Comprehensive Radiation Monitoring Plan

(Sea-area Monitoring related to ALPS treated water)

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Purpose of Comprehensive Radiation Monitoring Plan

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Purpose

The purpose of this plan is to contribute to the following:

(i) To grasp radiation dose levels and distribution of radioactive materials mainly in the residential areas and locations on a medium-to-long-term basis,
(ii) To plan and evaluate decontamination scheme and other measures to be taken to reduce exposure dose levels in accordance with different exposure situations,
(iii) To investigate and make a decision with respect to changes and revisions made to evacuation zones based on predictions of future exposure as realistically as possible,
(iv) To amass basic data for managing the health of residents and making health impact assessments (including (external and internal) exposure doses of residents in the vicinity),
(v) To grasp the state of the dispersion, deposition, migration, and transference of radioactive materials emitted into the environment,
(vi) To reduce rumor-based adverse impacts on reputation by handling ALPS Treated Water (refers to ALPS Treated water as defined in the Basic Policy),

Relevant government ministries, local governments, the operator of nuclear facilities, and other entities shall endeavor to collect data required for the foregoing. Attention should also be paid to the development of a system for gathering data obtained through monitoring as basic data for healthcare management of local residents over a long time period.

Environment Radiation Monitoring centered on Fukushima Prefecture in Japan

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Monitoring and Coordination Council (Minister of the Environment)

Secretariat: Nuclear Regulation Authority (NRA), Ministry of the Environment (MOE)

The Nuclear Regulation Authority (NRA), the Ministry of the Environment, the Nuclear Disaster Response Headquarters, the Consumer Affairs Agency, the Ministry of Agriculture, Forestry and Fisheries, the Fisheries Agency, the Ministry of Land, Infrastructure, Transport and Tourism, Fukushima Prefecture, Tokyo Electric Power Company Holdings, and other relevant ministries and agencies participated.

Decision making

- **Task Force on Monitoring and Measurement of the Marine Environment（since 2021）**
- **Expert Meeting on Monitoring of Sea Area Related to ALPS Treated Water (since 2021)**

Comprehensive Radiation Monitoring Plan*

* The CRMP is reviewed annually and has been revised almost every year.

Land-area

- Wide-area monitoring of the entire Fukushima Prefecture
  (Air dose, integrated dose, airborne dust, environmental soil, etc.)
- Detailed monitoring of evacuation order areas, etc.
  (Aerial monitoring of air dose rates, etc.)

Sea-area

Monitoring for sea water, sediment, and biota near the Fukushima Daiichi Nuclear Power Plant, coastal, offshore, open ocean water, and Tokyo-Bay, etc.

- 2011–2013: IAEA — ILC for the FDNPS accident (InterLaborary Comparison)
- 2021: Based on the discharge of ALPS treated water — Strengthening and Expanding Sea- area Monitoring
- 2022: IAEA — ILC for ALPS Treated water Discharge
- 2024: IAEA — Additional Measures

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The Monitoring of the Comprehensive Radiation Monitoring Plan

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Monitoring Coordination Meeting

Comprehensive Radiation Monitoring Plan

Coordination : Nuclear Emergency Response Headquarters

(Air environment throughout Fukushima Prefecture): NRA, CAO, FP, TEPCO
(Air environment throughout Japan): NRA, local governments
(Water environment on land): MOE, FP
(Sea area): NRA, FAJ, MOE, FP, TEPCO — ALPS Treated water Discharge
(Sea area(Tokyo Bay)): MLIT, NRA
(Schools, daycare centers): NRA, MEXT, FP, other local governments
(Ports, parks, sewerage): MLIT, FP, other local governments
(Wild animals and plants, waste, removed soil): MOE, FP, other local governments, TEPCO
(Agricultural soil, forests, pasture):MAFF, FA, FP, other local governments
(Waterworks): MLIT, MOE, CAO, FP, other local governments
(Foods): MHLW, MAFF, FAJ, FP, other local governments

Cabinet Office(CAO)

The Ministry of Environment(MOE)

農林水産省

The Ministry of Agriculture, Forestry and Fisheries(MAFF)

The Ministry of Education, Culture, Sports, Science and Technology (MEXT)

The Ministry of Land, Infrastructure, Transport and Tourism(MLIT)

The Ministry of Health, Labor and Welfare(MHLW)

Nuclear Regulation Authority(NRA)

林野庁

Forestry Agency(FA)

水産庁

Fishery Agency (FAJ)

Fukushima Prefecture(FP)

TEPCO

Tokyo Electric Power Co.(TEPCO)

Sea-area Monitoring related to ALPS treated water

- **Even if the discharge will be carried out safely, the Basic Policy states that Sea-area Monitoring will be conducted. The results of Sea-area Monitoring will are compared before and after the discharge in the medium to long term, which are widely publicized.**

- **Based on the basic policy, the main purpose of Sea-area Monitoring related to ALPS treated water was added to CRMP as "to reduce rumor-based adverse impacts on reputation by handling ALPS Treated Water." For the purpose, the relevant organizations have conducted the monitoring.**

Comprehensive Radiation Monitoring Plan

Coordination : Nuclear Emergency Response Headquarters

Independent
as the regulatory authority

Provide peace of mind
and countermeasures against rumors

Independent
from the government

水産庁

TEPCO

Responsibilities of Nuclear Operators

Internationally keeping neutral position

Countermeasures against rumors
to ensure the safety of fishery products
and consumer trust

Before strengthening & expanding the tritium monitoring program

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Before 30th March 2022

	NRA (Nuclear Regulation Authority)	MOE (Ministry of the Environment)		FAJ (Fisheries Agency, Japan)	Fukushima Pref	TEPCO (Tokyo Electric Power Company Holdings)		
Sample	Seawater	Seawater	Fish	Fish	Seawater	Seawater	Fish	Seaweed
Frequency	★Every month	—	—	—	★Every month	★Every week (Nearshore) / ★Twice a month (Coast) / ★Every month (Coast)	—	—
Number of sampling points	★4 points	–	–	–	★6points	★7 points (Nearshore) / ★6 points (Coast) / ★1 point (Coast)	–	–
Detection limit	★0.4 Bq/L	–	–	–	★0.5 Bq/L	★1 Bq/L (Nearshore) / ★0.4 Bq/L (Coast) / ★0.1 Bq/L (Coast)	–	–

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

After strengthening & expanding the tritium monitoring program

NRA JAPAN Nuclear Regulation Authority

After 30th March 2022

	NRA (Nuclear Regulation Authority)	MOE (Ministry of the Environment)		FAJ (Fisheries Agency, Japan)	Fukushima Pref	TEPCO (Tokyo Electric Power Company Holdings)		
Sample	Seawater	Seawater	Fish	Fish	Seawater	Seawater	Fish	Seaweed
Frequency	★Every month – Every 3 months	○Every week ★Every month	★Every 3 months	○Daily ★200 samples / year	○Every week ★Every month	○Daily - Every month ☆Three times a month ★Every month	★Every month	★Three times per year
Number of sampling points	★20 points	○11 points ★3 points (29 points for every 3 months)	★Nearshore and Coastal sea-area	○2 points ★Pacific side of the eastern Japan	○9 points ★9 points	○14 points ☆16 points ★36 points	★Coastal sea-area	Coastal sea-area
Detection limit	★0.1 Bq/L	○10 Bq/L ★0.1 Bq/L	★0.1Bq/kg wet weight (Tissue Free Water Tritium) ★0.5Bq/kg wet weight(Organically Bound Tritium)	○10 Bq/kg fresh ★0.5～1 Bq/kg fresh	○10 Bq/L ★0.1 Bq/L	○10 Bq/L ☆0.4 Bq/L ★0.1 Bq/L	★0.1Bq/kg wet weight (Tissue Free Water Tritium) ★0.5Bq/kg wet weight(Organically Bound Tritium)	★0.1Bq/kg wet weight (Tissue Free Water Tritium) ★0.5Bq/kg wet weight(Organically Bound Tritium)

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

Current status of the the tritium monitoring

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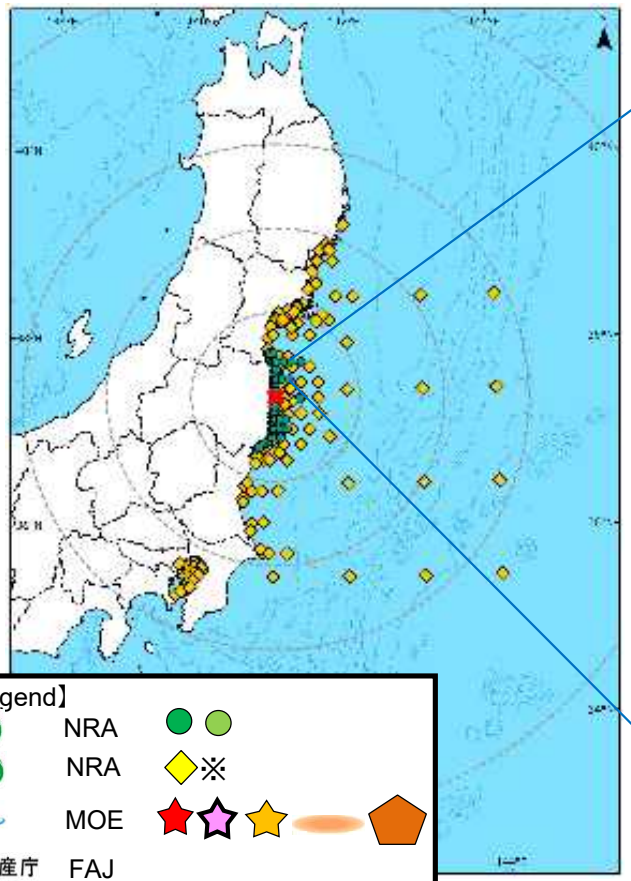
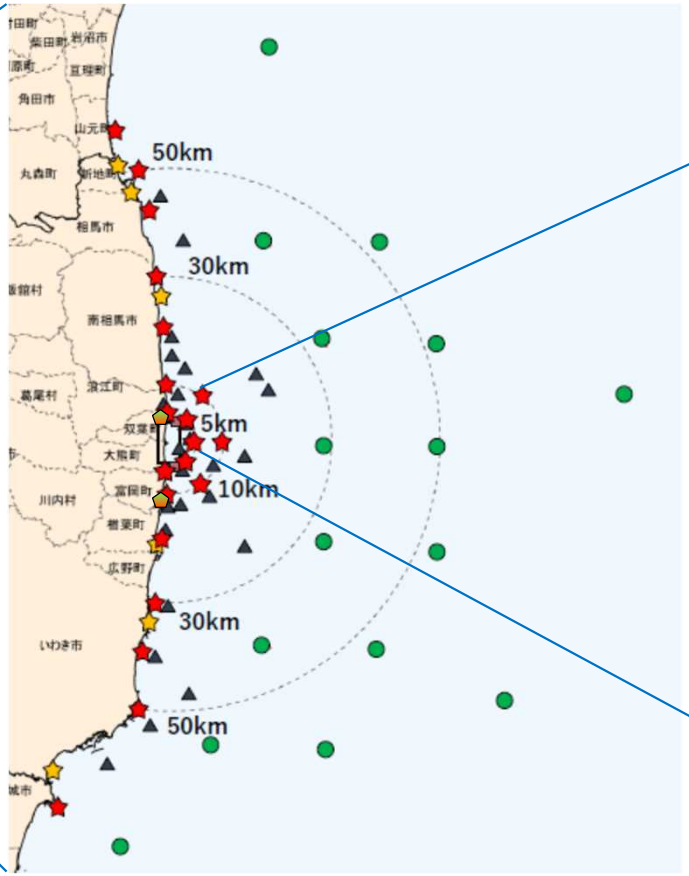
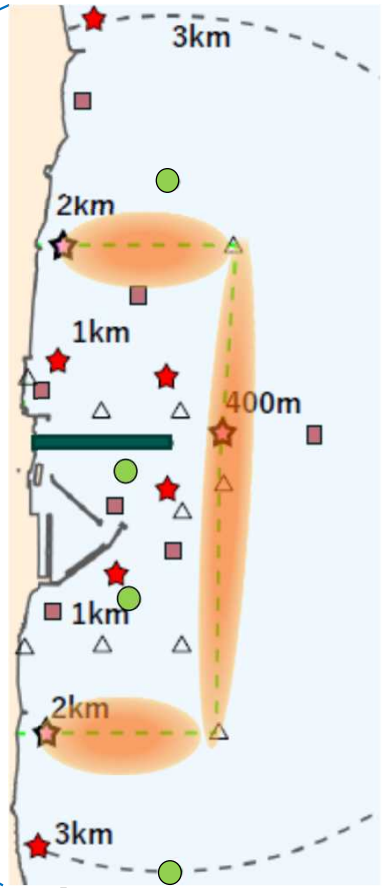
	NRA (Nuclear Regulation Authority)	MOE (Ministry of the Environment)		FAJ (Fisheries Agency, Japan)	Fukushima Pref	TEPCO (Tokyo Electric Power Company Holdings)		
Sample	Seawater	Seawater	Fish	Fish	Seawater	Seawater	Fish	Seaweed
Frequency	★Every month – Every 3 months	○One time during the discharge/ 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 ★450 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	★Once per month	★Three times per year
Number of sampling points	★20 points	○20 points / 3 points ★29points	★Nearshore and Coastal sea-area	○2 points ★Pacific side of the eastern Japan	○9 points ★9 points	○4/6/1/3 points ☆16 points ★36 points	★Coastal sea area	★Coastal sea-area
Detection limit	★0.1 Bq/L	○10 Bq/L ★0.1 Bq/L	★0.1Bq/kg wet weight (Tissue Free Water Tritium) ★0.5Bq/kg wet weight(Organically Bound Tritium)	○10 Bq/kg fresh ★0.3～1 Bq/kg fresh	○10 Bq/L ★0.1 Bq/L	○10 Bq/L ☆0.4 Bq/L ★0.1 Bq/L	★0.1Bq/kg wet weight (Tissue Free Water Tritium) ★0.5Bq/kg wet weight(Organically Bound Tritium)	★0.1Bq/kg wet weight (Tissue Free Water Tritium) ★0.5Bq/kg wet weight(Organically Bound Tritium)
Analytical result	★below DL – 5.8 Bq/L	○below DL - 20 Bq/L ★below DL - 5.0Bq/L	★below DL	○below DL ★below DL	○below DL ★below DL-1.6 Bq/L	○ below DL-56 Bq/L ☆ below DL-50 Bq/L ★ below DL-12 Bq/L	★below DL	★below DL
Official Website	https://radioactivity.nra.go.jp/en/results#sec-10	https://shorisui-monitoring.env.go.jp/en/		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

Overview of Sea-area monitoring related to ALPS treated water discharge into the sea







【Legend】
- NRA
- NRA ※
- MOE
- 水産庁 FAJ
- FP
- TEPCO

※Sampling points for radionuclides other than ALPS Treated water discharge into the sea

Sampling points related to ALPS treated water discharge into the sea

【Seawater】
Tritium
・Precise analysis at
Rapid analysis at

Other various radionuclides
・Precise analysis at

【Marine Biota】
(Fish)
FWT and OBT
seasonal to every month
C-14:seasonal
Cs-134 and Cs-137:every month
(Seaweed)
FWT and OBT: 3 times a year
I-129 : 2-3 times a year
Cs-134 and Cs-137: 3 times a year

水産庁 FAJ
【Fishery Products】
Tritium
・Precise analysis:
200 samples a year
・Rapid analysis:
(Discharge)4 times a week
(Suspension)1 time a week

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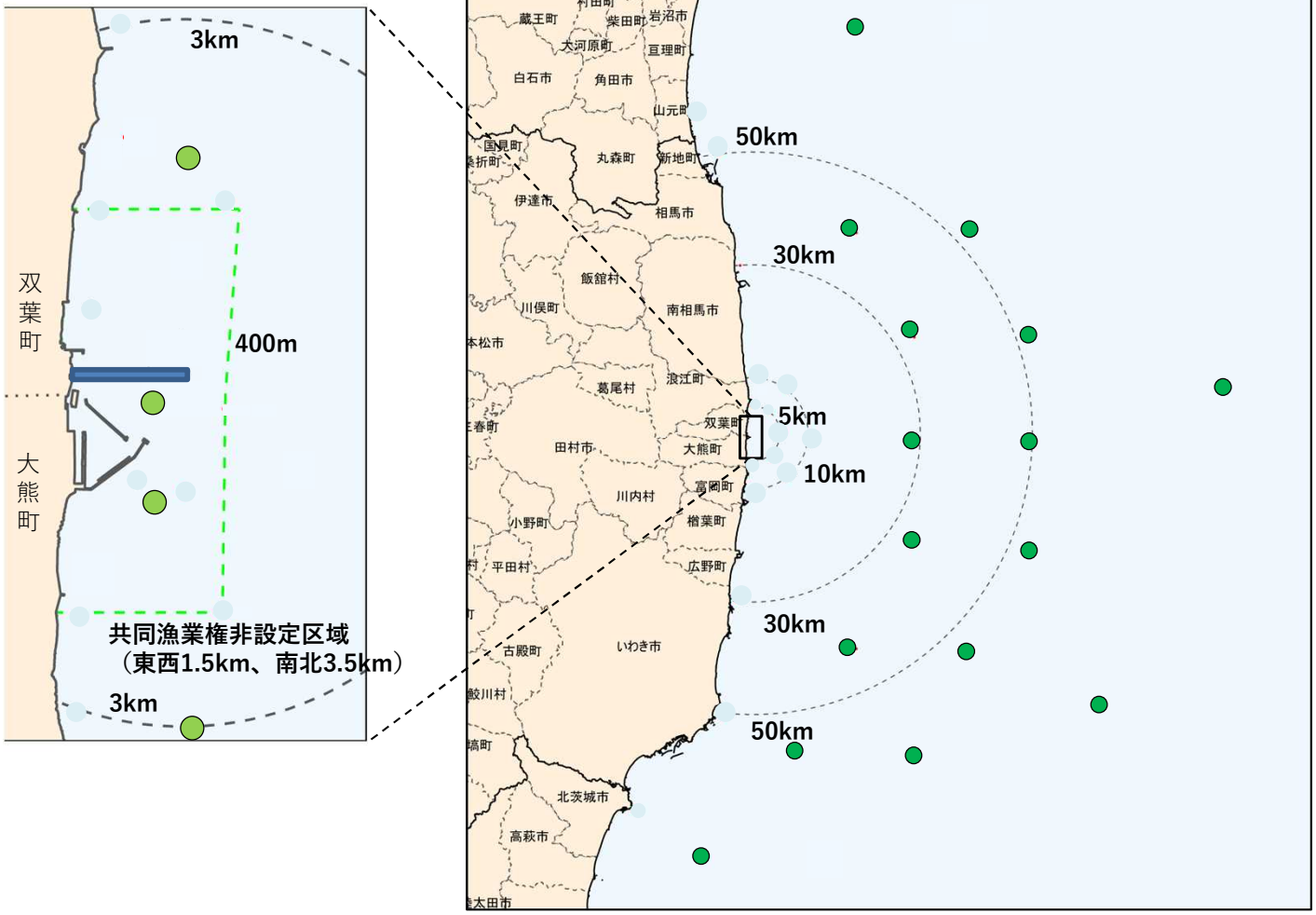
Monitoring of the Nuclear Regulation Authority



【Seawater】

Tritium

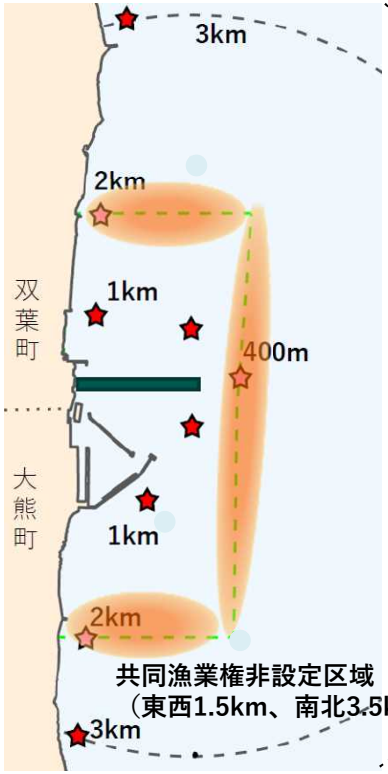
・Precise analysis every month at ●

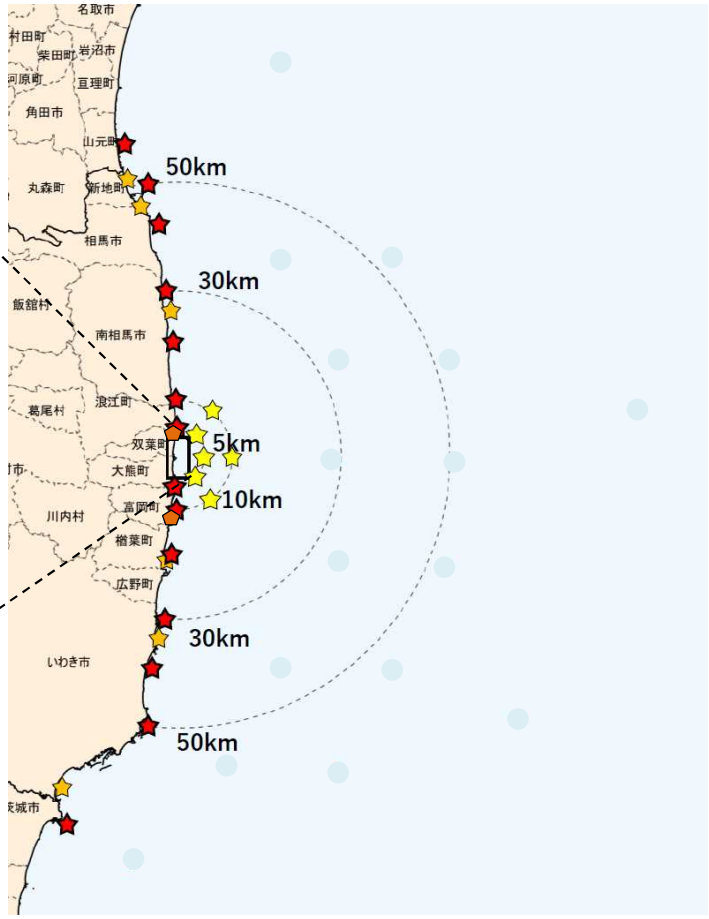
Precise analysis every 3 months at ●

Cs-134, Cs-137 and Sr-90

・Precise analysis every 3 months at ●

Monitoring of the Ministry of the Environment





【Marine Biota】
（Fish）
・FWT and OBT : seasonal at
・C-14: seasonal at
（Seaweed）
・I-129 : Twice a year at

【Seawater】

Tritium

・Precise analysis seasonal at ★ ☆
Rapid analysis at ★ ☆ ★
(Discharge) ☆ : 2 times ★ : 1 time
(Suspension) ☆ once a month
(Before and during the beach opening) ★

Major 7 radionuclides: Cs-134, Cs-137, Sr-90, Ru-106, Sb-125, I-129, Co-60

・Precise analysis seasonal at ☆

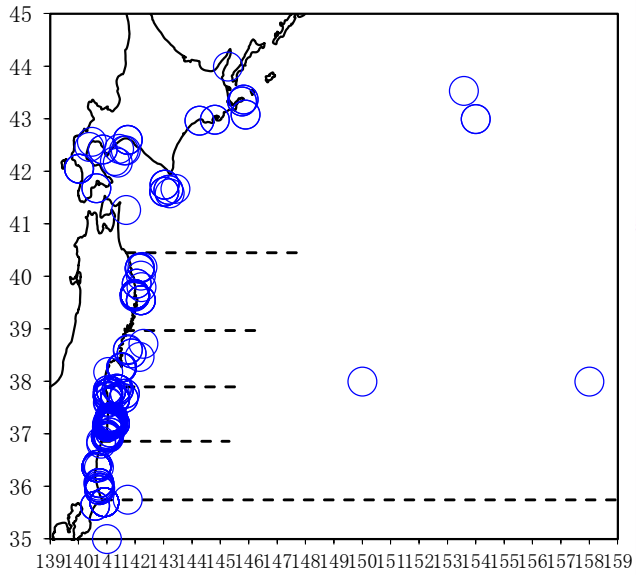
Other radionuclides: Te-125m, Ce-144, Eu-154, Eu-155, Mn-54,Fe-55,Pu-238,Pu-239, Pu-240, Am-241, Cm-244, Y-90, Tc-99,Cd-113m, Ni-63,Se-79, U-234, U-238, Np-237, C-14

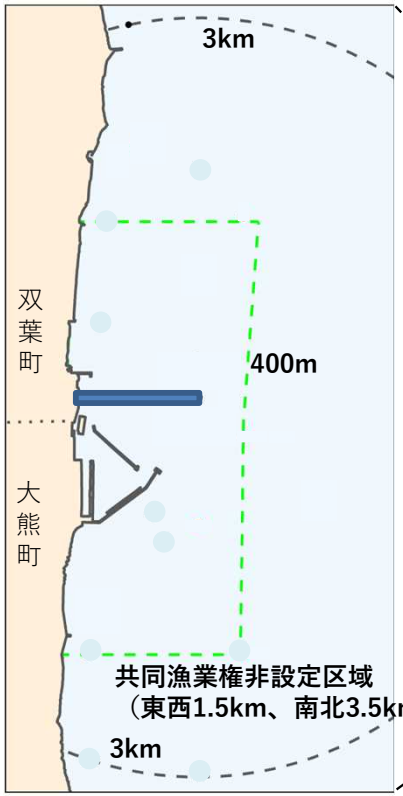
・Precise analysis once a year at ☆

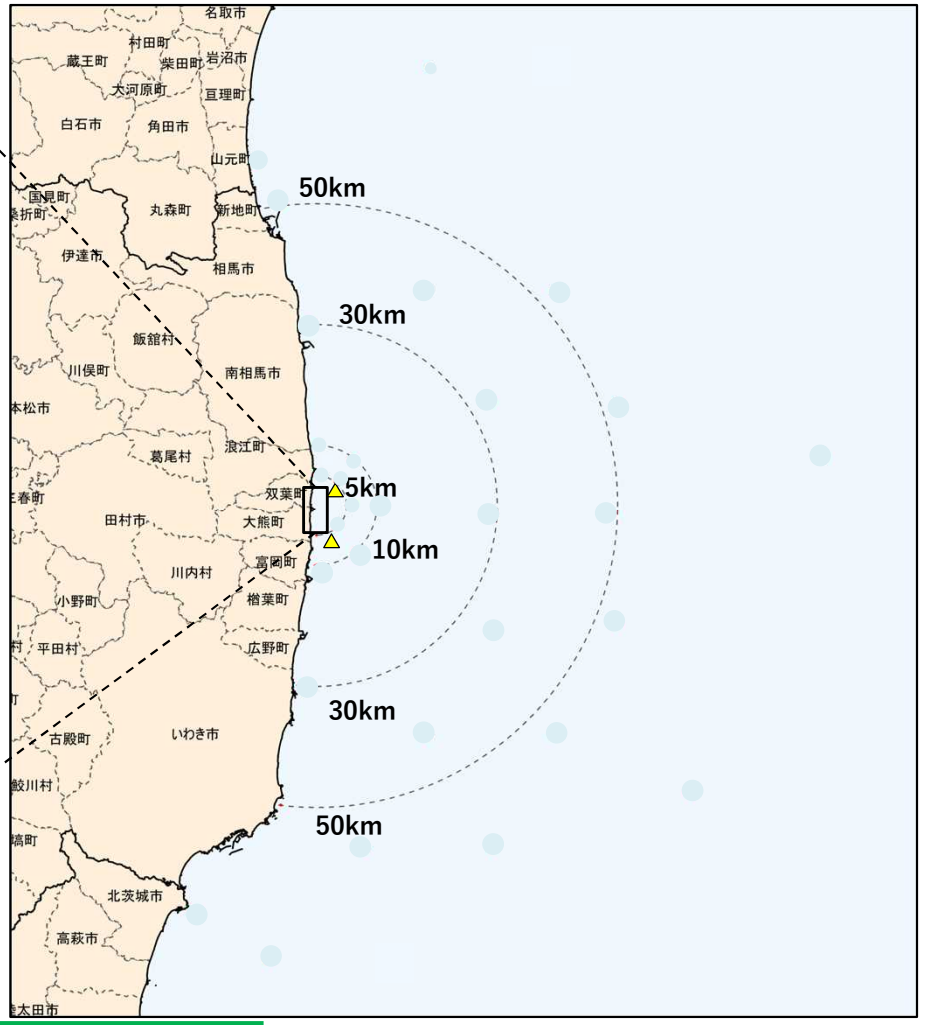
Monitoring of Fishery Agency

NRA JAPAN Nuclear Regulation Authority

水産庁







【Fishery Products】

Tritium

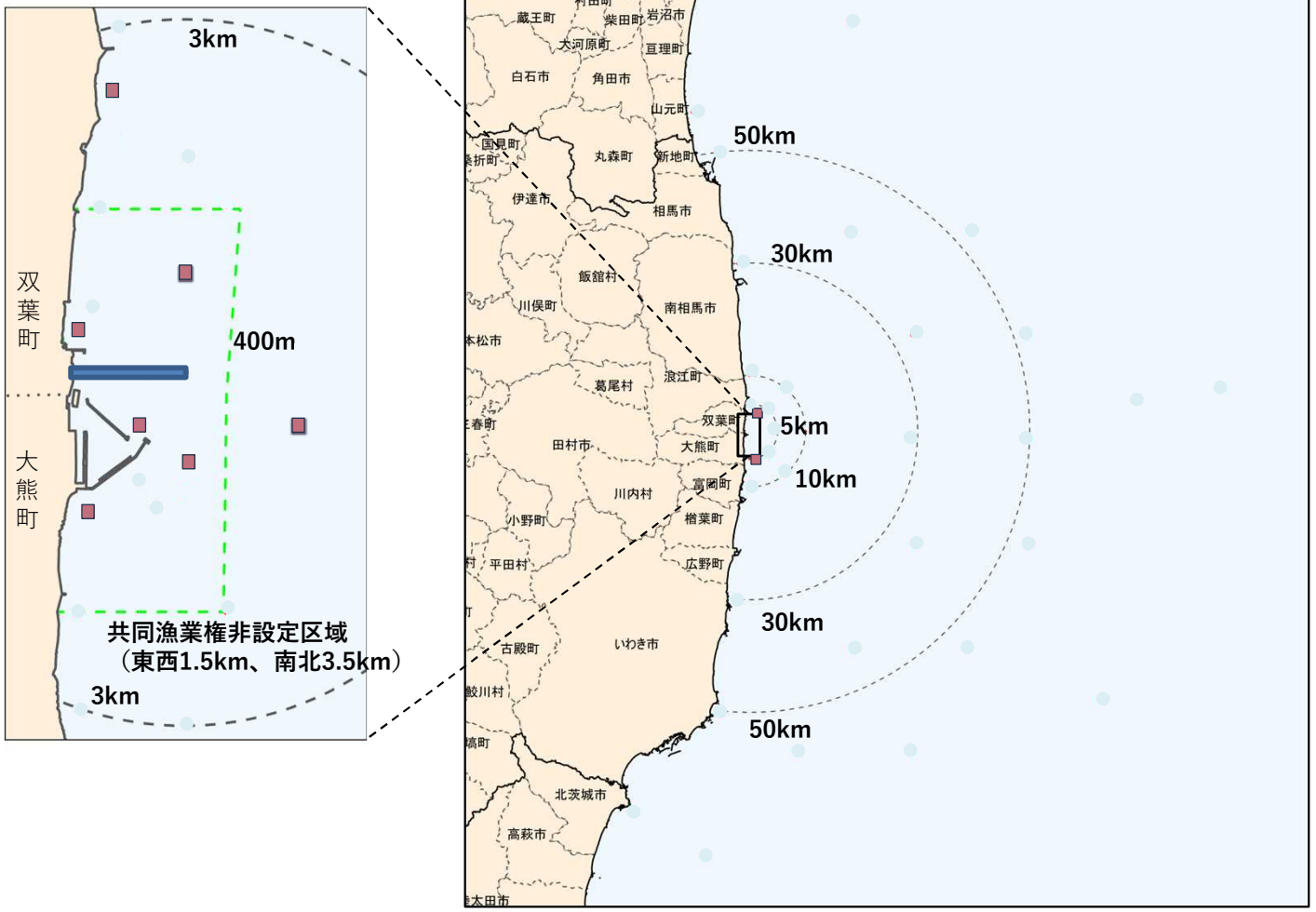
・Precise analysis:200 samples a year at ○

・Rapid analysis:

(Discharge4 times a week at △

(Suspension)1 time a week at △

Monitoring of Fukushima Prefecture



【Seawater】

Tritium

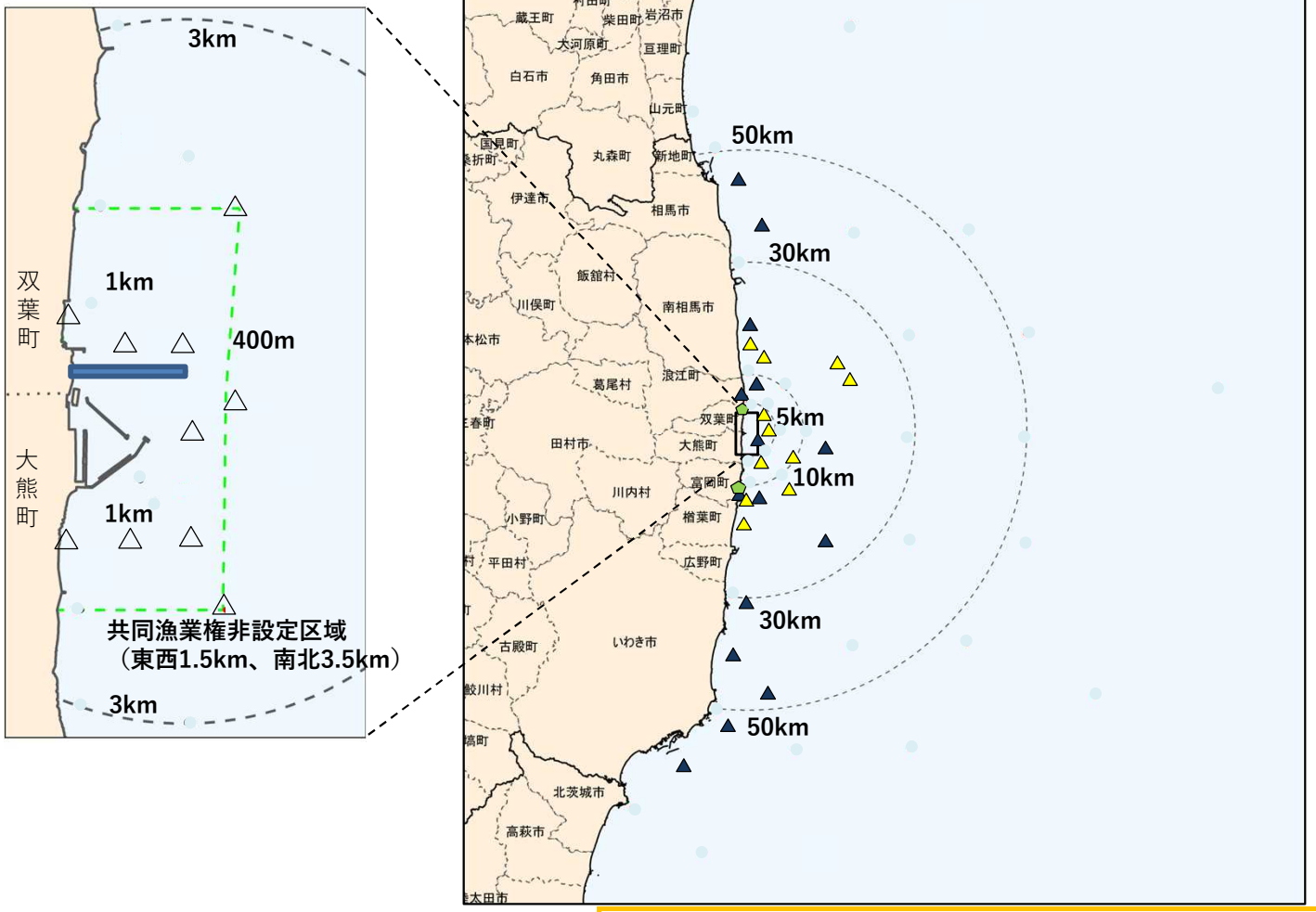
・Precise analysis every month at ■

・Rapid analysis at

(Discharge) Every week at ■

(Suspension)1 time a month at ■

Monitoring of Tokyo Electric Power Company



【Seawater】

Tritium

・Precise analysis at ▲ △ ▲

Rapid analysis at △

Cs-134 and Cs-137

・Precise analysis at ▲ △ ▲

【Marine Biota】

（Fish）

・FWT and OBT : every month at ▲

・Cs-134 and Cs-137:every month at ▲

（Seaweed）

・FWT and OBT : three times a year at ⬟

・I-129 : three times a year at ⬟

・Cs-134 and Cs-137 : three times a year at ⬟

Backup Slides

Implementation details for the monitoring of sea areas

CRMP Appendix Table 1: Implementation details for the monitoring of sea areas

Samples	Implementation details for the monitoring of sea areas*1	Applicable purposes in the Comprehensive Radiation Monitoring Plan
Seawater	To ascertain concentrations of radioactive cesium in particular and other radioactive materials	(v), (vi)
Sea sediment*2	To ascertain the distribution of radioactive cesium in particular and time–dependence and/or migration of radioactive materials	(v)
Marine biota	To ascertain concentrations of radioactive materials and changes in concentrations of radioactive materials over time	(ii), (iv), (v), (vi)

**1 Cs-134 and Cs-137 will be analyzed, and other radionuclides as required.
*2 The qualitative properties of soil will be ascertained as required.

Monitoring of marine biota

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CRMP Appendix Table 11: Monitoring of marine biota

Applicable sea area	Target	Radionuclide	Detection limit *1 (Bq/kg wet weight)	Frequency of analysis	Implementing entity
Coastal sea area	Fish	Cs-134 Cs-137*2	1×10^{1}	Once per month	TEPCO
		H-3	1×10^{-1} (Tissue Free Water Tritium) 5×10^{-1} (Organically Bound Tritium)	Once per month	
Coastal sea area	Seaweed	Cs-134 Cs-137	2×10^{-1}	Three times per year	TEPCO
		I-129	1×10^{-1}		
		H-3	1×10^{-1} (Tissue Free Water Tritium) 5×10^{-1} (Organically Bound Tritium)		
Coastal sea area Offshore sea area Open sea	Fishery products	Cs-134 Cs-137	1×10^{1}	Once per week*3	Fisheries Agency*4
		H-3*6	3×10^{-1}~1	450 samples per year	
Nearshore sea area Coastal sea area	Aquatic organism *5	Cs-134 Cs-137*2	$1 \times 10^{-3} \sim 1 \times 10^{-2}$	Three times per year	Ministry of the Environment
	Fish	H-3	1×10^{-1} (Tissue Free Water Tritium) 5×10^{-1} (Organically Bound Tritium)	Four times per year	
		C-14	2	Four times per year	
	Seaweed	I-129	1×10^{-1}	Four times per year	

*1 The unit of detection limit for tritium is Bq/L.
*2 Sr-90 will also be measured if necessary (detection limit is 2×10^{-2} Bq/kg (wet weight)).
*3 Depending on the target item and local government, the frequency of monitoring can be set taking the past monitoring results into account.
*4 Fisheries Agency monitors fishery products with a focus on radioactive cesium to ensure food safety and consumer confidence based on the "Concepts of Inspection Planning and the Establishment and Cancellation of Items and Areas to which Restriction of Distribution and/or Consumption of Foods concerned Applies". In addition, monitoring of tritium is conducted in accordance with the Basic Policy and others, taking into consideration the requests of local stakeholders. The results of fishery products monitoring also contribute to the data for sea area monitoring. Hence, fishery products monitoring is included in this plan.
*5 Prey species are included in monitoring so that they can be used to grasp the mechanism of bioaccumulation of radioactive materials through the food chain.
*6 The Frequency of analysis “450 samples per year” includes the samples to be analyzed by the rapid analysis method with a detection limit of about 1 × 101Bq/L.
*…Applicable body part of the target shown in Table 11 will be entrusted to a measurement entity.