Report on the Monitoring of Radionuclides in Fishery Products (Summary)

Fisheries Agency of Japan

Introduction

- Since the accident at Fukushima Daiichi Nuclear Power Station in Mar. 2011, the national and local governments have cooperated closely with relevant bodies to secure the safety of fishery products.
- While the radioactive materials levels in fishery products decreased greatly in the three years, concerns on their safety still exist among some consumers.
- In order to promote accurate understanding on the safety of Japanese fisheries products domestically and overseas, the data or information accumulated from three years of inspection were evaluated comprehensively in this Report.

Table of Contents (extract)

Standard Limits for Radioactive Cesium in Foods

- Established by the Ministry of Health, Labor and Welfare based on 1 mSv/year which is an intervention exemption level adopted by Codex and on risk assessment by the Food Safety Commission.
- The limits take into consideration the contribution of other radionuclides such as strontium etc.

Provisional regulation values[1]

Category	Limit
Drinking water	200
Milk, dairy products	200
Vegetables	500
Grains	
Meat, eggs, fish, etc.	

New standard limits[2]

Category	Limit
Drinking water	10
Milk	50
General Foods	100
Infant Foods	50

1 The values take into account the contribution of radioactive strontium.
2 The limits take into account the contribution of radioactive strontium, plutonium etc..

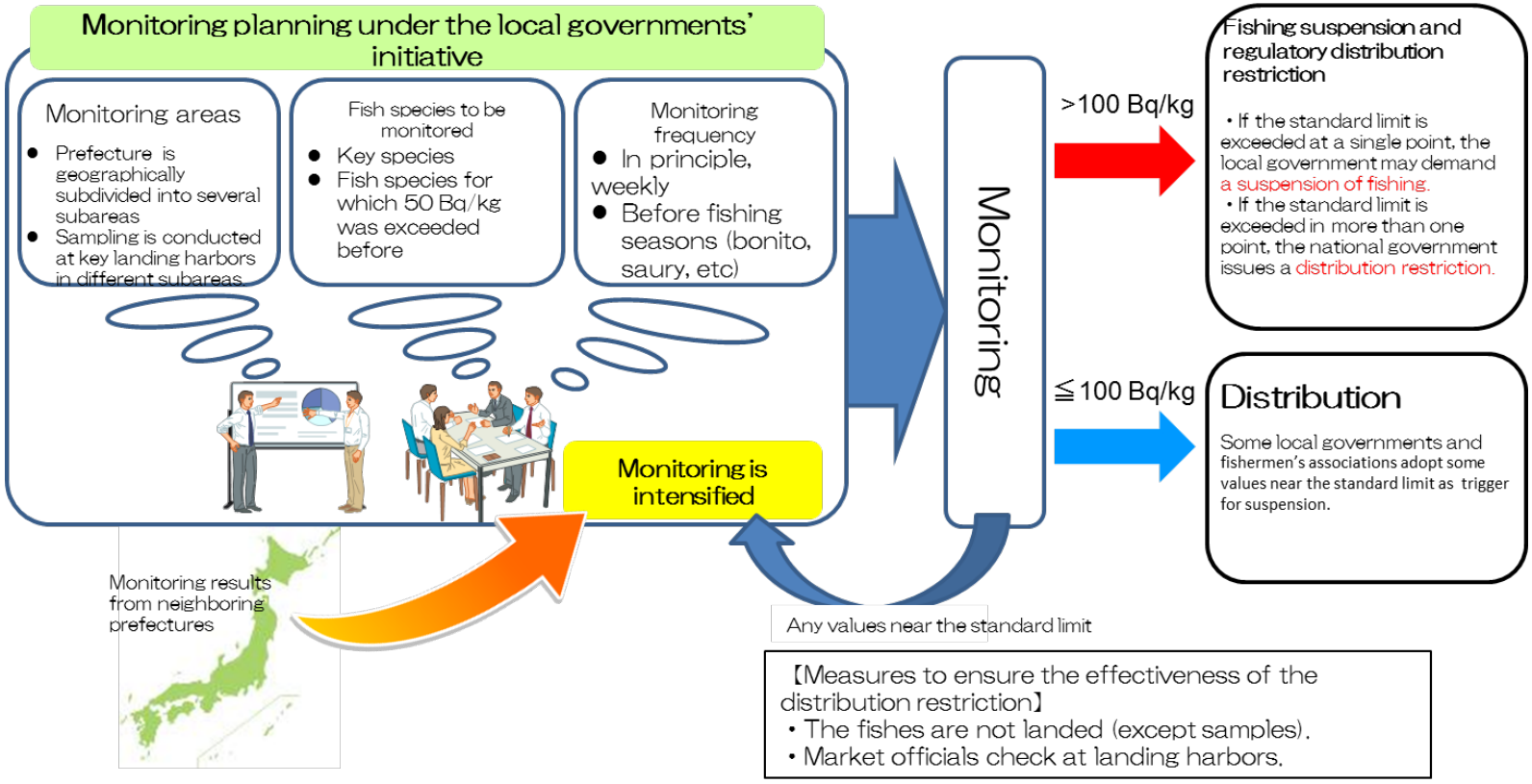
Drinking water: about 0.1mSv	Foods: about 0.9 mSv	88% of 0.9 mSv from radioactive Cs,12% of 0.9 mSv from radionuclides other than Cs*

* For marine products, which is one of the “General Foods”, it was assumed, as a conservative assumption, that the effective dose of other radionuclides such as strontium etc. would be equal to that of radioactive cesium.

Framework for Securing the Safety of Fishery Products

○ Monitoring is focused on major fish species or those which exceeded 50 Bq/kg in the previous year.

○ In cases where the same fishery products at multiple locations exceed the standard limit, the restrictions on their distribution and are imposed by the head of the Nuclear Emergency Response Headquarters.



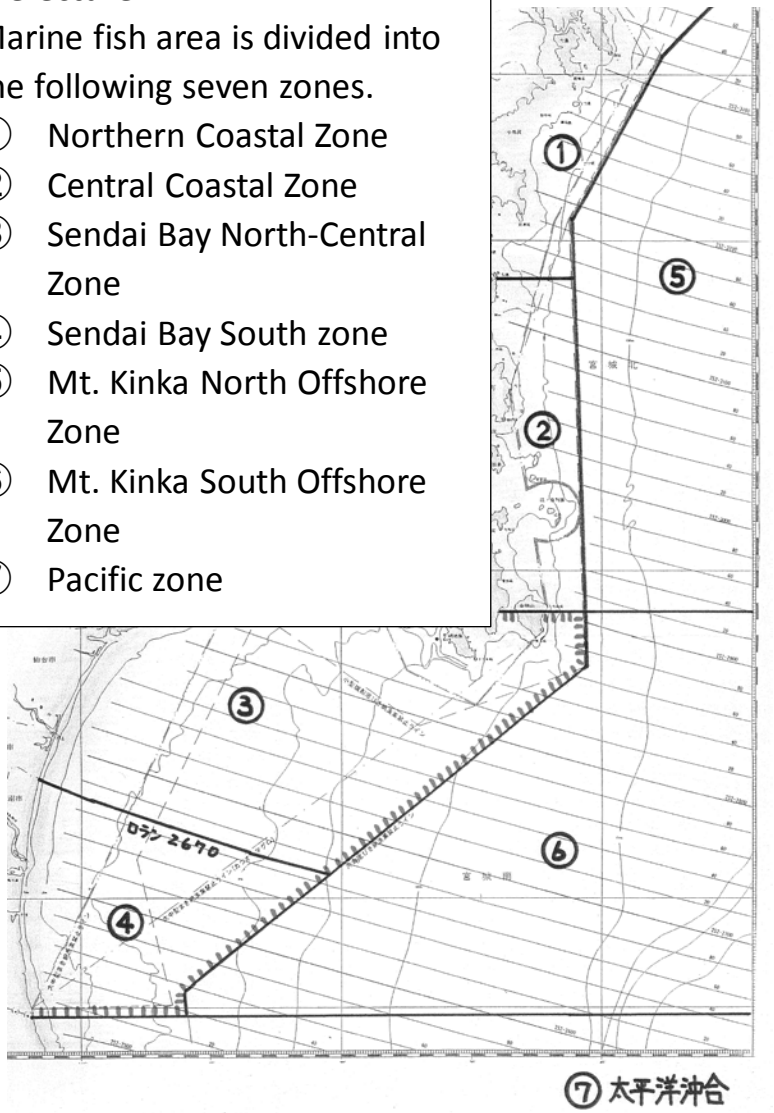
Inspection of Fishery Products

<Monitoring zones in Miyagi Prefecture>

Marine fish area is divided into the following seven zones.

① Northern Coastal Zone
② Central Coastal Zone
③ Sendai Bay North-Central Zone
④ Sendai Bay South zone
⑤ Mt. Kinka North Offshore Zone
⑥ Mt. Kinka South Offshore Zone
⑦ Pacific zone

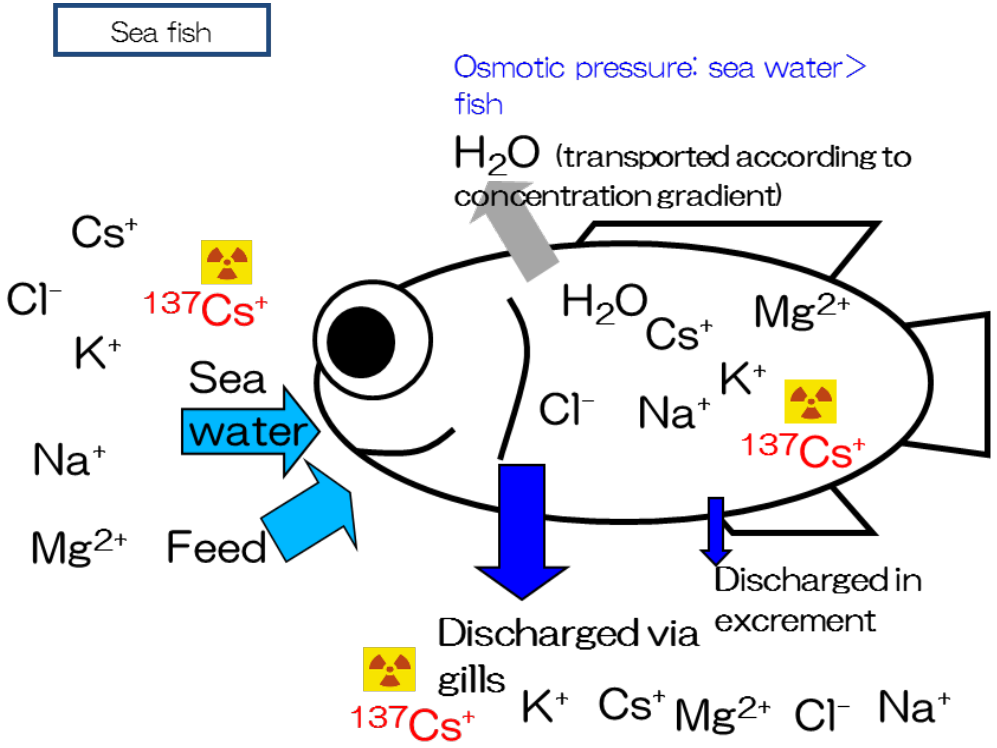
In case of Miyagi Prefecture

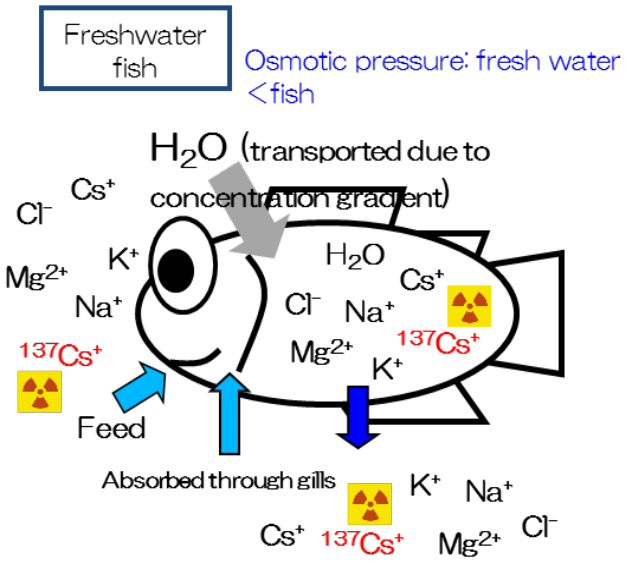


- Local governments divide their marine fish areas by taking account of fishing activities or distribution of fish species.
- Monitoring is conducted for each zone based on monitoring plans.
- If radioactive cesium levels exceed or are close to the standard limit, the frequency of monitoring is intensified.

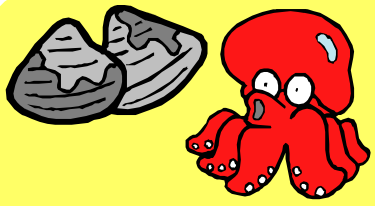
Radioactive Cesium in Fishery Products

○ Radioactive cesium is taken from the surrounding water (sea/fresh water) into the bodies of fish without distinguishing them from other salts including potassium, and is excreted by them naturally.





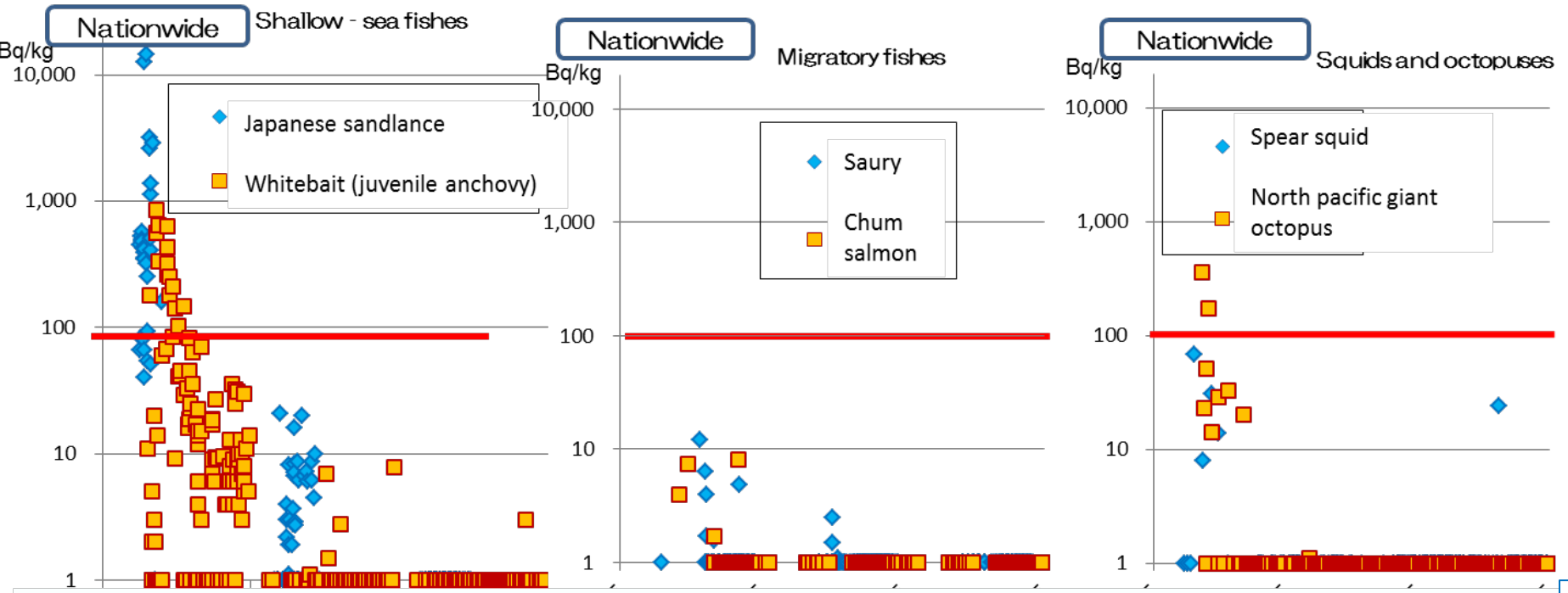
Since freshwater fishes have a capability to retain salts within their body, it is harder for them to discharge radioactive cesium than sea fishes.



In invertebrates, the majority of salts flow freely between the seawater and the inside of the invertebrates' bodies. For this reason, radioactive cesium concentrations will drop off more quickly in invertebrates than in marine fish if there is a reduction in radioactive cesium concentrations in the surrounding seawater.

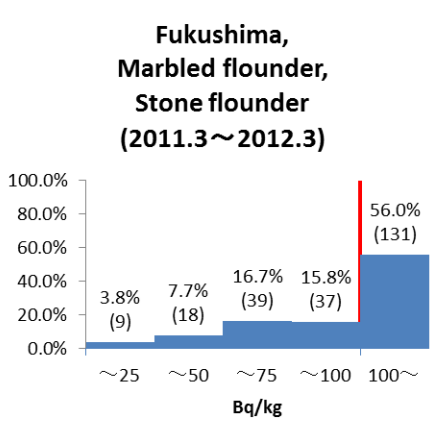
Inspection Results of Fishery Products(1)

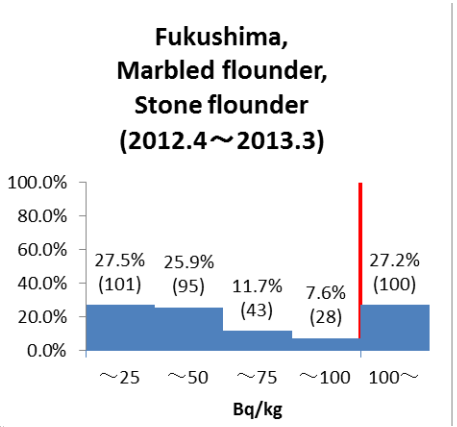
- Since the accident, about 49,000 samples of more than 400 fish species were inspected.
- Those inspection results were summarized by each fish species and fishing ground.
  - Shallow-sea fishes, Squid and Octopus:
    While radioactive cesium concentrations were high in the immediate post-accident period, the levels dropped off quickly.
  - Migratory fishes: No sample has ever exceeded 100 Bq/kg.

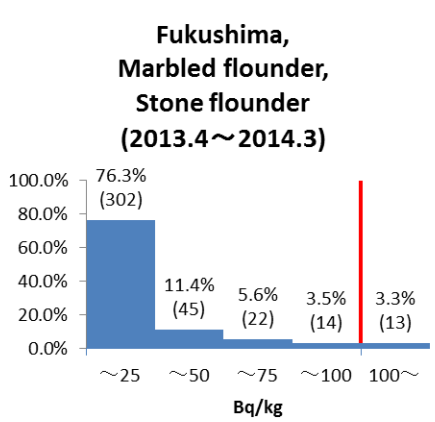


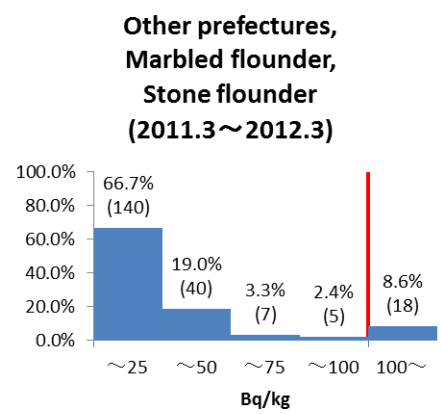
Inspection Results of Fishery Products(2)

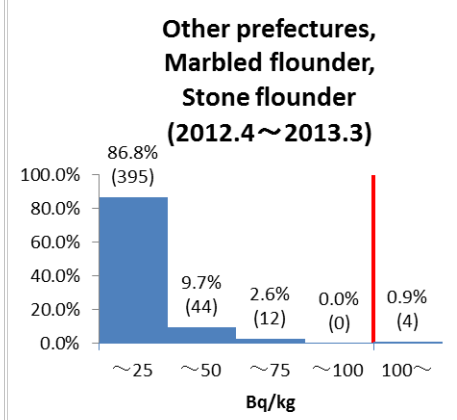
- While a some of bottom fish species in Fukushima prefectural area still demonstrate radioactive cesium exceeding the limit, the proportion of these is in declining trend.
  (e.g.) The ratio exceeding the limit in Marbled/Stone flounder in Fukushima prefecture:
  56% (in 2011) → 3.3% (in 2013)
- Even for the same fish species, their concentrations in other areas than Fukushima have been stably low except in the immediate post-accident period.

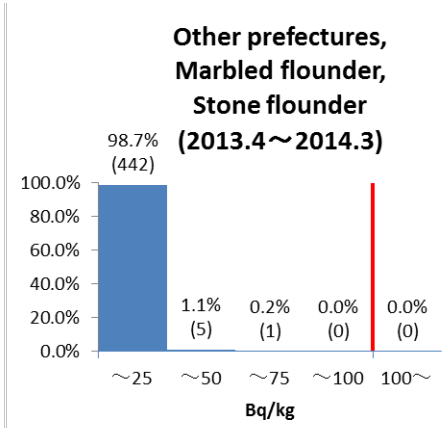








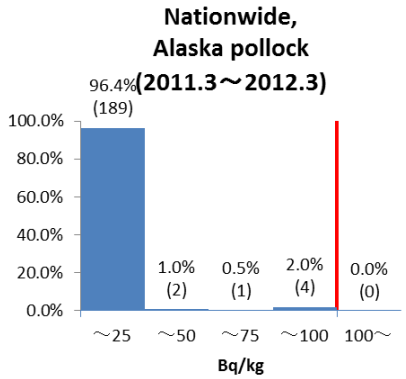


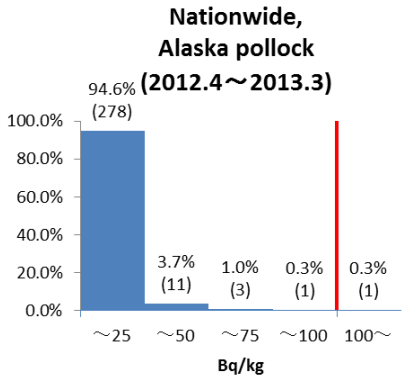


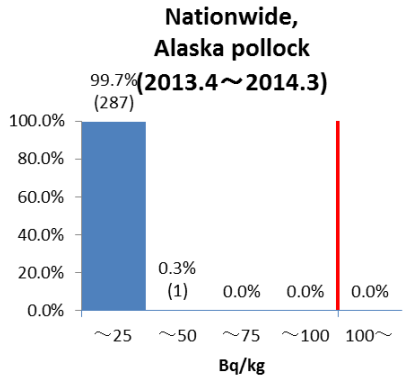
Inspection Results of Fishery Products(3)

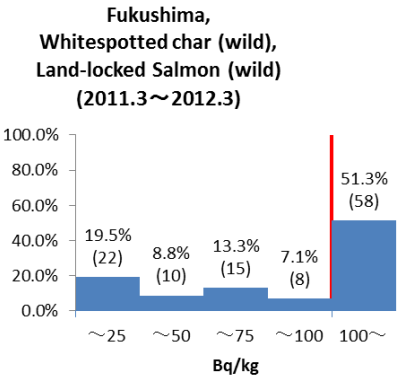
- The concentrations of radioactive cesium of some bottom fishes such as Alaska pollack have been stably low since the accident even in Fukushima prefectural area.
- While a part of freshwater fish species (wild) in Fukushima prefecture still demonstrates radioactive cesium exceeding the limit, the proportion of these is in declining trend.

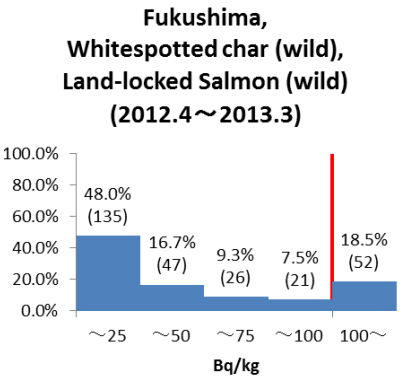
(e.g.) The ratio exceeding the limit in Whitespotted char (wild) and Land-locked salmon (wild) in Fukushima prefecture: 51.3% (in 2011) → 10.6% (in 2013)

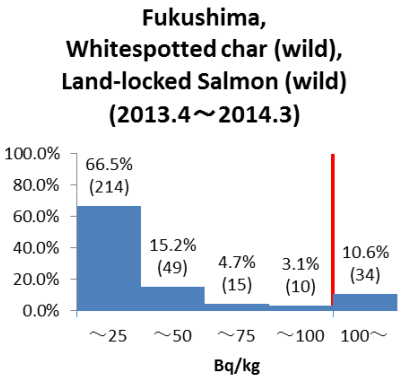












Inspection for Other Radionuclides than Cesium

○ A total of 63 samples from 2011 to May 2013 were inspected for radioactive strontium, and 5 samples were inspected for plutonium. The concentrations were largely at the same levels as before the accident*. Furthermore, the effective dose of radioactive strontium was significantly less than that of radioactive cesium. Thus, the assumption** that was made in calculating the standard limits was sufficiently safe.

** The effective dose of other radionuclides would be equal to that of radioactive cesium for marine species.

The concentrations of radioactive strontium in fishery products (between 04/11/2011 and 11/24/2013)

Nuclides	# of samples	< LOD		Range (Bq/kg)	Notes : Cs134+137 (Bq/kg)
		# of samples	LOQ (Bq/kg)		
Sr90	63	53	0.0089-0.04	0.026-1.2	ND-970
Pu238	5	5	0.00053-0.00093	-	0.054-0.248
Pu239＋240	5	4	0.00085-0.00093	0.0011	

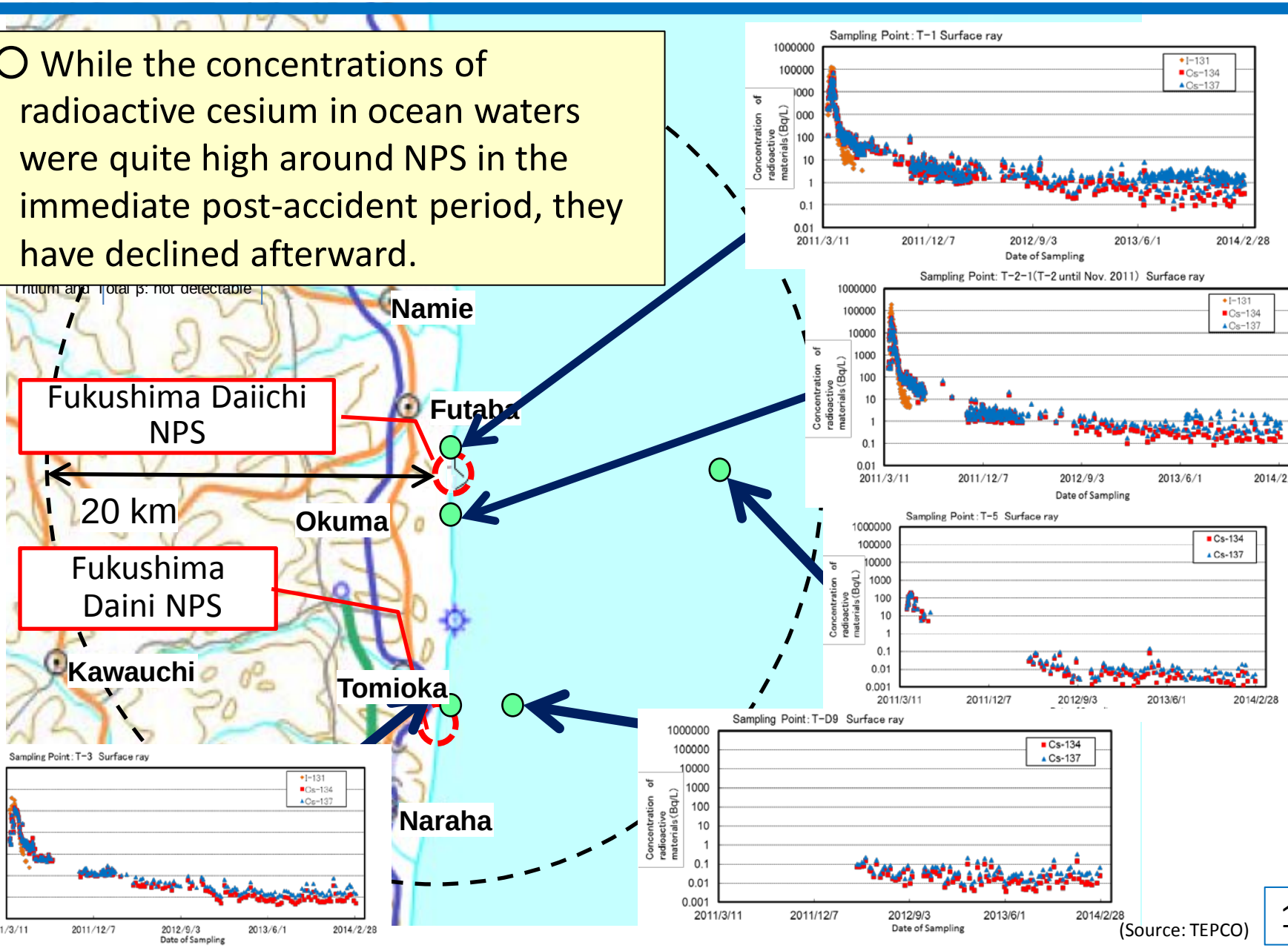
*** Ranges of radionuclides' levels observed before the accident**

Sr90	<LOD-0.26 Bq/kg
Pu238	<LOD-0.0016 Bq/kg
Pu239+240	<LOD-0.073 Bq/kg

(Source: Nuclear Regulation Authority (http://search.kankyo-hoshano.go.jp/servlet/search.top))

Radioactive Cesium in Ocean Water

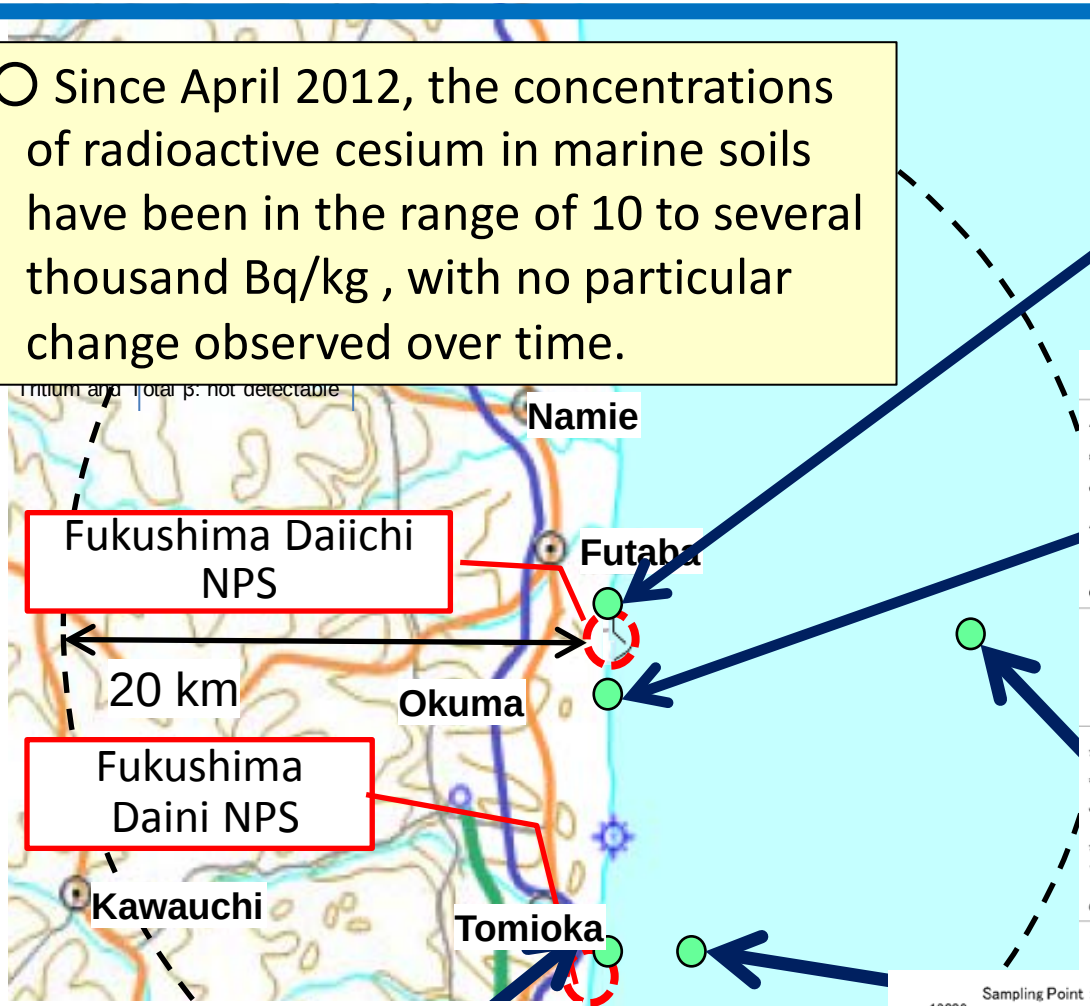
○ While the concentrations of radioactive cesium in ocean waters were quite high around NPS in the immediate post-accident period, they have declined afterward.

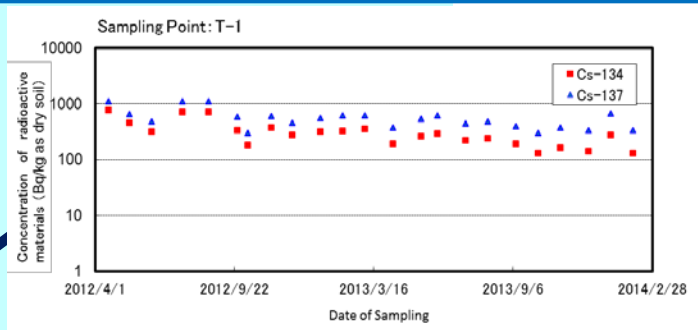


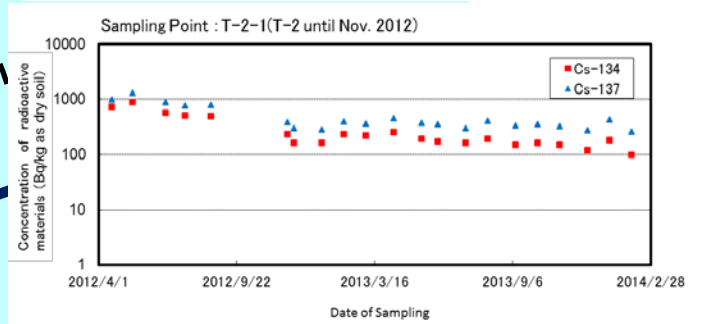
(Source: TEPCO)

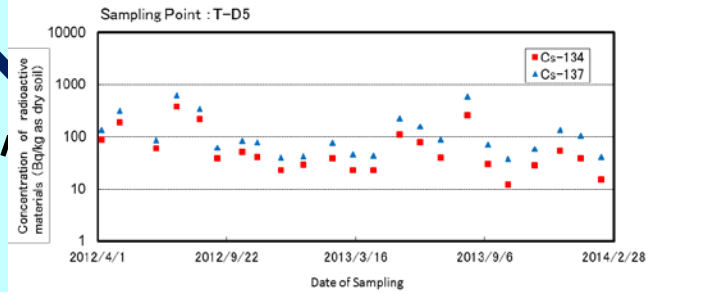
Radioactive Cesium in Marine Soil

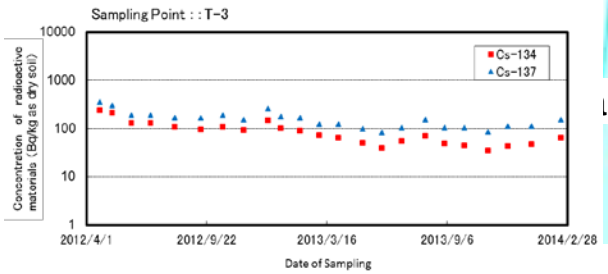
○ Since April 2012, the concentrations of radioactive cesium in marine soils have been in the range of 10 to several thousand Bq/kg , with no particular change observed over time.

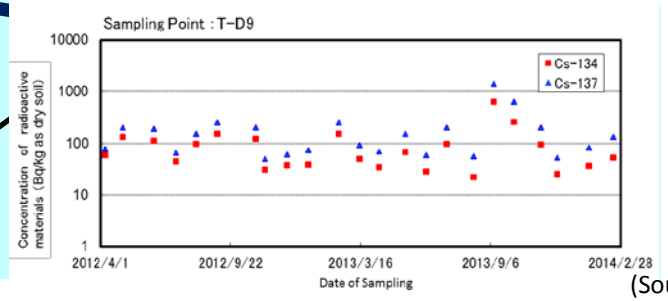










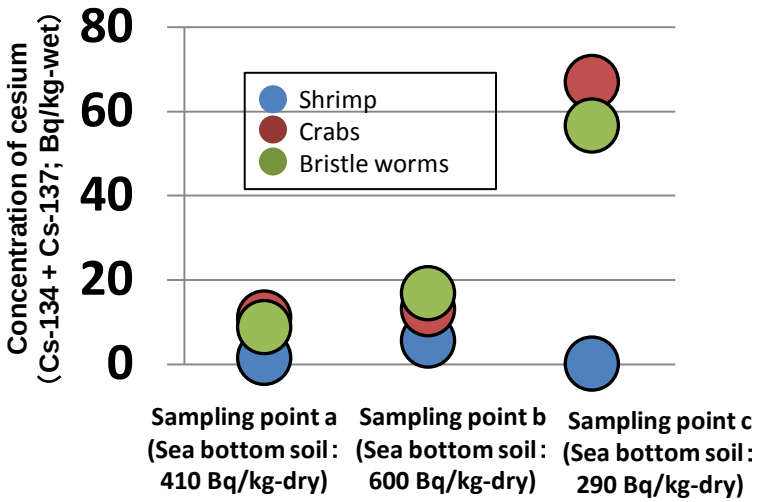


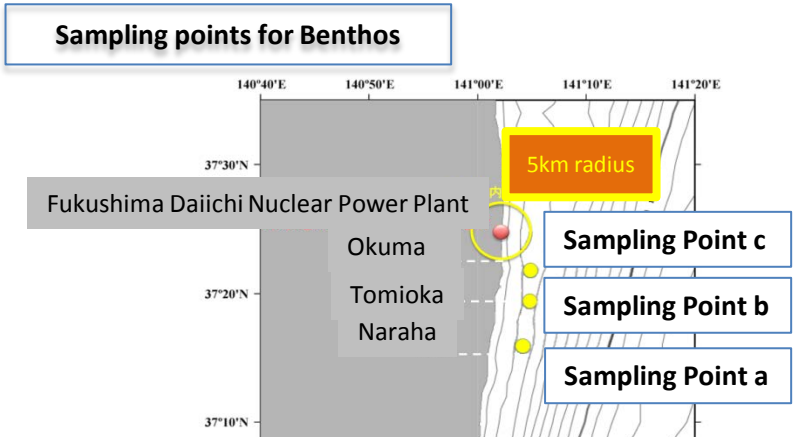
(Source: TEPCO)

Research Activity

○ New findings have been obtained on the mechanism by which radionuclides are transferred to fishery products.

(1) No correlation was found between the radioactive cesium concentrations of benthos and those of marine soils.

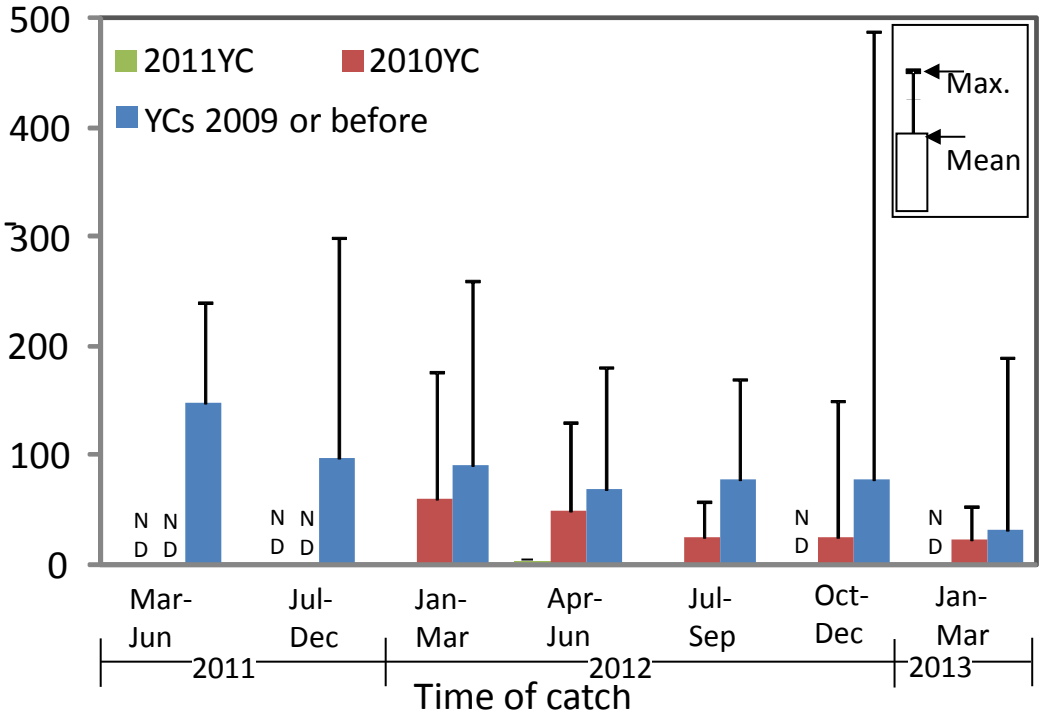




(2) For Olive flounder and Pacific cod;

① Little radioactive cesium was taken in by the birth year groups born after the accident (2011 or later).

② Little intake of radioactive materials took place in the winter of 2012 or later.



Chronological trend in concentration of cesium in Pacific cod (Gadus macrocephalus) caught off Fukushima according to age class

Damaging Rumors and Import Regulations

【 Domestic consumer awareness】

- According to the survey by the Consumer Affairs Agency on consumer awareness, consumers stating that they “hesitate to buy food products made in Fukushima because they wish to buy food that does not contain radioactive materials” amounted to 19.4% of all respondents in February 2013, although this figure fell to 15.3% in February 2014.

【Import regulations 】

- Many countries imposed import regulations on Japanese fishery products (e.g. request of test certificate of radionuclides, ban on import of all fishery products from certain prefectures).
- Some of those countries still continue those policies.

＜Examples of import restriction on Japanese fishery products＞

- ✓ China: ban on import from 10 prefectures
- ✓ South Korea： ban on import from 8 prefectures (since September 2013)

Example of Website

【Monitoring results】

Item	Radioactive Caesium (Bq/kg) Total		
English	Standard limit for Radioactive Cesium in fish: 100Bq/kg	Radioactive Caesium (Bq/kg) Cesium-134	Radioactive Caesium (Bq/k Cesium-137
Saffron cod *(Eleginus gracilis)*	Not detectable	Not detectable (<0.369)	Not detectable (<0.407)
Alaska pollock *(Theragra chalcogramma)*	Not detectable	Not detectable (<0.563)	Not detectable (<0.564)
Pacific cod *(Gadus macrocephalus)* (over 1 kg)	Not detectable	Not detectable (<0.409)	Not detectable (<0.457)
Pacific cod *(Gadus macrocephalus)* (over 1 kg,Liver part)	Not detectable	Not detectable (<4.65)	Not detectable (<5.59)

Briefing sessions

【Briefing Organizers】

Producers: Fishery cooperatives-affiliated groups and fishery product processors

Distributors: Tsukiji Market wholesaler, intermediate wholesalers and traders and mass retailers

Others: Consumer groups and journalists

December 10, 2013
Briefing and discussion session for foreign journalists at Marine Ecology Research Institute

Future Challenges

- Sustained effort to supply safe fishery products, such as monitoring and explication of mechanism for contamination
- Provision of proper information on the safety of fishery products for domestic and international use
- Cooperation with international organizations