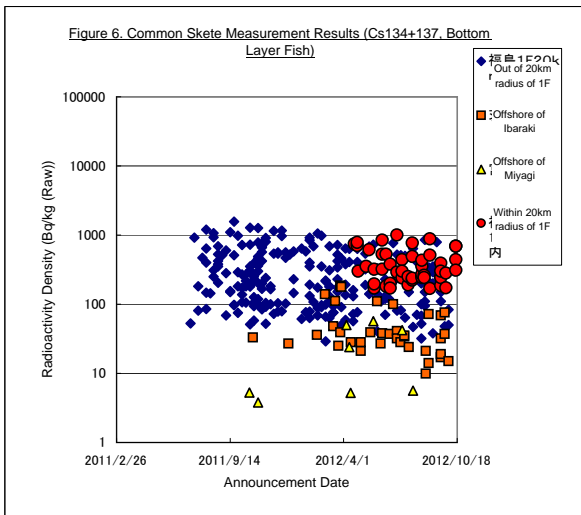
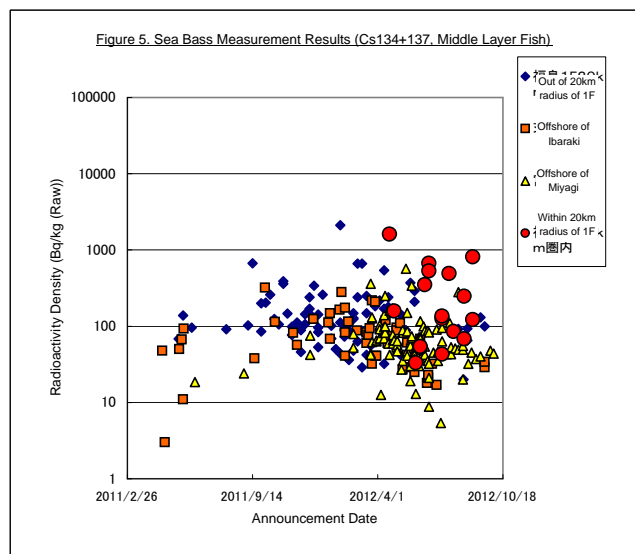
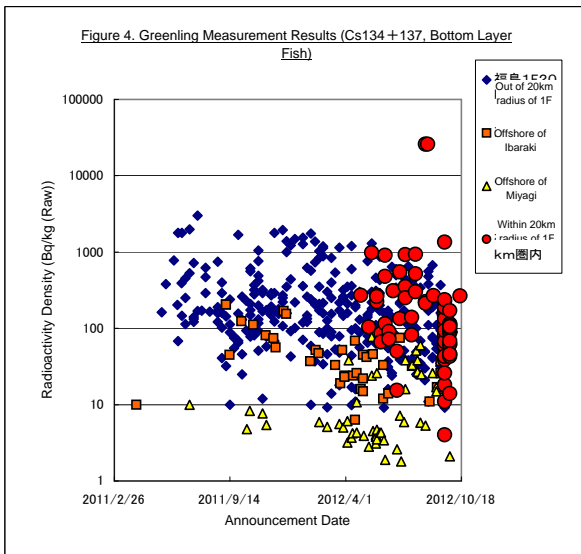
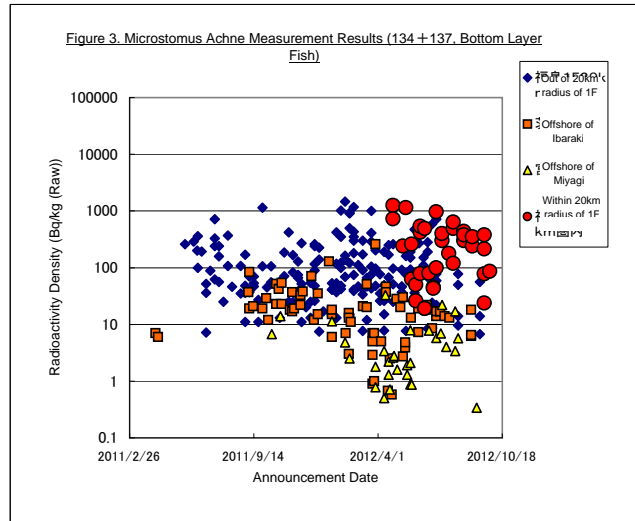
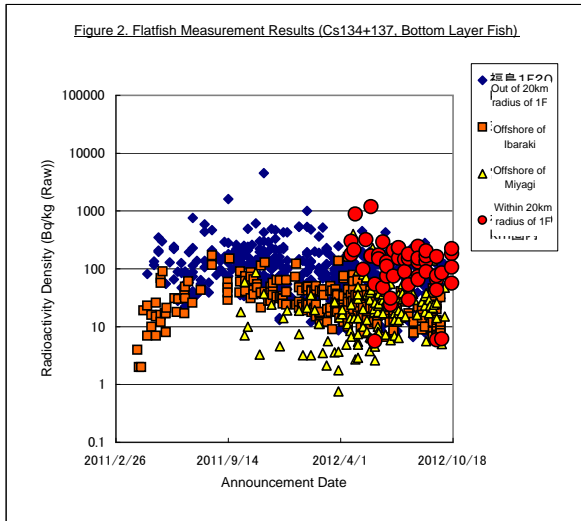


Figure 1. Fish and Shell Fish Measurement Points (As of September 2012)



(Remark) The measurement results of "Out of 20km radius of 1F (includes a part of "Within 20km radius of 1F" as the evacuation area was changed on August 10, 2012)", "Offshore of Ibaraki" and "Offshore of Miyagi" was obtained from the Japan Meteorological Agency

Results of Additional Sampling of Greenling (Preliminary Report)

1. Sampling of greenling, seawater, marine soil and bait organisms in a 2km square ocean area around 1km offshore of Ota River (G1)

(1) Greenling

- Number of samples collected (G1): Total of 57

| Date | Aug. 29 | Aug. 30 | Sep. 4 | Sep. 5 | Sep. 11 | Sep. 12 | Oct. 9 | Oct. 10 |
|-------------------|---------|---------|--------|--------|---------|---------|--------|---------|
| Number of samples | 15 | 8 | 4 | 10 | 10 | 5 | 1 | 4 |

- Radioactive cesium density (Measured one sample at a time)

Below the detection limit (ND) - 1,350 Bq/kg (Raw)

100 Bq/kg or less: 37 samples (all the samples with body length size 30cm or less)

(Reference)

- The maximum radioactive cesium density detected in the greenling sampled within 20km from 1F before August 2: 980 Bq/kg (Raw) (May 2 at G5)
- ND: Cs-134: 8.2 Bq/kg (Raw), Cs-137: 8.7 Bq/kg (Raw)

(2) Radioactive cesium density of seawater

- Number of times sampled: 4 (August 29, September 4, September 11 and October 10) (G1)
- Cesium 137 density: 0.021 - 0.049 Bq/L (August 29 - September 11) * The sample collected on October 10 is currently being analyzed.

(3) Radioactive cesium density of marine soil

- Number of sampling locations: 20 (August 29, September 4, September 11 and October 10) (in a 2km square ocean area around G1)
- Cesium 134+137 density: 20 - 640 Bq/kg (Dry soil) (August 29 - September 11) * The sample collected on October 10 is currently being analyzed.

(Reference)

- Radioactive cesium density in the coast north of 1F (Offshore of Ukedo and Soma): 17-530Bq/kg (Dry soil) (July 27, 2012)

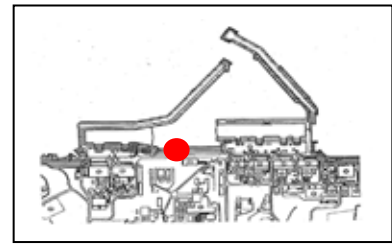
(4) Bait organisms

Sampling using trawl net for gathering bait organisms was conducted on October 16 (The collected samples are currently under radioactivity density analysis)

2. Sampling of fish in the port of Fukushima Daiichi Nuclear Power Station

- (1) Sampling using fishing baskets was done near the shallow draft quay on October 10.

(2) Collected samples (No greenling was sampled)
Brown hakeling (1), jacopever (2), common Japanese conger (1)
The samples are currently under radioactivity density analysis.



Sampling location in the port
(Shallow draft quay)

End