

Chapter 2 Results of the Detailed Environmental Survey in FY2016

1. Purpose of the survey

The Detailed Environmental Survey is implemented to provide as required under the Chemical Substances Control Law (Law 117, 1973), the data and details required for risk assessments et al. of chemical substances prioritized for evaluations. This compiled material is intended to allow for nationwide assessments of exposure in the general environment.

2. Target chemicals

In the FY2016 Detailed Environmental Survey, 22 chemicals (groups) that were selected and designated as target chemicals. The combinations of target chemicals and the surveyed media are given below.

No.	Name	The Chemical Substances Control Law		The PRTR Law		Surveyed media			
		Before the revision	After the revision	Before the revision	After the revision	Surface water	Sedi-ment	Wild life	Air
[1]	Aniline	II Monitored	Priority Assessment Chemical Substances	I 15	I 18	○			
[2]	Benzyl benzoate		Priority Assessment Chemical Substances			○	○	○	
[3]	Ethylamine		Priority Assessment Chemical Substances			○			
[4]	Ethylbenzene	II Monitored	Priority Assessment Chemical Substances	I 40	I 53	○		○	
[5]	Ethylene oxide	II Monitored	Priority Assessment Chemical Substances	I 42	I 56	○			
[6]	Ethylene glycol		Priority Assessment Chemical Substances			○			
[7]	Xylenes		Priority Assessment Chemical Substances	I 63	I 80				
	[7-1] <i>o</i> -Xylene					○		○	
	[7-2] <i>m</i> -Xylene					○		○	
	[7-3] <i>p</i> -Xylene					○		○	
[8]	Chloromethane (synonym: Methyl chloride)	II Monitored	Priority Assessment Chemical Substances	I 96	I 128	○			
[9]	4,4'-Diamino-3,3'-dichlorodiphenylmethane (synonym: 4,4'-Methylenebis(2-chloroaniline) or 3,3'-Dichloro-4,4'-diamino diphenylmethane)	II Monitored III Monitored		I 120	I 160	○		○	
[10]	Dichlorobenzenes				I 181				
	[10-1] <i>o</i> -Dichlorobenzene	II Monitored III Monitored	Priority Assessment Chemical Substances	I 139		○	○	○	○
	[10-2] <i>m</i> -Dichlorobenzene	III Monitored				○	○	○	○
	[10-3] <i>p</i> -Dichlorobenzene	II Monitored III Monitored	Priority Assessment Chemical Substances	I 140		○	○	○	○

No.	Name	The Chemical Substances Control Law		The PRTR Law		Surveyed media			
		Before the revision	After the revision	Before the revision	After the revision	Surface water	Sedi-ment	Wild life	Air
[11]	<i>N,N</i> -Dimethylpropane-1,3-diylidiamine		Priority Assessment Chemical Substances			○			
[12]	Terephthalic acid	II Monitored	Priority Assessment Chemical Substances	I 205	I 270	○			
[13]	Triethanolamine		Priority Assessment Chemical Substances			○			
[14]	(<i>E</i>)-4-(2,6,6-Trimethylcyclohex-1-en-1-yl)-but-3-en-2-one (synonym: Ionone)		Priority Assessment Chemical Substances			○			
[15]	1,2,4-Trimethylbenzene	III Monitored	Priority Assessment Chemical Substances		I 296		○	○	
[16]	Carbon disulfide	II Monitored	Priority Assessment Chemical Substances	I 241	I 318	○		○	
[17]	(<i>Z</i>)- <i>N,N</i> -Bis(2-hydroxyethyl)oleamide	III Monitored	Priority Assessment Chemical Substances			○			
[18]	Propane-1,2-diol		Priority Assessment Chemical Substances			○			
[19]	Bromomethane (synonym: Methyl bromide)	II Monitored III Monitored	Priority Assessment Chemical Substances	I 288	I 386	○			
[20]	Formaldehyde	II Monitored	Priority Assessment Chemical Substances	I 310	I 411	○			
[21]	<i>N</i> -Methyldidecylamine		*			○			
[22]	Methylenebis(4,1-phenylene) diisocyanate	II Monitored	Priority Assessment Chemical Substances	II 78	I 448				○

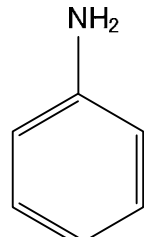
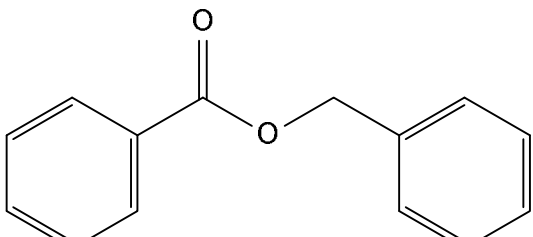
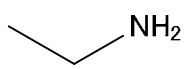
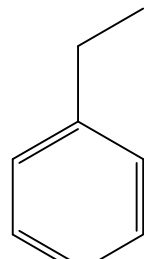

(Note 1) “The PRTR Law” hereafter means “Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (Law No. 86 of 1999).”

(Note 2) Pre-Revision “Areas as designated under the Chemical Substances Control Law” refer to those areas designated prior to the 20 May 2009 revision of the law (which went into effect on 1 April 2011), while “Post Revision Areas” refer to the areas defined as designated post-20 May 2009.

(Note 3) “Before the revision” in “The PRTR Law” means “appointments before the revision of government ordinance on November 21, 2008” and “After the revision” in “The PRTR Law” means “appointments after that revision”.

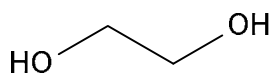
(Note 4) *: Designation of Priority Assessment Chemical Substances was rescinded on 30th March 2017.

Chemical and physical properties of target chemicals of the Detailed Environmental Survey are as follows.

<p>[1] Aniline</p> 	<p>Molecular formula: C₆H₇N CAS: 62-53-3 ENCS: 3-105 MW: 93.13 mp: -6.0°C¹⁾ bp: 184.1°C¹⁾ sw: 35.0g/kg (25°C)¹⁾ Specific gravit: 1.0217g/cm³ (20°C)¹⁾ logPow: 0.90¹⁾</p>
<p>[2] Benzyl benzoate</p> 	<p>Molecular formula: C₁₄H₁₂O₂ CAS: 120-51-4 ENCS: 3-1389 MW: 212.24 mp: 19°C¹⁾ bp: 321.3°C¹⁾ sw: Insoluble¹⁾ Specific gravit: 1.1121g/cm³ (25°C)¹⁾ logPow: 3.97¹⁾</p>
<p>[3] Ethylamine</p> 	<p>Molecular formula: C₂H₇N CAS: 75-04-7 ENCS: 2-130 MW: 45.08 mp: -81°C¹⁾ bp: 16.6°C¹⁾ sw: Miscible¹⁾ Specific gravit: 0.689 g/cm³ (15°C)¹⁾ logPow: -0.13¹⁾</p>
<p>[4] Ethylbenzene</p> 	<p>Molecular formula: C₈H₁₀ CAS: 100-41-4 ENCS: 3-28, 3-60 MW: 106.17 mp: -94.95°C¹⁾ bp: 136.2°C¹⁾ sw: 0.161g/kg (25°C)¹⁾ Specific gravit: 0.8626g/cm³ (25°C)¹⁾ logPow: 3.15¹⁾</p>
<p>[5] Ethylene oxide</p> 	<p>Molecular formula: C₂H₄O CAS: 75-21-8 ENCS: 2-218 MW: 44.05 mp: -112.46°C¹⁾ bp: 10.4°C¹⁾ sw: Soluble¹⁾ Specific gravit: 0.8821g/cm³ (10°C)¹⁾ logPow: -0.30¹⁾</p>

(Abbreviations) CAS CAS registry number, ENCS registry number in the Existing and New Chemical Substances List, MW molecular weight, mp melting point, bp boiling point, SW solubility in water, Specific gravities Specific gravity(no unit) or density, logPow *n*-octanol-water partition coefficient, kPa kilopascal (1 atom approximately equal to 101.3kPa).

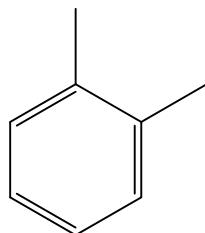
[6] Ethylene glycol



Molecular formula: C₂H₆O₂
CAS: 107-21-1
ENCS: 2-230
MW: 62.07
mp: -13°C¹⁾
bp: 197.5°C¹⁾
sw: Miscible¹⁾
Specific gravit: 1.1135g/cm³ (20°C)¹⁾
logPow: -1.36²⁾

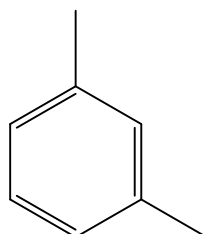
[7] Xylenes

[7-1] *o*-Xylene



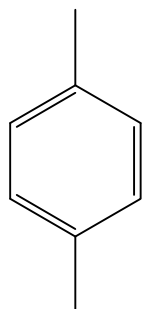
Molecular formula: C₈H₁₀
CAS: 95-47-6
ENCS: 3-3, 3-60
MW: 106.17
mp: -25.16°C¹⁾
bp: 144.4°C¹⁾
sw: 0.171 g/kg (25°C)¹⁾
Specific gravit: 0.8755g/cm³ (25°C)¹⁾
logPow: 3.12¹⁾

[7-2] *m*-Xylene



Molecular formula: C₈H₁₀
CAS: 108-38-3
ENCS: 3-3, 3-60
MW: 106.17
mp: -47.85°C¹⁾
bp: 139.1°C¹⁾
sw: 0.161 g/kg (25°C)¹⁾
Specific gravit: 0.8598g/cm³ (25°C)¹⁾
logPow: 3.20¹⁾

[7-3] *p*-Xylene



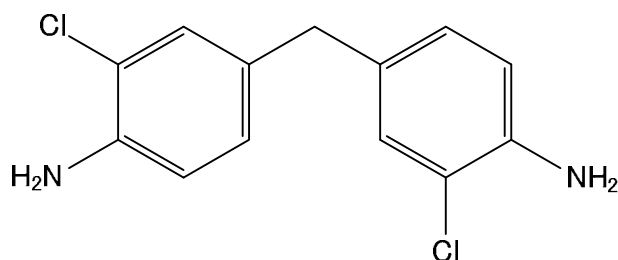
Molecular formula: C₈H₁₀
CAS: 106-42-3
ENCS: 3-3, 3-60
MW: 106.17
mp: 13.3°C¹⁾
bp: 138.3°C¹⁾
sw: 0.181g/kg (25°C)¹⁾
Specific gravit: 0.8565g/cm³ (25°C)¹⁾
logPow: 3.15¹⁾

[8] Chloromethane (synonym: Methyl chloride)



Molecular formula: CH₃Cl
CAS: 74-87-3
ENCS: 2-35
MW: 50.49
mp: -97.6°C¹⁾
bp: -24.1°C¹⁾
sw: 5.35g/kg (25°C)¹⁾
Specific gravit: 0.911g/cm³ (25°C, 1atm)¹⁾
logPow: 0.91¹⁾

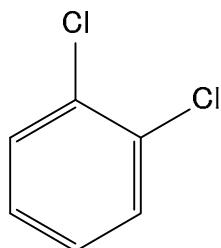
[9] 4,4'-Diamino-3,3'-dichlorodiphenylmethane (synonym: 4,4'-Methylenebis(2-chloroaniline) or 3,3'-Dichloro-4,4'-diamino diphenylmethane)



Molecular formula: $C_{13}H_{12}Cl_2N_2$
 CAS: 101-14-4
 ENCS: 4-95, 4-96, 4-275
 MW: 267.15
 mp: $110^{\circ}C$ ²⁾
 bp: $378.9^{\circ}C$ ³⁾
 sw: $0.0139g/L$ ($24^{\circ}C$)³⁾
 Specific gravit: 1.44 ⁴⁾
 logPow: 3.91 ³⁾

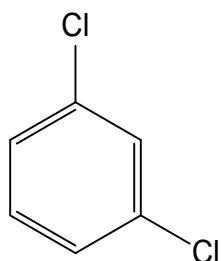
[10] Dichlorobenzenes

[10-1] *o*-Dichlorobenzene



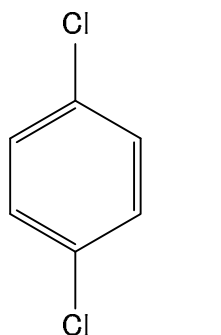
Molecular formula: $C_6H_4Cl_2$
 CAS: 95-50-1
 ENCS: 3-41
 MW: 147.00
 mp: $-17.0^{\circ}C$ ¹⁾
 bp: $180.2^{\circ}C$ ¹⁾
 sw: $0.15g/kg$ ($25^{\circ}C$)¹⁾
 Specific gravit: $1.3059g/cm^3$ ($20^{\circ}C$)¹⁾
 logPow: 3.38 ¹⁾

[10-2] *m*-Dichlorobenzene



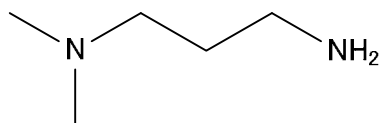
Molecular formula: $C_6H_4Cl_2$
 CAS: 541-73-1
 ENCS: 3-41
 MW: 147.00
 mp: $-24.8^{\circ}C$ ¹⁾
 bp: $172^{\circ}C$ ¹⁾
 sw: $0.120g/kg$ ($25^{\circ}C$)¹⁾
 Specific gravit: $1.2884g/cm^3$ ($20^{\circ}C$)¹⁾
 logPow: 3.48 ¹⁾

[10-3] *p*-Dichlorobenzene



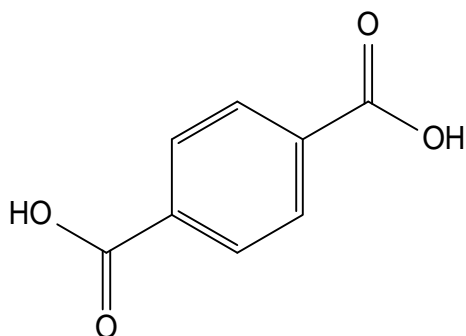
Molecular formula: $C_6H_4Cl_2$
 CAS: 106-46-7
 ENCS: 3-41
 MW: 147.00
 mp: $53.1^{\circ}C$ ¹⁾
 bp: $173.9^{\circ}C$ ¹⁾
 sw: $0.080g/kg$ ($25^{\circ}C$)¹⁾
 Specific gravit: $1.2475g/cm^3$ ($55^{\circ}C$)¹⁾
 logPow: 3.38 ¹⁾

[11] *N,N*-Dimethylpropane-1,3-diyldiamine



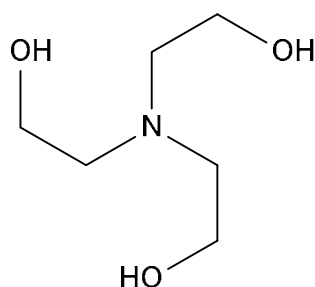
Molecular formula: $C_5H_{14}N_2$
 CAS: 109-55-7
 ENCS: 2-158
 MW: 102.18
 mp: $60^{\circ}C$ ³⁾
 bp: $129^{\circ}C$ ¹⁾
 sw: Soluble⁴⁾
 Specific gravit: 0.8272 ($20^{\circ}C$)¹⁾
 logPow: -0.352 ⁵⁾

[12] Terephthalic acid



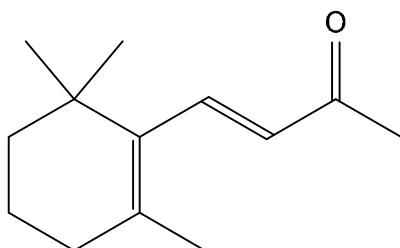
Molecular formula: C₈H₆O₄
 CAS: 100-21-0
 ENCS: 3-1334
 MW: 166.13
 mp: Above 300°C, 402°C, 425°C⁵⁾
 bp: 300°C (Sublimation)¹⁾
 sw: 0.065g/kg (25°C)¹⁾
 Specific gravit: 1.519g/cm³ (25°C)¹⁾
 logPow: 2.00³⁾

[13] Triethanolamine



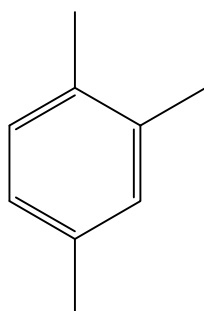
Molecular formula: C₆H₁₅NO₃
 CAS: 102-71-6
 ENCS: 2-308
 MW: 149.19
 mp: 21.5°C¹⁾
 bp: 350°C¹⁾
 sw: Miscible¹⁾
 Specific gravit: 1.1242g/cm³ (20°C)¹⁾
 logPow: -1.00³⁾

[14] (*E*)-4-(2,6,6-Trimethylcyclohex-1-en-1-yl)-but-3-en-2-one (synonym: Ionone)



Molecular formula: C₁₃H₂₀O
 CAS: 79-77-6
 ENCS: 3-2387
 MW: 192.30
 mp: -35°C⁵⁾
 bp: 267°C⁵⁾
 sw: 0.17g/kg (25°C)¹⁾
 Specific gravit: 0.945g/cm³ (20°C)¹⁾
 logPow: 4.0⁵⁾

[15] 1,2,4-Trimethylbenzene



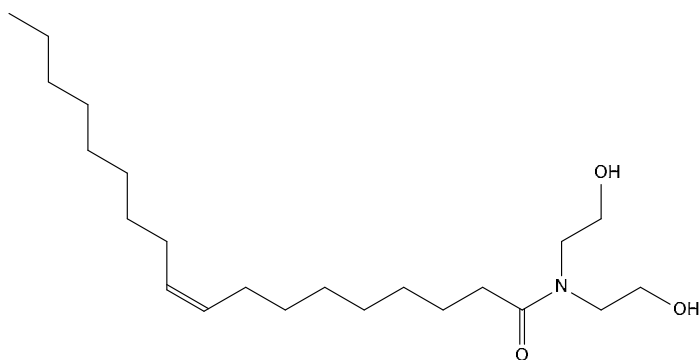
Molecular formula: C₉H₁₂
 CAS: 95-63-6
 ENCS: 3-7, 3-3427
 MW: 120.19
 mp: -43.8°C¹⁾
 bp: 169.4°C¹⁾
 sw: 0.057g/kg (25°C)¹⁾
 Specific gravit: 0.8758g/cm³ (20°C)¹⁾
 logPow: 3.63¹⁾

[16] Carbon disulfide
 Carbon disulfide

SCS

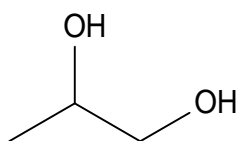
Molecular formula: CS₂
 CAS: 75-15-0
 ENCS: 1-172
 MW: 76.14
 mp: -111.7°C¹⁾
 bp: 46.2°C¹⁾
 sw: 2.10g/kg (20°C)¹⁾
 Specific gravit: 1.2632g/cm³ (20°C)¹⁾
 logPow: 1.94³⁾

[17] (Z)-N,N-Bis(2-hydroxyethyl)oleamide



Molecular formula: C₂₂H₄₃NO₃
CAS: 93-83-4
ENCS: 2-814, 2-827, 2-2503, 7-87,
8-311
MW: 369.58
mp: Uncertain
bp: Uncertain
sw: Uncertain
Specific gravit: Uncertain
logPow: Uncertain

[18] Propane-1,2-diol



Molecular formula: C₃H₈O₂
CAS: 57-55-6
ENCS: 2-234
MW: 76.09
mp: -60°C¹⁾
bp: 187.3°C¹⁾
sw: Miscible¹⁾
Specific gravit: 1.0361g/cm³ (20°C)¹⁾
logPow: -0.92³⁾

[19] Bromomethane (synonym: Methyl bromide)



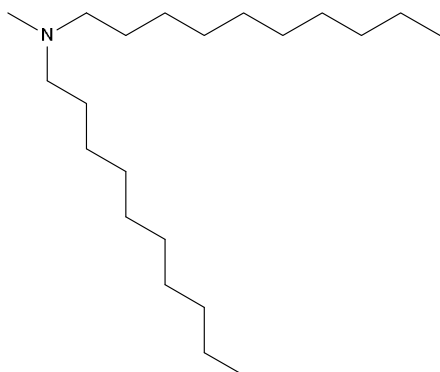
Molecular formula: CH₃Br
CAS: 74-83-9
ENCS: 2-39
MW: 94.94
mp: -93.7°C¹⁾
bp: 3.4°C¹⁾
sw: 18.3g/kg (20°C)¹⁾
Specific gravit: 1.6755g/cm³ (20°C)¹⁾
logPow: 1.19¹⁾

[20] Formaldehyde



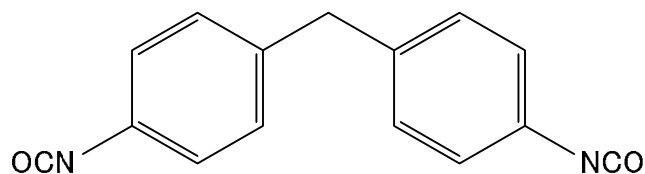
Molecular formula: CH₂O
CAS: 50-00-0
ENCS: 2-482
MW: 30.03
mp: -92°C¹⁾
bp: -19.1°C¹⁾
sw: 400g/L (20°C)³⁾
Specific gravit: 0.815g/cm³ (-20°C)¹⁾
logPow: 0.35¹⁾

[21] N-Methyldidecylamine



Molecular formula: C₂₁H₄₅N
CAS: 7396-58-9
ENCS: 2-176
MW: 311.59
mp: Uncertain
bp: Uncertain
sw: Uncertain
Specific gravit: Uncertain
logPow: Uncertain

[22] Methylenebis(4,1-phenylene) diisocyanate



Molecular formula: $C_{15}H_{10}N_2O_2$
CAS: 101-68-8
ENCs: 4-118
MW: 250.25
mp: 40.41°C ¹⁾
bp: 196°C (5mmHg) ¹⁾
sw: Uncertain
Specific gravit: 1.197g/cm³ (70°C) ¹⁾
logPow: Uncertain

References

- 1) Rumble, J.R. (ed), CRC Handbook of Chemistry and Physics 98th Edition (2017), The Royal society of Chemistry.
- 2) O'Neil, M.J. (ed), The Merck Index 15th Edition (2013), CRC Press.
- 3) U.S. EPA, Estimation Programs Interface (EPI) Suite v4.1 (<http://www.epa.gov/oppt/exposure/pubs/episuitd1.htm>)
- 4) U.S. National Library of Medicine, Hazardous Substances Data Bank (HSDB) (<https://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB>)
- 5) OECD, Screening Information Dataset (SIDS) for High Product in Volume Chemicals (Processed by UNEP Chemicals) (<http://www.inchem.org/pages/sids.html>)

3. Surveyed site and procedure

In the Detailed Environmental Survey, the sampling and analysis of specimens was entrusted to prefectural governments and government-designated cities across Japan, and some specimens were sampled and analysed by private analytical laboratories.

(1) Organisations responsible for sampling

Local communities	Organisations responsible for sampling* ¹	Surveyed media			
		Surface water	Sediment	Wildlife	Air
Hokkaido	Environmental Promotion Section, Environment Division, Department of Environment and Lifestyle, Hokkaido Prefectural Government and Hokkaido Research Organization Environmental and Geological Research Department Institute of Environmental Sciences	○			○
Sapporo City	Sapporo City Institute of Public Health	○			
Iwate Pref.	Research Institute for Environmental Sciences and Public Health of Iwate Prefecture	○	○	○	
Miyagi Pref.	Miyagi Prefectural Institute of Public Health and Environment	○			
Sendai City	Sendai City Institute of Public Health	○	○		
Akita Pref.	Akita Research Center for Public Health and Environment	○	○	○	
Yamagata Pref.	Yamagata Institute of Environmental Sciences	○	○		
Ibaraki Pref.	Ibaraki Kasumigaura Environmental Science Center	○			○
Tochigi Pref.	Tochigi Prefectural Institute of Public Health and Environmental Science	○			
Gunma Pref.	Gunma Prefectural Institute of Public Health and Environmental Sciences	○			
Saitama Pref.	Center for Environmental Science in Saitama	○			○
Saitama City	Saitama City Institute of Health Science and Research	○			
Chiba Pref.	Chiba Prefectural Environmental Research Center	○	○		○
Tokyo Met.	Environmental Improvement Division, Bureau of Environment, Tokyo Metropolitan Government and Tokyo Metropolitan Research Institute for Environmental Protection	○	○	○	
Kanagawa Pref.	Kanagawa Environmental Research Center				○
Yokohama City	Yokohama Environmental Science Research Institute	○	○	○	○
Kawasaki City	Kawasaki Environment Research Institute	○	○	○	
Niigata Pref.	Niigata Prefectural Institute of Public Health and Environmental Sciences	○	○	○	
Toyama Pref.	Toyama Prefectural Environmental Science Research Center	○	○		
Ishikawa Pref.	Ishikawa Prefectural Institute of Public Health and Environmental Science	○	○		
Fukui Pref.	Fukui Prefectural Institute of Public Health and Environmental Science	○			
Nagano Pref.	Nagano Environmental Conservation Research Institute	○	○		○
Shizuoka Pref.	Shizuoka Institute of Environment and Hygiene	○	○		
Aichi Pref.	Aichi Environmental Research Center	○	○		
Nagoya City	Nagoya City Environmental Science Research Center	○	○	○	○
Mie Pref.	Mie Prefecture Health and Environment Research Institute	○	○		○
Shiga Pref.	Lake Biwa Environmental Research Institute	○	○		
Kyoto Pref.	Kyoto Prefectural Institute of Public Health and Environment	○			○
Kyoto City	Kyoto City Institute of Health and Environmental Sciences	○	○		
Osaka Pref.	Environment Preservation Division, Environment Management Office, Department of Environment, Agriculture, Forestry and Fisheries, Osaka Prefectural Government and Research Institute of Environment, Agriculture and Fisheries, Osaka Prefecture	○	○	○	○* ²
Osaka City	Osaka City Institute of Public Health and Environmental Sciences	○	○		
Hyogo Pref.	Water and Air Quality Control Division, Environmental Management Bureau, Agricultural and Environmental Affairs Department, Hyogo Prefectural Government and Hyogo Prefectural Institute of Environmental Sciences, Hyogo Environmental Advancement Association	○	○	○	○
Kobe City	Natural Environmental Symbiotic Division, Environmental Preservation Branch, Environment Bureau, Kobe City and Kobe Institute of Health, Welfare Bureau, Health Division, Health	○	○		
Wakayama Pref.	Wakayama Prefectural Research Center of Environment and Public Health	○			
Okayama Pref.	Okayama Prefectural Institute for Environmental Science and Public Health	○	○	○	
Yamaguchi Pref.	Yamaguchi Prefectural Institute of Public Health and Environment	○	○	○	○
Tokushima Pref.	Tokushima Prefectural Public Health, Pharmaceutical and Environmental Sciences Center	○			
Kagawa Pref.	Kagawa Prefectural Research Institute for Environmental Sciences and Public Health	○	○		○
Ehime Pref.	Ehime Prefectural Institute of Public Health and Environmental Science	○			
Fukuoka Pref.	Fukuoka Institute of Health and Environmental Sciences	○			

Local communities	Organisations responsible for sampling*1	Surveyed media			
		Surface water	Sediment	Wildlife	Air
Kitakyushu City	Kitakyushu City Institute of Environmental Sciences	○			
Fukuoka City	Fukuoka City Institute for Hygiene and the Environment	○	○		
Saga Pref.	Saga Prefectural Environmental Research Center	○			
Oita Pref.	Oita Prefectural Institute of Health and Environment, Life and Environment Department		○	○	

(Note 1) *1: Organisations responsible for sampling are described by their official names in FY 2016.

(Note 2) *2: That organization cooperated with a private analytical laboratory in sampling specimens

(2) Surveyed sites and target chemicals

The numbers of target chemicals (groups) and the numbers of surveyed sites, etc. by surveyed medium in the detailed environmental survey were as shown in the following table.

The target chemicals and the national distribution map of the survey sites for each medium are shown in Table 2-1-1 and Figures 2-1-1 for surface water, Table 2-1-2 and Fig.2-1-1 for sediment, Table 2-1-3 and Fig.2-1-2 for wildlife and Table 2-1-4 and Fig.2-1-3 for the air.

In addition, about 20 sites were selected as survey sites per target chemical. To obtain data for areas to be expected to high concentrations in the general environment survey sites are selected based on information regarding releases and emissions. Among the sites considering to rank in the top of PRTR emissions, it was included the surrounding sites where samples can be taken in the survey sites.

Surveyed media	Numbers of local communities	Numbers of target chemicals	Numbers of surveyed sites	Numbers of samples at a surveyed site
Surface water	42	20	78	1
Sediment	27	3	31	3
Wildlife	12	7	14	3
Air	14*	2	18	3
All media	44	22	113	

(Note) *:For 1 of the 14 organizations, it was cooperated with a private analytical laboratory in sampling specimens.

(3) Detection limit

The detection limits of analysed values reported by the analytical laboratory are not necessarily the same because of differences in the properties of specimens and in the available measurement equipment. To enable summarisation, therefore, a unified detection limit is predetermined and the analytical values reported by the analytical laboratory are summarised by the following procedure.

Treatment of measured value as an undetected value in high-sensitivity analysis

In the case of high-sensitivity analysis, in which the detection limit of the analytical laboratory is lower than the unified detection limit, any measured value lower than the unified detection limit is treated as an undetected value in the nationwide summary (see schematic (A)).

Elimination of undetected values in low-sensitivity analysis from summary subject

When the detection limit of the analytical laboratory is higher than the unified detection limit, any target chemical not detected is eliminated from the subject of the summary (see schematic (B)).

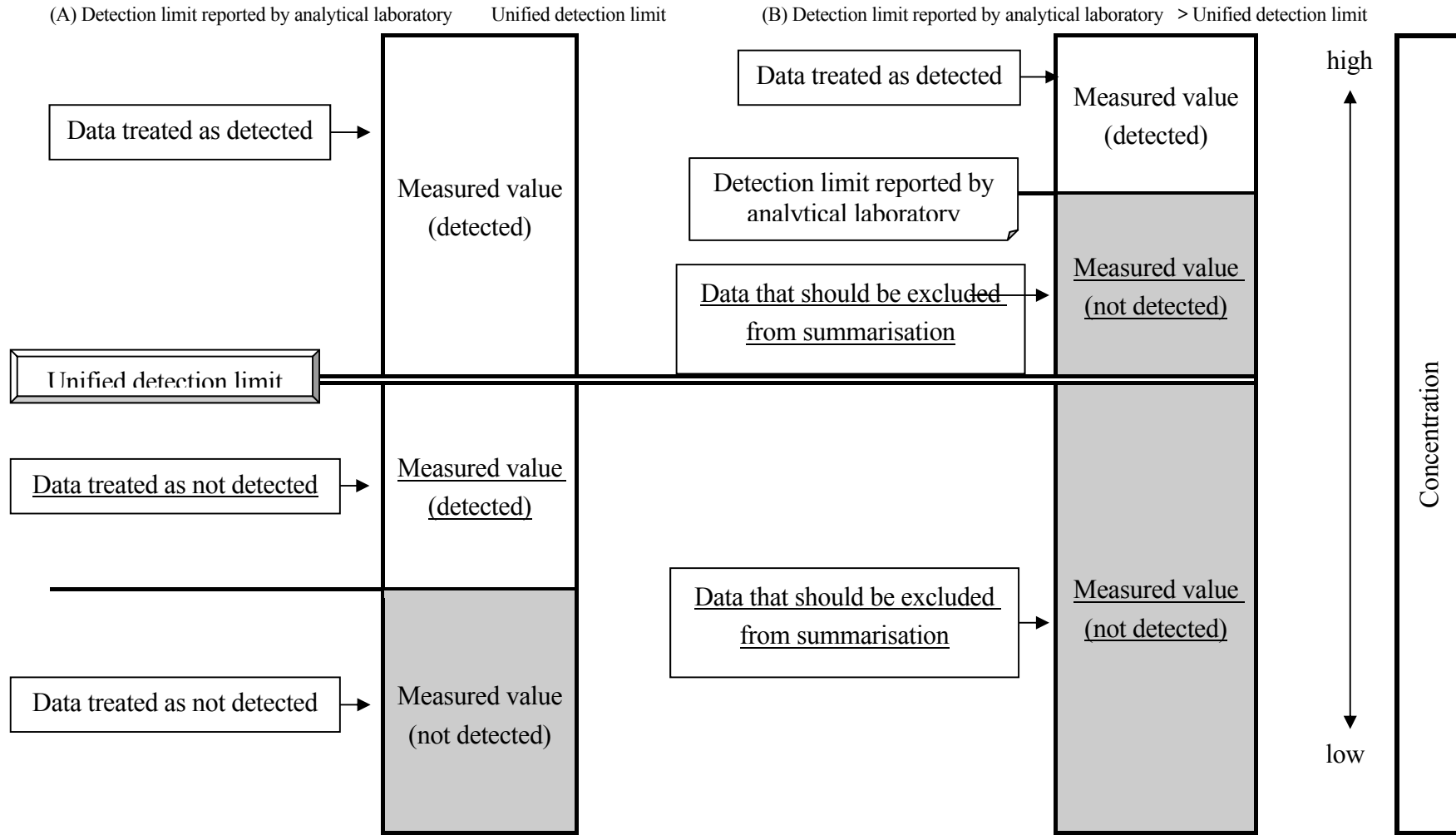
When the instrument detection limit (IDL) and the method detection limit (MDL) are given in the analytical method, which is described in reports on the investigation of the development of analytical methods for chemicals and adopted in the Initial Environmental Survey (hereafter, the Initial Environmental Survey Analytical Method), if the IDL measured by the analytical laboratory is lower than the given IDL, the MDL of the Initial Environmental Survey Analytical Method is used as the detection limit by the analytical laboratory.

When IDL and MDL are not given in the Initial Environmental Survey Analytical Method, the detection limit is predetermined by the following procedure.

When the analytical laboratory calculates the appropriate IDL and MDL following the calculation method stated in the analytical method development instruction manuals, this calculated MDL is used as the detection limit by the analytical laboratory.

When the appropriate IDL and MDL are not calculated by the analytical laboratory, one of the following procedures was employed to establish the detection limit by the analytical laboratory.

- deduction from the IDL and MDL calculated for the corresponding chemical by Initial Environmental Survey Analytical Method or other analytical laboratories
- deduction from the lowest calibration curve concentration and the results of recovery tests
- deduction from the results of addition and collection tests, the results of operation blank tests, and the signal/noise ratio (S/N ratio) obtained from the chromatogram of environmental specimens



Schematic of procedure for data summarisation

Table 2-1-1 List of surveyed sites (surface water) and target chemicals in the Detailed Environmental Survey in FY2016

Local communities	Surveyed sites	Target chemicals																			
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[16]	[17]	[18]	[19]	[20]	[21]
Hokkaido	Bifuka Bridge, Riv. Teshio (Bifuka Town)																				○
	Suzuran-ohashi Bridge, Riv. Tokachi (Obihiro City)																				○
	Hiroo Bridge, Riv. Hiroo (Hiroo Town)				○			○													
	Ishikarikakokyo Bridge, Mouth of Riv. Ishikari (Ishikari City)			○		○	○						○	○	○	○					○
	Minato Bridge, Riv. Tomakomai-horonai (Tomakomai City)				○			○													
Sapporo City	Nakanuma of Riv. Toyohira (Sapporo City)																				○
	Daiichishinkawa-bashi Bridge, Riv. Shin (Sapporo City)																				○
Iwate Pref.	Riv. Toyosawa (Hanamaki City)		○	○		○	○						○	○	○			○	○		○
Miyagi Pref.	Futatsuya-bashi Bridge, Riv. Hasama (Tome City)	○		○	○			○	○		○					○			○	○	
	Sakura-hodoukyou Bridge, Riv. Shiroishi (Shibata Town)	○		○	○			○	○		○					○			○	○	
Sendai City	Hirose-ohashi Bridge, Riv. Hirose (Sendai City)		○																		
Akita Pref.	Akita Canal (Akita City)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Yamagata Pref.	Lower Riv. Murayamano (Higashine City)				○			○													
	Mouth of Riv. Mogami (Sakata City)			○		○	○						○	○	○						○
Ibaraki Pref.	Tonekamome-ohashi Bridge, Mouth of Riv. Tone (Kamisu City)					○	○		○	○						○		○	○	○	
Tochigi Pref.	Riv. Tagawa (Utsunomiya City)	○							○	○										○	
Gunma Pref.	Iwata Bridge, Riv. Tsuruikuta (Itakura Town)	○			○	○		○													
	Ainokawa Bridge, Riv. Yata (Itakura Town)	○			○	○		○													
Saitama Pref.	Hinsen Bridge, Riv. Motokoyama (Honjo City)																				○
	Upstream of the junction with Riv. Ayase, Riv. Furuayase (Soka City)				○			○													
	Akigaseshusui of Riv. Arakawa (Shiki City)	○											○			○					
Saitama City	Nakadote-hashii Bridge, Riv. Kamo (Saitama City)	○			○			○										○			
Chiba Pref.	Asai-bashi Bridge, Riv. Yourou (Ichihara City)			○									○				○				○
Tokyo Met.	Mouth of Riv. Arakawa (Koto Ward)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Mouth of Riv. Sumida (Minato Ward)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Yokohama City	Kamenoko-bashi Bridge, Riv. Tsurumi (Yokohama City)	○	○	○	○			○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Yokohama Port	○	○	○	○			○	○	○	○	○	○	○	○	○	○	○	○	○	○
Kawasaki City	Mouth of Riv. Tama (Kawasaki City)		○		○			○	○		○	○								○	
	Keihin Canal, Port of Kawasaki (front of Chidoricho)*	○			○			○				○									
	Keihin Canal, Port of Kawasaki (front of Ogimachi)*	○			○			○	○		○									○	
Niigata Pref.	Lower Riv. Shinano (Niigata City)				○	○		○					○								
	Yataro Bridge, Riv. Shibue (Myoko City)				○																
	Offshore of Nishikubiki (front of Teraji)																○				

Local communities	Surveyed sites	Target chemicals																			
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[16]	[17]	[18]	[19]	[20]	[21]
Toyama Pref.	Minato Bridge, Riv. Kamo (Uozu City)				○			○													
	Hagiura-kobashi Bridge, Toyama Canal (Toyama City)					○	○														
	Hagiura-bashi Bridge, Mouth of Riv. Jintsu (Toyama City)	○			○			○													
Ishikawa Pref.	Mouth of Riv. Sai (Kanazawa City)	○	○			○				○		○			○			○		○	
Fukui Pref.	Nakatuno Bridge, Riv. Kuzuryu (Fukui City)																				○
	Takami-bashi Bridge, Riv. Yoshinoze (Sabae City)																				○
Nagano Pref.	Tategahana bashi Bridge, Riv. Shinano (Nagano City)																				○
	Lake Suwa (center)		○	○		○	○				○	○	○	○	○	○					○
Shizuoka Pref.	Shimizu Port	○																			
	Riv. Tenryu (Iwata City)									○											
Aichi Pref.	Shinsakai-bashi Bridge, Riv. Sakai (Kariya City, Toyoake City)				○			○													
	Nagoya Port, West of Shiomi Wharf*		○	○	○		○	○	○		○		○	○	○	○	○	○	○	○	○
Nagoya City	Minatoshinbashi Bridge, Riv. Hori (Nagoya City)	○			○			○											○	○	○
	Nagoya Port, East of Shiomi Wharf				○			○	○			○							○	○	
Mie Pref.	Yokkaichi Port	○			○			○		○	○	○	○	○	○	○		○		○	○
	Toba Port				○			○													
Shiga Pref.	Lake Biwa (center, offshore of Minamihira)		○							○	○							○			
	Lake Biwa (center, offshore of Karasaki)		○							○	○							○			
Kyoto Pref.	Miyazu Port	○								○											
	Gokou Bridge, Riv. Kizu (Yawata City)				○			○													
Kyoto City	Miyamae-bashi Bridge, Riv. Katsura (Kyoto City)	○									○										
Osaka Pref.	Mouth of Riv. Yamato (Sakai City)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Osaka City	Kema-bashi Bridge, Riv. Oh-kawa (Osaka City)	○			○								○					○		○	
	Osaka Port	○	○	○	○		○	○	○		○	○	○	○	○	○	○	○	○	○	○
Hyogo Pref.	Offshore of Himeji								○	○	○									○	
	Aboshi Port				○	○															
	Oji Bridge, Riv. Ibo (Himeji City, Tatsuno City)	○																			
Kobe City	Kobe Port(center)			○							○										
Wakayama Pref.	Kinokawa-ohashi Bridge, Mouth of Riv. Kinokawa (Wakayama City)				○	○				○		○	○	○		○		○			○
	Tsukiji Bridge, Riv. Tsukiji (Wakayama City)																		○		
	Wakayama-Shimotsu Port (Honko Area)																	○			
Okayama Pref.	Miya Bridge, Riv. Kongo (Wake Town)									○											
	Mouth of Mizushima Port				○			○													
	Offshore of Mizushima		○	○						○	○		○				○				
Yamaguchi Pref.	広島湾西部和木沖				○			○													
	Tokuyama Bay		○				○		○		○	○	○	○	○		○	○	○	○	○
	Offshore of Hagi		○																		
Tokushima Pref.	Kagasuno Bridge, Riv. Imagire (Tokushima City, Matsushige Town)																○				
Kagawa Pref.	Takamatsu Port	○	○	○		○		○	○		○	○	○	○		○	○	○	○	○	○
Ehime Pref.	Sawazu Fishing Port	○																			

Local communities	Surveyed sites	Target chemicals																			
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[16]	[17]	[18]	[19]	[20]	[21]
Fukuoka Pref.	Kabura-bashi Bridge, Riv. Raizan (Maebaru Itoshima City)					○											○				
	Offshore of Omuta																○				
Kitakyushu City	Dokai Bay	○																			
Fukuoka City	Hakata Bay		○	○			○		○	○	○	○	○	○	○			○	○	○	○
Saga Pref.	Imari Bay				○			○													
Oita Pref.	Mouth of Riv. Oita (Oita City)			○		○	○		○			○	○	○	○	○	○	○	○	○	○

[1] Aniline, [2] Benzyl benzoate, [3] Ethylamine, [4] Ethylbenzene, [5] Ethylene oxide, [6] Ethylene glycol, [7] Xylenes, [8] Chloromethane (synonym: Methyl chloride), [9] 4,4'-Diamino-3,3'-dichlorodiphenylmethane (synonym: 4,4'-Methylenebis(2-chloroaniline) or 3,3'-Dichloro-4,4'-diamino diphenylmethane), [10] Dichlorobenzenes, [11] *N,N*-Dimethylpropane-1,3-diyldiamine, [12] Terephthalic acid, [13] Triethanolamine, [14] (*E*)-4-(2,6,6-Trimethylcyclohex-1-en-1-yl)-but-3-en-2-one (synonym: Ionone), [16] Carbon disulfide, [17] (*Z*)-*N,N*-Bis(2-hydroxyethyl)oleamide, [18] Propane-1,2-diol, Bromomethane (synonym: Methyl bromide), [20] Formaldehyde, [21] *N*-Methyldidecylamine

(Note) *: “Keihin Canal, Port of Kawasaki (front of Ogimachi)” of Detailed Environmental Survey and “Keihin Canal, Port of Kawasaki” of Environmental Monitoring are the same point each.

Table 2-1-2 List of surveyed sites (sediment) and target chemicals in the Detailed Environmental Survey in FY2016

Local communities	Surveyed sites	Target chemicals		
		[2]	[10]	[15]
Iwate Pref.	Riv. Toyosawa (Hanamaki City)	○	○	
Sendai City	Hirose-ohashi Bridge, Riv. Hirose (Sendai City)	○		
Akita Pref.	Akita Canal (Akita City)	○	○	○
Yamagata Pref.	Lower Riv. Murayamano (Higashine City)			○
Chiba Pref.	Coast of Ichihara and Anegasaki			○
Tokyo Met.	Mouth of Riv. Arakawa (Koto Ward)	○	○	○
	Mouth of Riv. Sumida (Minato Ward)	○	○	○
Yokohama City	Yokohama Port	○	○	○
Kawasaki City	Mouth of Riv. Tama (Kawasaki City)	○	○	○
	Keihin Canal, Port of Kawasaki (front of Ogimachi)*		○	○
Niigata Pref.	Lower Riv. Shinano (Niigata City)			○
Toyama Pref.	Hagiura-bashi Bridge, Mouth of Riv. Jintsu (Toyama City)			○
Ishikawa Pref.	Mouth of Riv. Sai (Kanazawa City)	○		
Nagano Pref.	Lake Suwa (center)	○	○	○
Shizuoka Pref.	Shiraha Bridge, Riv. Magome (Hamamatsu city)			○
Aichi Pref.	Nagoya Port, West of Shiomi Wharf*	○	○	○
Nagoya City	Minatoshinbashi Bridge, Riv. Hori (Nagoya City)			○
Mie Pref.	Yokkaichi Port		○	
Shiga Pref.	Lake Biwa (center, offshore of Minamihira)	○	○	
	Lake Biwa (center, offshore of Karasaki)	○	○	
Kyoto City	Miyamae-bashi Bridge, Riv. Katsura (Kyoto City)		○	
Osaka Pref.	Mouth of Riv. Yamato (Sakai City)	○	○	○
Osaka City	Osaka Port	○	○	○
Hyogo Pref.	Offshore of Himeji		○	
Kobe City	Kobe Port(center)		○	
Okayama Pref.	Offshore of Mizushima	○	○	○
Yamaguchi Pref.	Tokuyama Bay	○	○	
	Offshore of Hagi	○		
Kagawa Pref.	Takamatsu Port	○		○
Fukuoka City	Hakata Bay	○	○	○
Oita Pref.	Mouth of Riv. Oita Oita City)	○		○

[2] Benzyl benzoate, [10] Dichlorobenzenes, [15] 1,2,4-Trimethylbenzene

(Note) *: “Keihin Canal, Port of Kawasaki (front of Ogimachi)” of Detailed Environmental Survey and “Keihin Canal, Port of Kawasaki” of Environmental Monitoring are the same point each.



Figure 2-1-1 Surveyed sites (surface water and sediment) in the Detailed Environmental Survey in FY2015

Table 2-1-3 List of surveyed sites (wildlife) and target chemicals in the Detailed Environmental Survey in FY2016

Local communities	Surveyed areas	Wildlife species	Target chemical						
			[2]	[4]	[7]	[9]	[10]	[15]	[16]
Iwate Pref.	Yamada Bay	Blue mussel	○	○	○	○	○	○	○
		Greenling	○	○	○	○	○	○	○
Akita Pref.	Akita Canal	Sea bass	○			○	○	○	
Tokyo Met.	Tokyo Bay	Sea bass	○	○	○	○	○	○	○
Yokohama City	Yokohama Port	Blue mussel	○				○	○	
Kawasaki City	Offshore of Ogishima Island, Port of Kawasaki	Sea bass	○	○	○	○	○	○	○
Niigata Pref.	Lower Riv. Shinano Niigata City)	Carp	○	○	○	○	○	○	○
Nagoya City	Nagoya Port	Striped mullet		○	○			○	
Osaka Pref.	Osaka Bay	Sea bass	○	○	○	○	○	○	○
Hyogo Pref.	Offshore of Himeji	Sea bass	○	○	○	○	○	○	○
Okayama Pref.	Offshore of Mizushima	Striped mullet	○	○	○	○	○	○	○
Yamaguchi Pref.	Tokuyama Bay	Striped mullet	○	○	○	○	○	○	○
	Offshore of Hagi	Sea bass*	○	○	○	○	○	○	○
Oita Pref.	Mouth of Riv. Oita Oita City)	Sea bass	○	○	○	○	○	○	○

[2] Benzyl benzoate, [4] Ethylbenzene, [7] Xylenes, [9] 4,4'-Diamino-3,3'-dichlorodiphenylmethane (synonym: 4,4'-Methylenebis(2-chloroaniline) or 3,3'-Dichloro-4,4'-diamino diphenylmethane), [10] Dichlorobenzenes, [15] 1,2,4-Trimethylbenzene, [16] Carbon disulfide

(Note) Three samples were measured per point, but at Offshore of Hagi only two samples were measured.

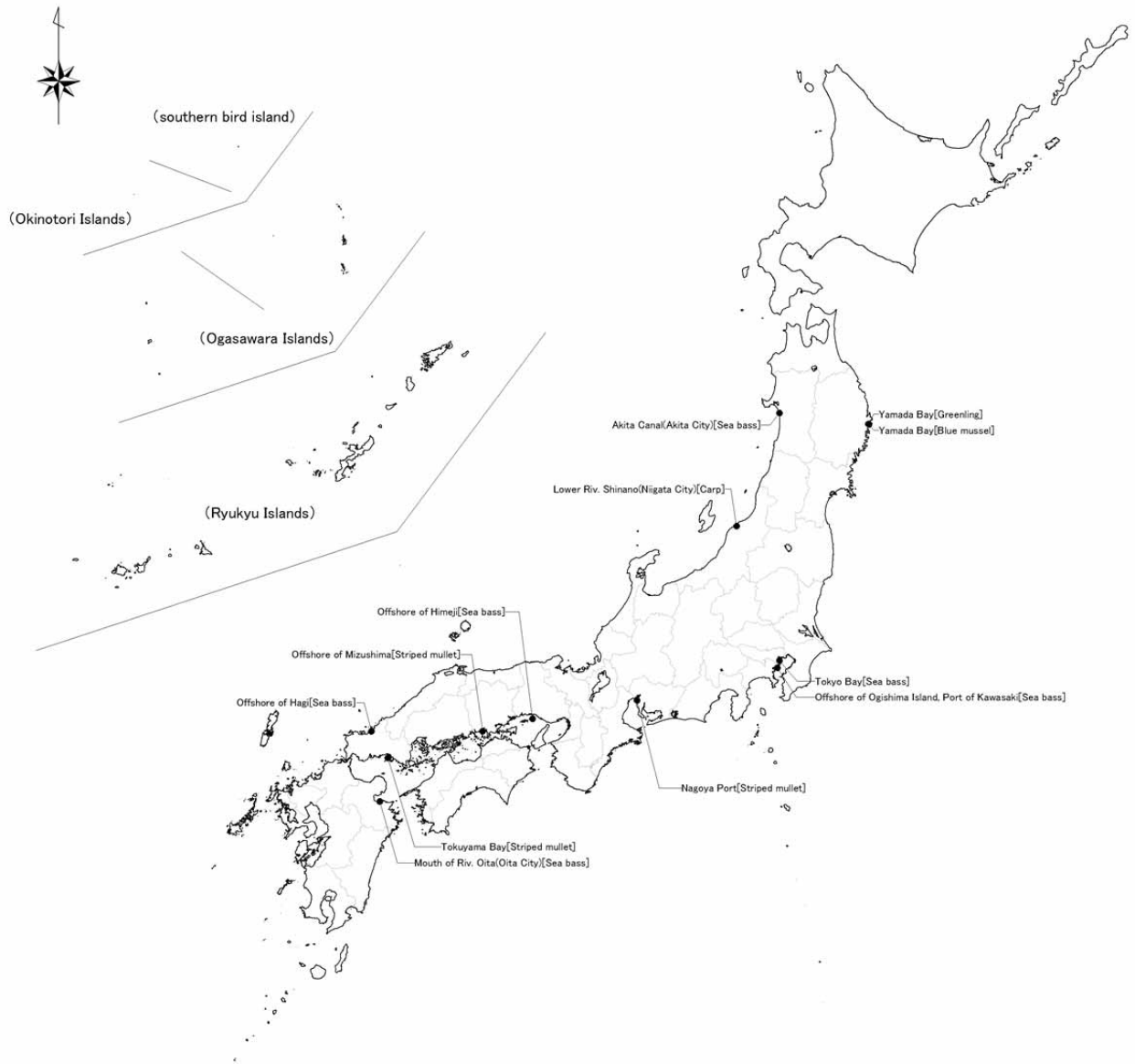


Figure 2-1-2 Surveyed sites (wildlife) in the Detailed Environmental Survey in FY2015

Table 2-1-4 List of surveyed sites (air) and target chemicals in the Detailed Environmental Survey in FY2016

Local communities	Surveyed sites	Target chemicals	
		[10]	[22]
Hokkaido	Hokkaido Research Organization Environmental and Geological Research Department Institute of Environmental Sciences (Sapporo City)	○	○
	Numanohata Park (Tomakomai City)		○
Ibaraki Pref.	Ibaraki Kasumigaura Environmental Science Center Tsuchiura City)	○	○
Saitama Pref.	Center for Environmental Science in Saitama (Kazo City)		○
Chiba Pref.	Ichihara-iwasakinishi Air Quality Monitoring Station (Ichihara City)	○	○
Kanagawa Pref.	Kanagawa Environmental Research Center (Hiratsuka City)	○	○
Yokohama City	Isogoku-takigashira Roadside Air Pollution Monitoring Station (Yokohama City)	○	
Nagano Pref.	Komatsu Air Quality Monitoring Station (Komatsu City)	○	○
Nagoya City	Chikusa Ward Heiwa Park (Nagoya City)	○	○
	Nagoya City Hokusui Elementary School (Nagoya City)	○	
Mie Pref.	Mie Prefecture Health and Environment Research Institute (Yokkaichi City)	○	○
Kyoto Pref.	Uji Prefectural Government Building (Uji City)	○	○
Osaka Pref.	National Shijounawate Roadside Air Pollution Monitoring Station (Shijounawate City)		○
	Annex of 2nd Osaka common building for government offices (Osaka City)	○	
Hyogo Pref.	Nishiwaki City Government Building (Nishiwaki City)		○
Yamaguchi Pref.	Miyanomae Children's Park Air Quality Monitoring Station (Shunan City)	○	
	Yamaguchi Prefectural Institute of Public Health and Environment (Yamaguchi City)	○	○
Kagawa Pref.	Kagawa Prefectural Public Swimming Pool (Takamatsu City)	○	○

[10] Dichlorobenzenes, [22] Methylenebis(4,1-phenylene) diisocyanate

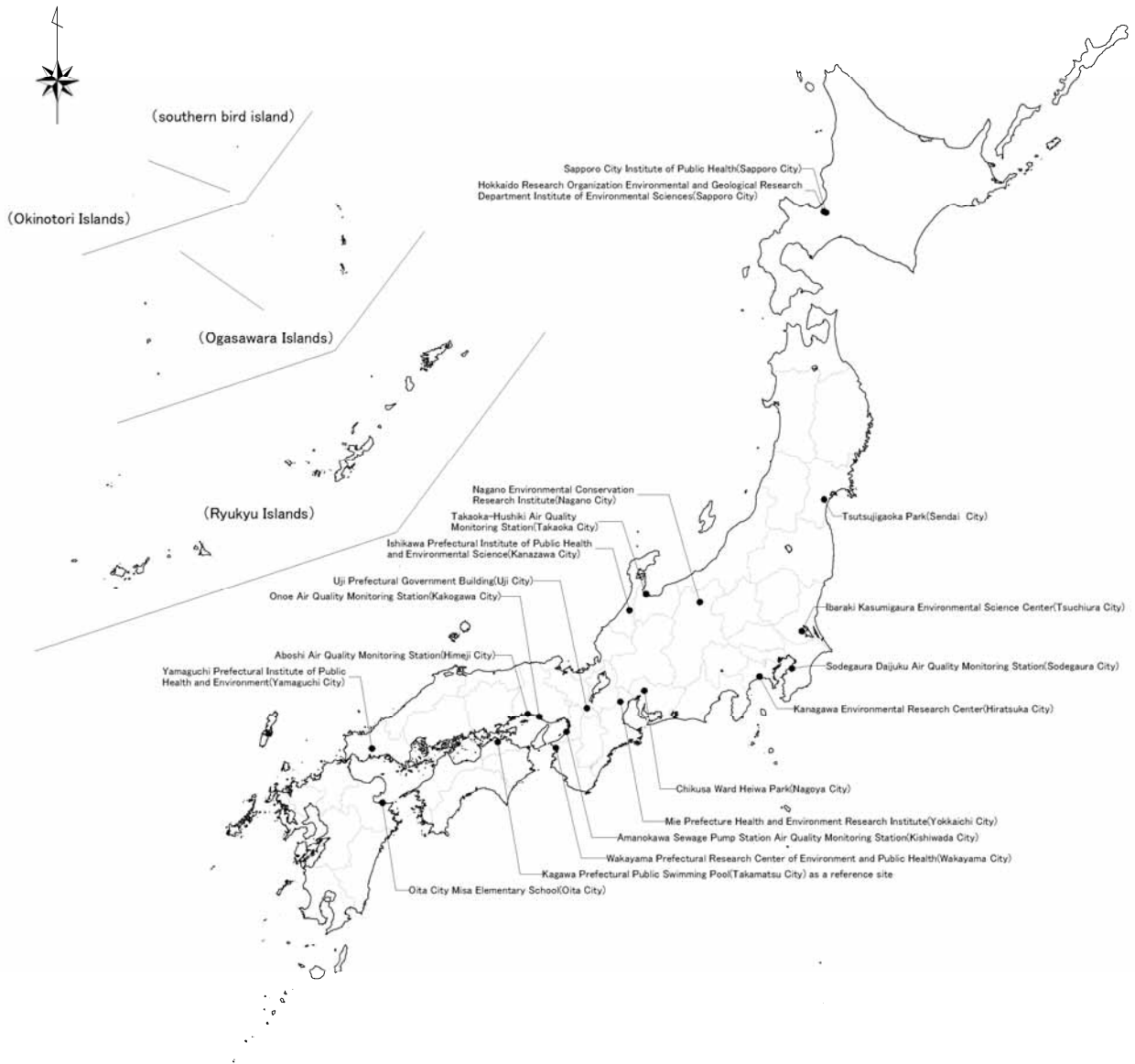


Figure 2-1-3 Surveyed sites (air) in the Detailed Environmental Survey in FY 2015

4. Summary of survey results

The detection ranges and the detection limits are shown in Table 2-2. The survey results are summarized as follows.

In surface water, 16 out of the 20 target chemicals (groups) were detected. Target chemicals were categorized by analytical methods such as structurally similar chemicals capable of simultaneous analyses.

- [1] Aniline : 23 of the 28 valid sites
- [2] Benzyl benzoate : 2 of the 20 valid sites
- [3] Ethylamine : 1 of the 20 valid site
- [4] Ethylbenzene : 1 of the 32 valid site
- [6] Ethylene glycol : 17 of the 20 valid sites
- [7] Xylenes
 - [7-1] *o*-Xylene : 1 of the 32 valid sites
- [8] Chloromethane (synonym: Methyl chloride) : 5 of the 20 valid sites
- [10] Dichlorobenzenes
 - [10-3] *p*-Dichlorobenzene : 6 of the 24 valid sites
- [12] Terephthalic acid : All 22 valid sites
- [13] Triethanolamine : All 20 valid sites
- [14] (*E*)-4-(2,6,6-Trimethylcyclohex-1-en-1-yl)-but-3-en-2-one (synonym: Ionone) : 2 of the 20 valid sites
- [16] Carbon disulfide : 18 of the 20 valid sites
- [17] (*Z*)-*N,N*-Bis(2-hydroxyethyl)oleamide : 3 of the 18 valid sites
- [18] Propane-1,2-diol : 19 of the 20 valid sites
- [20] Formaldehyde : All 20 valid sites
- [21] *N*-Methyldidecylamine : 5 of the 20 valid sites

In sediment, 3 out of the 2 target chemicals (groups) were detected. Target chemicals were categorized by analytical methods such as structurally similar chemicals capable of simultaneous analyses.

- [2] Benzyl benzoate : 6 of the 20 valid sites
- [15] 1,2,4-Trimethylbenzene : 18 of the 19 valid sites

In wildlife (bivalves or fish), 4 out of the 7 target chemicals (groups) were detected. Target chemicals were categorized by analytical methods such as structurally similar chemicals capable of simultaneous analyses.

- [2] Benzyl benzoate : 7 of the 13 valid sites
- [4] Ethylbenzene : 1 of the 12 valid site
- [7] Xylenes
 - [7-1] *o*-Xylene : 1 of the 12 valid site
 - [7-2] *m*-Xylene : 1 of the 12 valid site
 - [7-3] *p*-Xylene : 1 of the 12 valid site
- [9] 4,4'-Diamino-3,3'-dichlorodiphenylmethane (synonym: 4,4'-Methylenebis(2-chloroaniline) or 3,3'-Dichloro-4,4'-diamino diphenylmethane) : 3 of the 12 valid sites

In air, 1 out of the 2 target chemicals (groups) was detected. Target chemicals were categorized by analytical methods such as structurally similar chemicals capable of simultaneous analyses.

• [10] Dichlorobenzenes

[10-1] *o*-Dichlorobenzene : All 14 valid sites : 14 地点中 14 地点

[10-2] *m*-Dichlorobenzene : 13 of the 14 valid sites : 14 地点中 13 地点

[10-3] *p*-Dichlorobenzene : All 14 valid sites : 14 地点中 14 地点

Table 1-2 Summary of the detection ranges and the detection limits in the Detailed Environmental Survey in FY 2016

No.	Target chemicals	Surface water [ng/L]		Sediment [ng/g-dry]		Wildlife [ng/g-wet]		Air [ng/m ³]	
		Detection range and frequency	Detection limit	Detection range and frequency	Detection limit	Detection range and frequency	Detection limit	Detection range and frequency	Detection limit
[1]	Aniline *	nd~160 23/28	13						
[2]	Benzyl benzoate	nd~72 2/20	4.4	nd~3.5 6/20	1.3	nd~6.5 7/13	1.1		
[3]	Ethylamine	nd~260 1/20	200						
[4]	Ethylbenzene	nd~10 1/32	10			nd~4.4 1/12	3.3		
[5]	Ethylene oxide *	nd 0/15	8,500						
[6]	Ethylene glycol	nd~7,100 17/20	45						
[7]	Xylenes								
	[7-1] <i>o</i> -Xylene	nd~20 1/32	9.7			nd~3.9 1/12	2.1		
	[7-2] <i>m</i> -Xylene	nd 0/32	25			nd~7.6 1/12	3.2		
	[7-3] <i>p</i> -Xylene	nd 0/32	13			nd~5.2 1/12	3.5		
[8]	Chloromethane (synonym: Methyl chloride) *	nd~17 5/20	3.0						
[9]	4,4'-Diamino-3,3'-dichlorodiphenylmethane (synonym: 4,4'-Methylenebis(2-chloroaniline) or 3,3'-Dichloro-4,4'-diamino diphenylmethane)	nd 0/20	8.0			nd~0.80 3/12	0.20		
[10]	Dichlorobenzenes *								
	[10-1] <i>o</i> -Dichlorobenzene	nd 0/24	7.4	nd 0/20	2.5	nd 0/13	1.2	nd~430 14/14	7.1
	[10-2] <i>m</i> -Dichlorobenzene	nd 0/24	6.2	nd 0/20	1.6	nd 0/13	1.0	nd~260 13/14	6.5
	[10-3] <i>p</i> -Dichlorobenzene	nd~44 6/24	6.5	nd 0/15	17	nd 0/13	1.7	40~2,700 14/14	10
[11]	<i>N,N</i> -Dimethylpropane-1,3-diyl diamine	nd 0/20	30						
[12]	Terephthalic acid *	8.3~390 22/22	7.2						
[13]	Triethanolamine	Fresh water: 31~2,700 13/13 Sea water: 26~490 7/7	Fresh water: 4.1 Sea water: 26						
[14]	(<i>E</i>)-4-(2,6,6-Trimethylcyclohex-1-en-1-yl)-but-3-en-2-one (synonym: Ionone)	nd~49 2/20	2.5						
[15]	1,2,4-Trimethylbenzene			nd~1.7 18/19	0.19	nd 0/14	3.0		

No.	Target chemicals	Surface water [ng/L]		Sediment [ng/g-dry]		Wildlife [ng/g-wet]		Air [ng/m ³]	
		Detection range and frequency	Detection limit	Detection range and frequency	Detection limit	Detection range and frequency	Detection limit	Detection range and frequency	Detection limit
[16]	Carbon disulfide *	nd~410 18/20	5.3			nd 0/11	0.41		
[17]	(Z)-N,N-Bis(2-hydroxyethyl)ol camide	nd~3.7 3/18	1.3						
[18]	Propane-1,2-diol	nd~5,300 19/20	33						
[19]	Bromomethane (synonym: Methyl bromide)	nd 0/20	5.1						
[20]	Formaldehyde *	420~5,700 20/20	240						
[21]	N-Methyldidecylamine	nd~1.6 5/20	0.55						
[22]	Methylenebis(4,1-phenylene) diisocyanate							nd 0/14	0.54

(Note 1) Detection frequency is based on the number of sites, thus means (the number of detected sites/the number of surveyed sites). A site where data was not available was excluded from the number of surveyed sites. A site where the data became invalid under a unified detection limit was also excluded. In sediment, wildlife and air, 3 samples were measured for a site, and the detection in more than one out of samples from a site can be defined as one detected site.

(Note 2) Detection range is based on the number of samples and therefore can be shown as “nd~” even if a target chemical is detected in all sites.

(Note 3) means the medium was not surveyed.

(Note 4)* connote target substances or points selected for survey in light of documentation or submittals regarding emissions.