NRA presentation

Updates of Sea Area Monitoring regarding ALPS treated water

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IAEA Review of Safety Related Aspects of Handling ALPS-Treated Water
（Regulatory Session）

Updates of Sea Area Monitoring Data(Tritium)

As of 16th December 2025

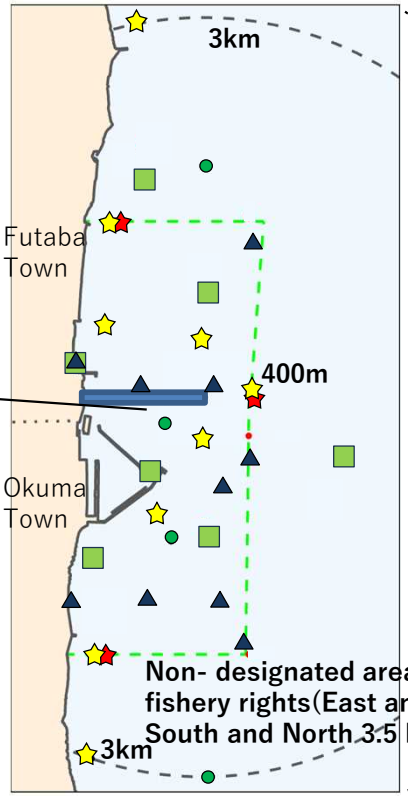
	NRA (Nuclear Regulation Authority)	MOE (Ministry of the Environment) (Dec. in 2024-Sep. in 2025)		FAJ (Fisheries Agency, Japan)	Fukushima Pref	TEPCO (Tokyo Electric Power Company Holdings)
Sample	Seawater	Seawater	Marine biota (Fish)	Fish	Seawater	Seawater
Frequency	★Every month – Every 3 months	○One time during the discharge/ Twice during the discharge— One time a month during the suspension ★— / Every 3 months	★Every 3 months	○Four times a week during the discharge–One time a week during the suspension ★200 samples / year	○Every week during the discharge/ One time a month during the suspension ★Every month	○Daily during the discharge - Every week during the suspension/ Twice a week during the discharge – Every month during the suspension / Every week/ Every month ☆Three times a month ★Every month
Number of sampling points	★20 points	○20 points / 3 points ★—/ 29 points	★3 points	○2 points ★Pacific side of the eastern Japan	○9 points ★9 points	○4/6/1/3 points ☆16 points ★36 points
Detection limit	★0.1 Bq/L	○10 Bq/L ★0.1 Bq/L	★TFWT 0.1 Bq/L, OBT 0.5 Bq/L	○10 Bq/kg fresh ★0.4 Bq/kg fresh	○10 Bq/L ★0.1 Bq/L	○10 Bq/L ☆0.4 Bq/L ★0.1 Bq/L
Analytical result	★below DL – 5.8Bq/L	○below DL ★below DL – 0.38Bq/L	★below DL~1.6 Bq/L(TFWT), below DL (OBT)	○below DL ★below DL	○below DL-5.5 Bq/L ★below DL-3.0 Bq/L	○ below DL-61 Bq/L ☆ below DL-42 Bq/L ★ below DL-52 Bq/L
Official Website	https://radioactivity.nra.go.jp/en/results#sec-10	https://policies.env.go.jp/water/shorisui-monitoring/		https://www.jfa.maff.go.jp/e/inspection/index.html	https://www.pref.fukushima.lg.jp/site/portal/moni-k.html	https://www.tepco.co.jp/decommission/progress/watertreatment/

【Legend】 ○Rapid analysis, ☆Precise analysis(TEPCO Analysis), ★Precise analysis

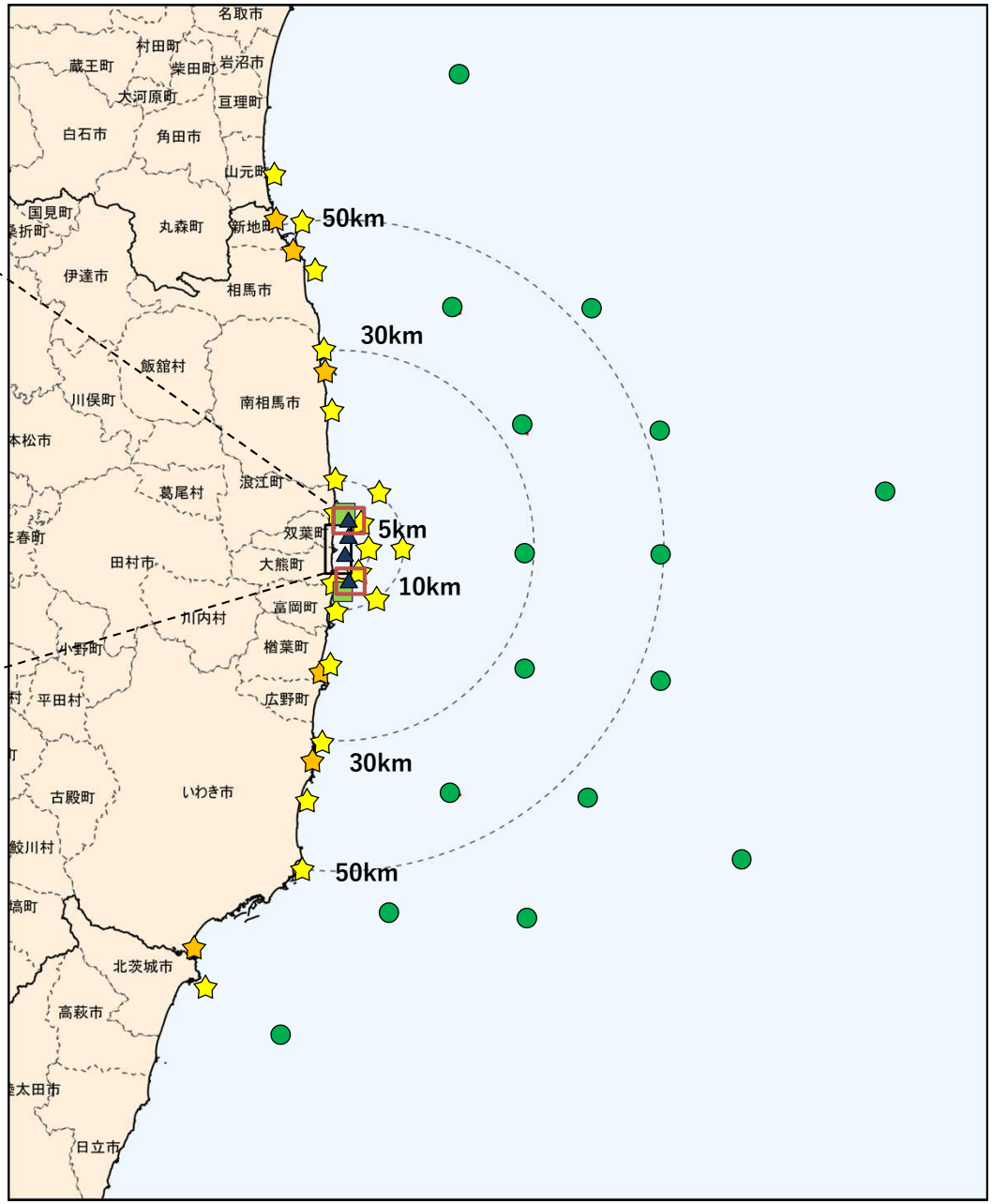
In addition, some other nuclides in seawater, sea sediment and marine biota are measured regularly.

Sea Area Monitoring regarding ALPS treated water

【Enlarged map (3 km radius)】



【Broader area map】



＜Legend＞

【MOE】

- ：Sampling points for tritium in seawater
- ：Sampling points for 7 major radionuclides, other related radionuclides
- ：Sampling points for tritium at beaches

The monitoring of fish (on the boundary of common fishery rights area) and seaweed (at Ukedo and Tomioka fishing ports) is also conducted.

【NRA】

- ：Sampling points for tritium in seawater

【TEPCO】

- ：Main sampling points for tritium in seawater

【Fukushima Pref】

- ：Sampling points for tritium in seawater

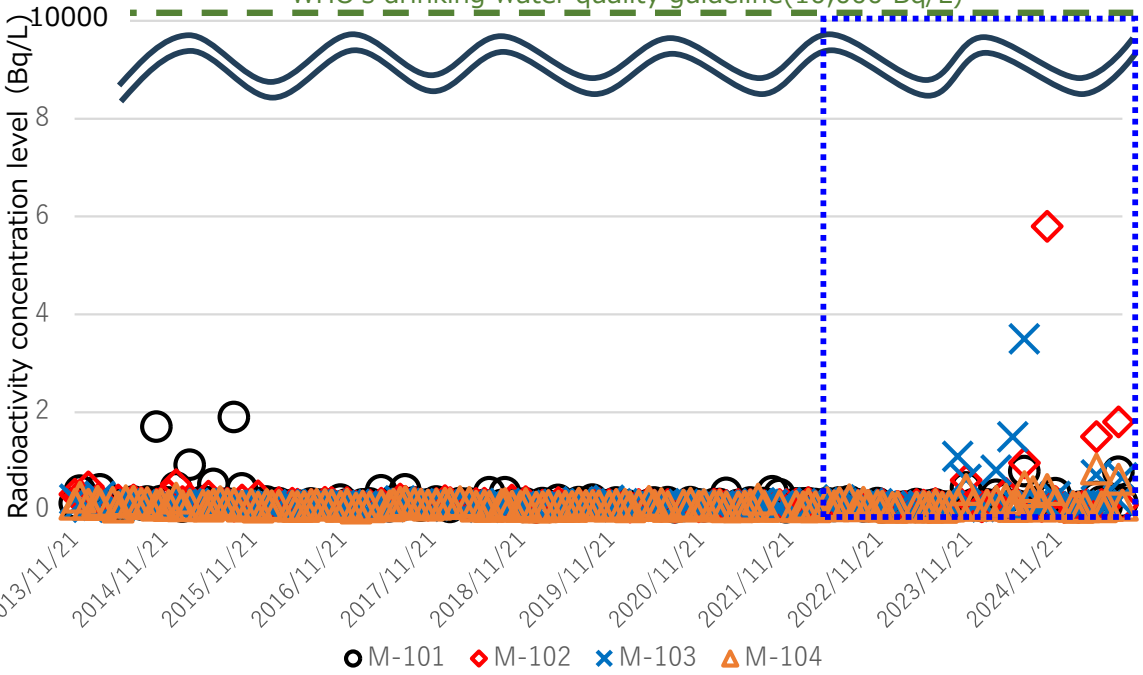
【FAJ】

- ：Sampling points for tritium rapid analysis in fishery products

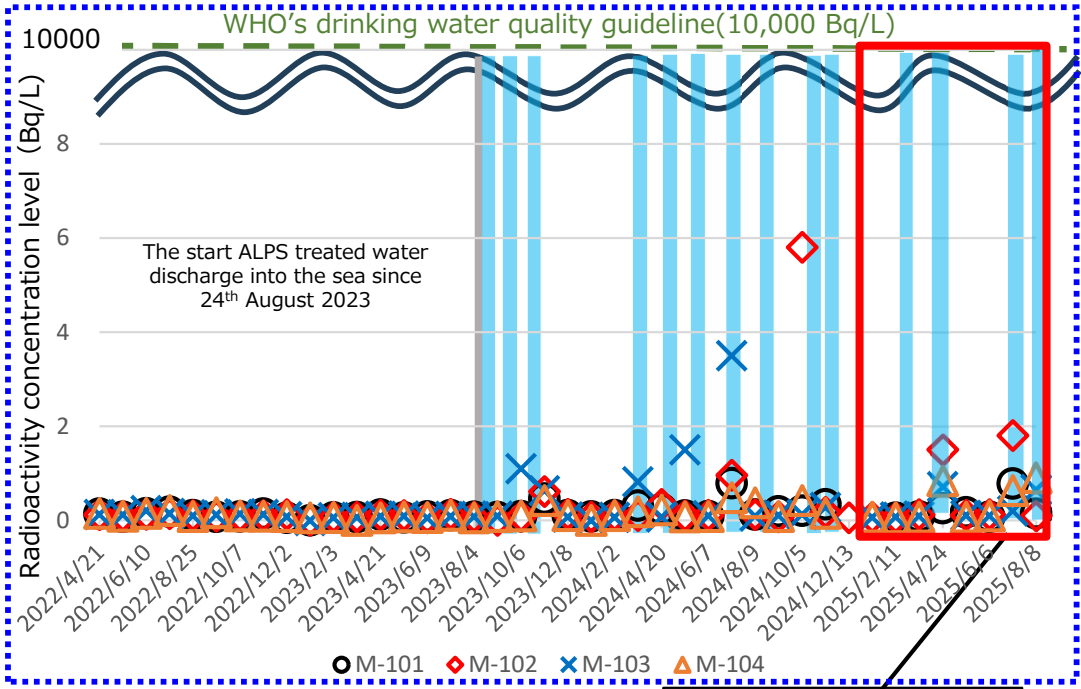
Tritium concentration in seawater samples at each monitoring point conducted by NRA

- After the start of the ALPS treated water discharge, a slight increase in tritium concentration was observed at monitoring points in the nearshore sea area.
- The tritium concentration level at monitoring points in the offshore area were no change to compare with that of before the ALPS treated water discharge.
- After the start of discharge of ALPS treated water, the concentration is sufficiently low, approximately 1/1,700 of WHO's drinking water quality guideline (10,000 Bq/L)to compared with maximum value(5.8 Bq/L, sampling on 5th Oct 2024) and **is not at a level that would affect people and/or the environment.**

Tritium concentration in seawater samples
(Trend graph of tritium concentration in seawater at the nearshore sea area from November 2013 to August 2025)



Tritium concentration in seawater samples
(Trend graph of tritium concentration in seawater at the nearshore sea area from April 2022 to August 2025)

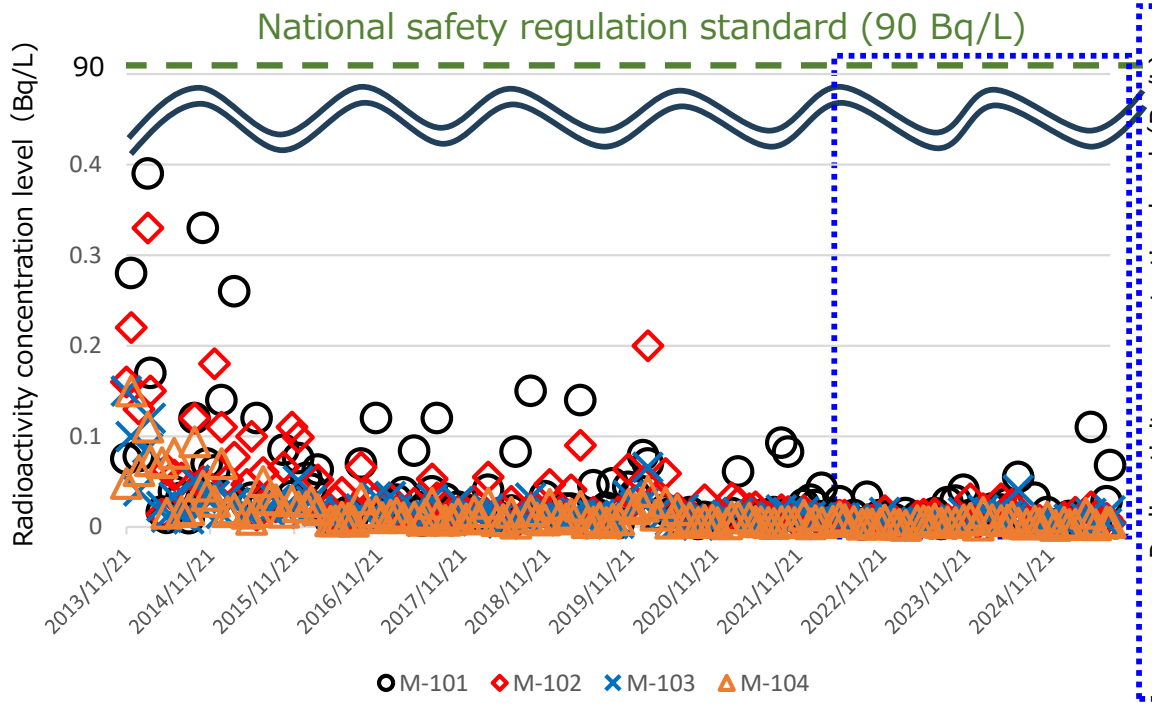


- Light blue shading indicates the period during ALPS treated water discharged into the sea.
- Monitoring data below the detection limit of actual measurement are not included for statistical process.

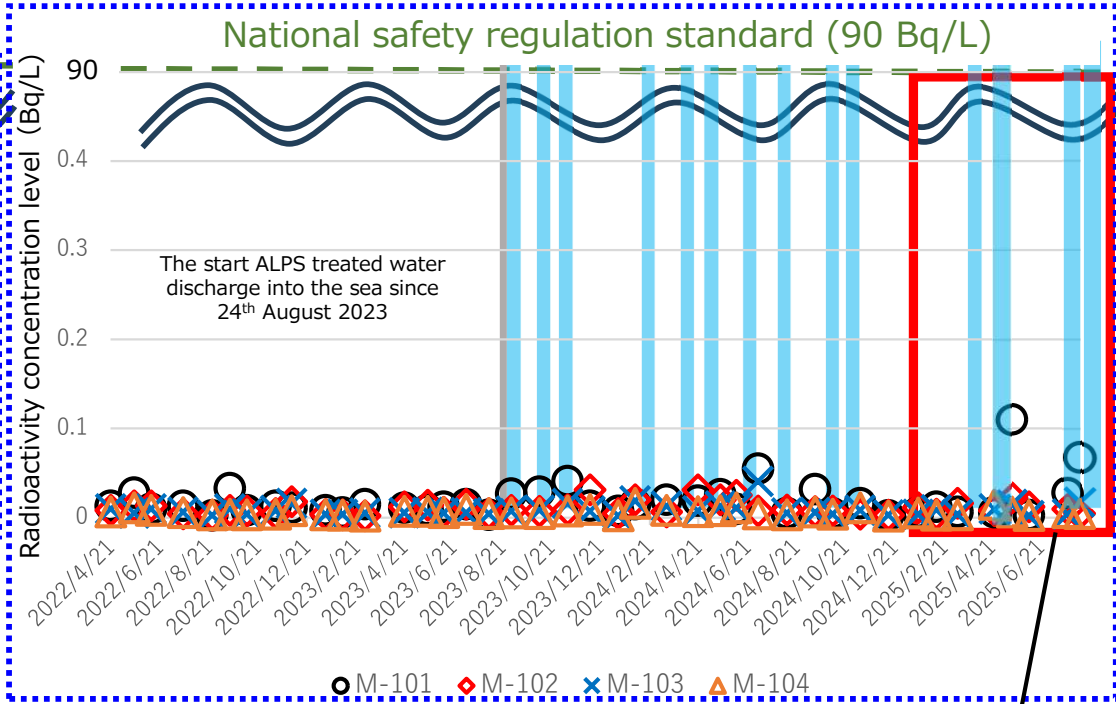
Radiocesium concentration in seawater samples at each monitoring point conducted by NRA

- Cesium-137 radioactivity concentration in seawater in the nearshore sea area is approximately same before and after the ALPS treated water discharge and **is not at a level that would affect people and/or the environment.**
  * National safety regulation standard: 90 Bq/L

Cesium concentration in seawater samples
(Trend graph of cesium-137 concentration in seawater at the nearshore sea area
from November 2013 to August 2025)



Cesium concentration in seawater samples
(Trend graph of cesium-137 concentration in seawater at the nearshore sea area
from April 2022 to August 2025)

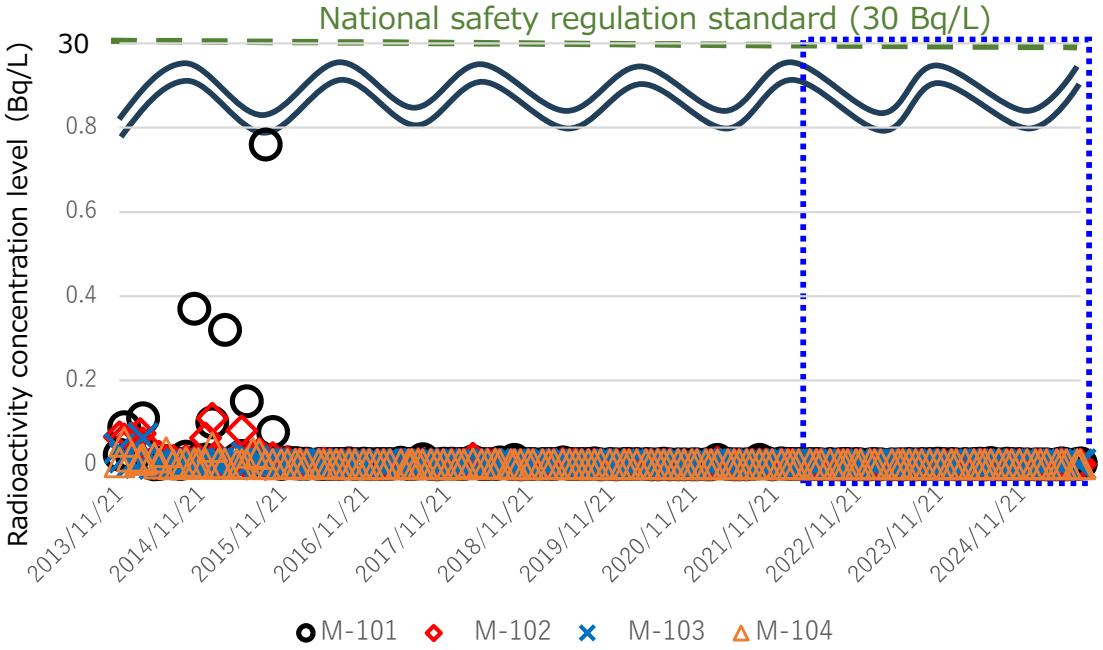


- Light blue shading indicates the period during ALPS treated water discharged into the sea.
- Monitoring data below the detection limit of actual measurement are not included for statistical process.

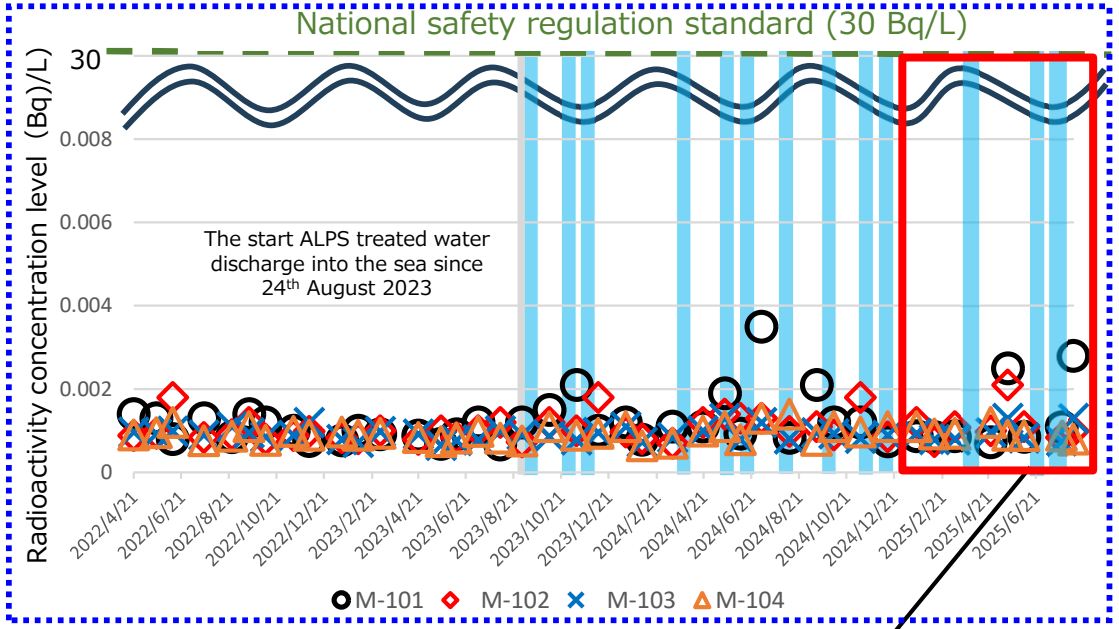
Strontium concentration in seawater samples at each monitoring point conducted by NRA

- Strontium-90 radioactivity concentration in seawater in the nearshore sea area is approximately same before and after the ALPS treated water discharge and **is not at a level that would affect people and/or the environment.**
- * National safety regulation standard: 30 Bq/L

Strontium concentration in seawater samples
(Trend graph of strontium concentration in seawater at the nearshore sea area
from November 2013 to August 2025)



Strontium concentration in seawater samples
(Trend graph of strontium concentration in seawater at the nearshore sea area
from April 2022 to August 2025)



- Light blue shading indicates the period during ALPS treated water discharged into the sea.
- Monitoring data below the detection limit of actual measurement are not included for statistical process.

Reference
(Monitoring data of MOE and FAJ)

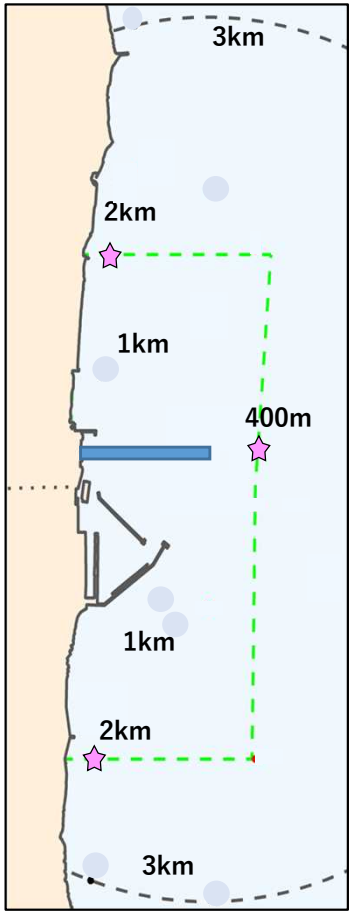
Seawater results of Ministry of the Environment

The results are significantly below various standards like the regulation limit or WHO drinking water guidance level, including results below the DL.
These results are not at a level that would affect people and/or the environment.

(Bq/L)

As of 14th Nov. 2025

Seawater	Before discharge (Apr. in 2022-Aug. in 2023)	After discharge (Sep. in 2023-Nov. in 2024)	Update since last review mission (Dec. in 2024-Sep. in 2025)
H-3 (29 sampling points)	ND－0.17 (D.L. : 0.04 - 0.06)	ND－5.0 (D.L. : 0.04 - 0.06)	ND－0.38 (D.L. : 0.03)
Cs-137	0.0031－0.031	0.0022－0.044	0.0021－0.010
Sr-90	0.00055－0.0011	0.00058－0.0079	0.00056－0.00083
Pu-239+ Pu-240	0.0000082－0.000026	ND－0.0000074 (D.L. : 0.000003)	0.0000045－0.0000069
Am-241	0.0000033－0.000012	ND－0.0000064 (D.L. : 0.000003 - 0.000005)	ND (D.L. : 0.000003 - 0.000004)
U-234	Not Measured	0.040－0.048	0.038－0.042
U-238	Not Measured	0.036－0.042	0.033－0.036
Y-90	0.00070－0.0011	0.00062－0.0079	0.00056－0.00076
C-14	0.0047－0.0061	0.0051－0.0060	0.0061－0.0062



※ Nuclides for which all results were below the detection limit are excluded from the table.
※ Refer to the Environmental Radiation Database. The data analyzed by nuclear operators was excluded.
※ For U-234 and U-238, no past measurement data was available for the surrounding areas, such as off the coast of Fukushima Prefecture, but the values were comparable to those obtained from general uranium element concentrations in seawater (U : 3 μg/L(0.04 Bq/L) and U-234/U-238≒1.1)*.

* MEXT, The Series of Environmental Radioactivity Measuring Methods No.14

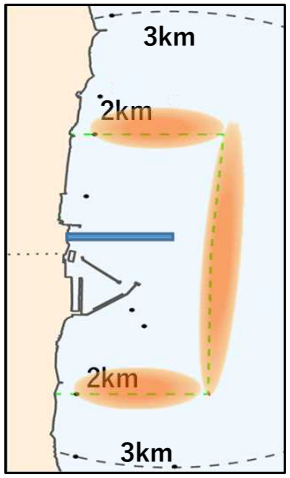
Marine biota results for sea-area monitoring

As of 14th Nov. 2025

H-3 concentration is almost same as in the surrounding seawater, and concentrations of C-14 and I-129 are almost same as they were before the discharge.

These results are not at a level that would affect people and/or the environment.

Fish	Before discharge (Apr. in 2022-Aug. in 2023)	After discharge (Sep. in 2023-Nov. in 2024)	Update since last review mission (Dec. in 2024-Sep. in 2025)
TFWT	ND－0.18 Bq/L (D.L. : 0.05 - 0.06 Bq/L)	0.042－1.6 Bq/L	0.066－0.66 Bq/L
OBT	ND (D.L. : 0.04 - 0.06 Bq/kg fresh)	ND－0.11 Bq/kg fresh (D.L. : 0.04 - 0.06 Bq/kg fresh)	ND (D.L. : 0.04 - 0.07 Bq/kg fresh)
C-14	16－28 Bq/kg fresh	19－30 Bq/kg fresh	20－34 Bq/kg fresh



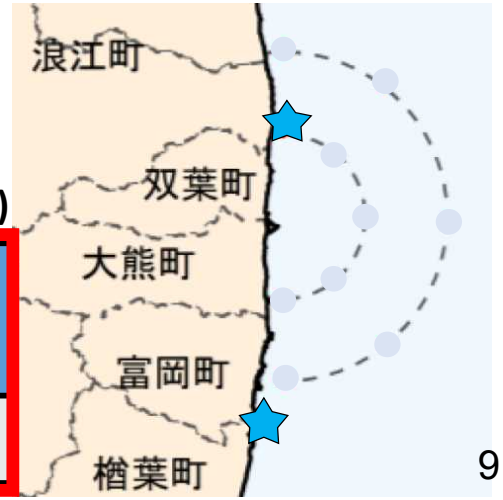
※ The Environmental Radiation Database was referenced.

※ Tritium data for fish are included, but no description of TFWT or OBT.

Fish(13 species)：Paralichthys olivaceus, Squatina japonica, Okamejei schmidti, Pagrus major, Myliobatis tobijei, Nibea mitsukurii, Hemitrygon akajei, Chelidonichthys spinosus, Lophiomus setigerus, Eopsetta grigorjewi , Triakis scyllium, Platycephalus sp.2, Carcharhinus obscurus

Seaweed(6 species)：Laminaria, Ulva, Eisenia bicyclis, Grateloupia lanceolata, Ahnfeltiopsis paradoxa, Chondrus giganteus

(Bq/kg fresh)



Seaweed	Before discharge (Apr. in 2022-Aug. in 2023)	After discharge (Sep. in 2023-Nov. in 2024)	Update since last review mission (Dec. in 2024-Sep. in 2025)
I-129	ND (D.L. : 0.01 - 0.05)	ND (D.L. : 0.03 - 0.09)	ND (D.L. : 0.01 - 0.06)

Fishery Products for Sea Area Monitoring(FAJ)(1)

- To implement for fisher/consumer's confidence and not to occur the adverse impacts on the reputation related to the discharge of ALPS treated water, FAJ conducts 2 method for tritium analysis. (①Precise Analysis, ②Rapid Analysis)
- No change is observed before and after the discharge of ALPS treated water.

① Precise Analysis

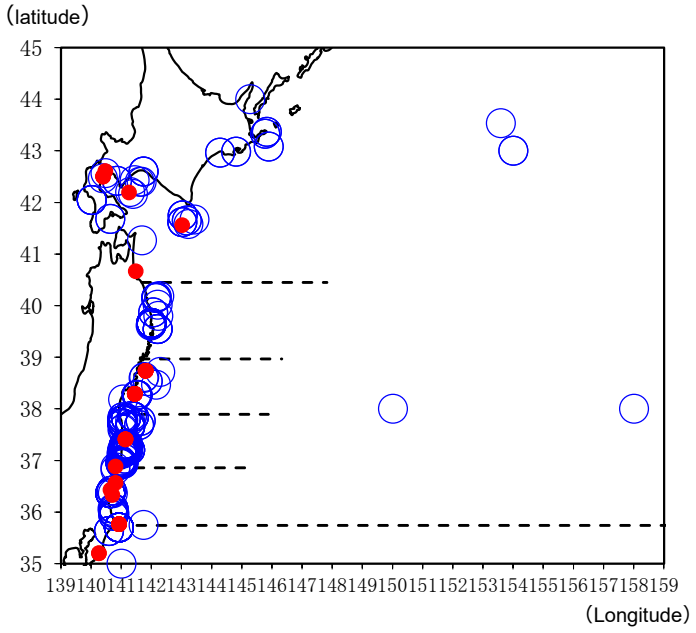
As of 14th Nov. 2025

- Precise analysis for tritium are conducted in large area on the Pacific side of the eastern Japan since June 2022.
- Measurement based on internationally recognized methods (Detection limit : Appox. 0.4Bq/kg fresh) .
- For precise analysis, 682 samples were analyzed, and all were below the detection limit.

(FAJ is jointly analysing the OBT with the IAEA.
In addition, FAJ plans to analysis OBT if the TFWT is not ND in precise analysis, and the other method (rapid analysis) analyses the total tritium (OBT+TFWT) in the sample.)

Fishery products※	Before discharge (Aug. in 2022 - Aug. 23rd in 2023)	After discharge (Aug. 24th in 2023 - Sep. in 2024)	Update since last review mission (Oct. in 2024 - Nov. in 2025)
H-3 (TFWT)	ND (D.L. : 0.210 - 0.408 Bq/kg fresh)	ND (D.L. : 0.175 - 0.388 Bq/kg fresh)	ND (D.L. : 0.216 - 0.312 Bq/kg fresh)

※ The date is based on the date of publication of the tritium analysis results.



※ Red points are update since last review mission.

Items

Fish (44 species) Fat greenling, Dusky sole, Spotted knifejaw, Stone flounder, Longnose eel, Skipjack tuna, Redwing searobin, Monkfish, Fox jacopever, Coho salmon, Splendid alfonsino, Crescent sweetlips, Southern mackerel, Chum salmon, Spanish mackerel, Pacific sanury, Dolphinfish, Whitebait, Drum, Rockfish, Vermiculated puffer, Alaska pollock, Seabass, Crimson seabream, Tiger puffer, Slime flounder, Olive flounder , Albacore, Japanese amberjack , Gurnard, Chub mackerel, Conger eel, Littlemouth flounder, marbled flounder, Chub mackerel, Red seabream, Pacific cod, Barfin flounder, John Dory, Rikuzen flounder, Shotted halibut, Bigeye scad, Ridged-eye flounder, Willowy flounder

Crustacean (2 species) Japanese spiny lobster, Swimming crab

Shellfish (7 species) Bloody clam , Japanese littleneck clam, Surf clam, Ezo abalone, Japanese abalone, Clam, Scallop, Pacific oyster

Cephalopods (4 species) Japanese flying squid , Chestnut octopus, Spear squid, Common octopus

Seaweed (4 species) Laver, Green laver, Sea tangle, Wakame seaweed

Others (3 species) Short-spined sea urchin, Japanese common sea cucumber, Common sea squirt

Fishery Products for Sea Area Monitoring(FAJ)(2)

- To implement for fisher/consumer's confidence and not to occur the adverse impacts on the reputation related to the discharge of ALPS treated water, FAJ conducts 2 method for tritium analysis. (①Precise Analysis, ②Rapid Analysis)
- **No change is observed before and after the discharge of ALPS treated water.**

② Rapid Analysis

As of 14th Nov. 2025

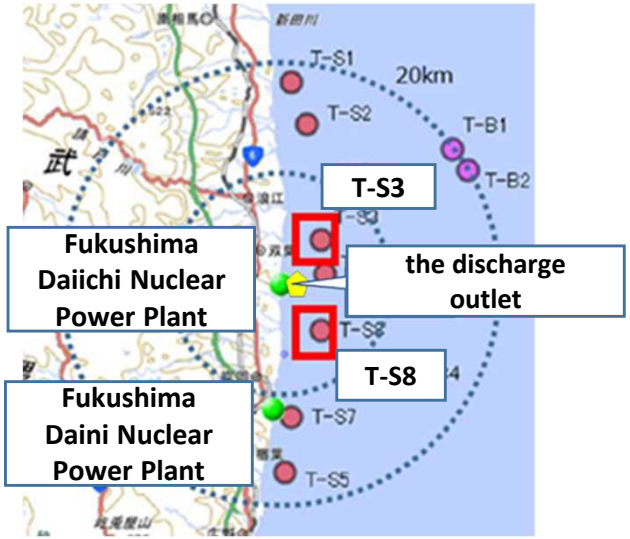
- In order to provide monitoring results as quickly as possible, FAJ introduced a rapid analysis method for tritium intensive monitoring since August 2023.
- This method can provide results the day or two after sampling (Detection limit : Appox.10 Bq/kg fresh) .
- For rapid analysis, 508 samples were analyzed, and all were below the detection limit.

Fishery products※	Before discharge (Aug. 9th in 2023 - Aug. 23rd in 2023)	After discharge (Aug. 24th in 2023 – Sep. in 2024)	Update since last review mission (Oct. in 2024 - Nov. in 2025)
H-3	ND (D.L. : 7.67 - 8.78 Bq/kg fresh)	ND (D.L. : 6.77 – 10.96 Bq/kg fresh)	ND (D.L. : 6.83 – 9.76 Bq/kg fresh)

※ The date is based on the date of publication of the tritium analysis results.

(WHO drinking water guidance level : 10, 000Bq/L)
No.15 and onwards are the results after the release of ALPS treated water

No.	Item	Press release Date	Analysis site	(Unit : Bq/kg) (Detection limit)	
1	Olive flounder	2023/8/9	Muscles	ND	(8.76)
2	Gurnard	2023/8/9	Muscles	ND	(8.72)
3	Olive flounder	2023/8/14	Muscles	ND	(7.75)
			⋮		
14	Olive flounder	2023/8/25	Muscles	ND	(8.65)
15	Olive flounder	2023/8/26	Muscles	ND	(8.06)
16	Gurnard	2023/8/26	Muscles	ND	(8.22)
17	Gurnard	2023/8/27	Muscles	ND	(8.76)
			⋮		
505	Olive flounder	2025/11/13	Muscles	ND	(8.22)
506	Olive flounder	2025/11/13	Muscles	ND	(8.14)
507	Olive flounder	2025/11/14	Muscles	ND	(7.71)
508	Olive flounder	2025/11/14	Muscles	ND	(7.59)



Ref : FAJ
https://www.jfa.maff.go.jp/e/inspection/index.html

（Reference）Methods of Tritium Analysis

① Precise Analysis

Receive the samples

Identify the samples

Measure the samples

Prepare the samples

Pouch the sample

Freeze minced sample into thin plates

Extract moisture from sample

Collect moisture as ice

Remove impurities (e.g. oil, protein, etc.) from the collected moisture

Let samples stand to prevent chemiluminescence

Measure the radiation with Liquid scintillation counter

② Rapid Analysis

Measure the samples

Cut off the edible part (about 10g) from the sample

Burn the sample and collect vapor

Cool the vapor and collect moisture as water

Let samples stand to prevent chemiluminescence

Measure the radiation with Liquid scintillation counter