Chapter 1 Results of the Initial Environmental Survey in FY2013

1. Purpose of the survey

Initial Environmental Surveys are implemented in compliance with the Law Concerning Reporting, etc. of Releases of Specific Chemical Substances to the Environment and Promoting Improvement in Their Management (Law No. 86, 1999) (hereafter, the PRTR); these surveys provide the basic resources to properly evaluate chemical substances which may present environmental risk by compiling and tracking data notably from areas susceptible to high concentrations in their general environments, as well as for evaluating environmental and exposure risks to chemical substances that are other than as designated by law.

2. Target chemicals

In the FY2013 Initial Environmental Survey, 14 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	Air
[1]	Chlormadinone and its acetate ester						
	[1-1] Chlormadinone					○	
	[1-2] Chlormadinone acetate					○	
[2]	Dichloroanilines				I 156		
	[2-1] 2,3-Dichloroaniline					○	
	[2-2] 2,4-Dichloroaniline	III Monitored				○	
	[2-3] 2,5-Dichloroaniline	III Monitored				○	
	[2-4] 2,6-Dichloroaniline					○	
	[2-5] 3,4-Dichloroaniline	III Monitored				○	
	[2-6] 3,5-Dichloroaniline					○	
[3]	1,1-Dichloroethene (synonym: Vinylidene chloride)	II Monitored		I 171	I 158		○
[4]	Disodium 4-amino-3-[4'-(2,4-diaminophenylazo)-1,1'-biphenyl-4-ylazo]-5-hydroxy-6-phenylazo-2,7-naphthalenedisulfonate (synonym: C.I. Direct black 38)	II Monitored		II 30	II 39	○	
[5]	*N*,*N*-Dimethyl-*n*-octadecylamine	III Monitored				○	
[6]	*N*,*N*-Dimethyldodecylamine		Priority Assessment Chemical Substances		I 223	○	
[7]	2-(Thiocyanatomethylthio)-1,3-benzothiazole (synonym: TCMTB)	II Monitored III Monitored			II 57	○	
[8]	*o*-Terphenyl				II 63	○	
[9]	Triethylamine	II Monitored			I 277		○
[10]	2,4,6-Trichlorophenol				I 287		○

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	Air
[11]	Sodium (1,1'-biphenyl)-2-olate			II 53	II 68	○	
[12]	3-Hydroxyestra-1,3,5(10),7-tetraen-17-one (synonym: Equilin)					○	
[13]	4,4'-Bipyridyl				II 75	○	
[14]	3-(4-Methylbenzylidene)-1,7,7-trimethylbicyclo[2.2.1]heptan-2one					○	

(Note 1)“The Chemical Substances Control Law” hereafter means “Law Concerning the Examination and Regulation of Manufacture, etc. of Chemical Substances (Law No. 117 of 1973).”

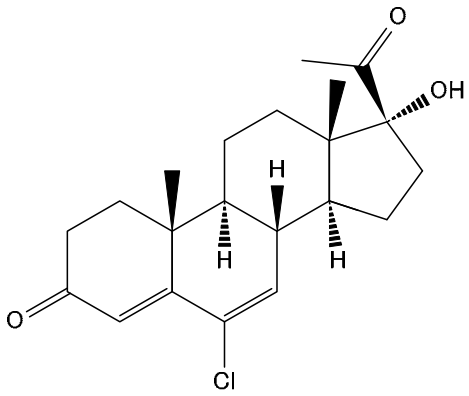
(Note 2) Pre-Revision “Areas as designated under the Chemical Substances Control Law” refer to those areas designated prior to the 20 May 2009 revision of the law (which went into effect on 1 April 2011), while “Post Revision Areas” refer to the areas defined as designated post-20 May 2009.

(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".

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

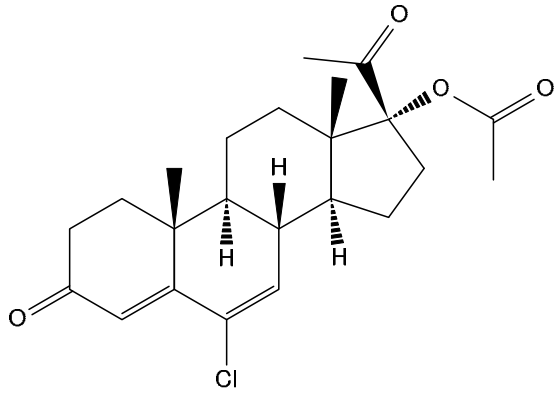
[1] Chlormadinone and its acetate ester

[1-1] Chlormadinone



Molecular formula: $C_{21}H_{27}ClO_3$
CAS: 1961-77-9
ENCS: Uncertain
MW: 362.89
mp: Uncertain
bp: Uncertain
sw: Uncertain
Specific gravities: Uncertain
logPow: Uncertain

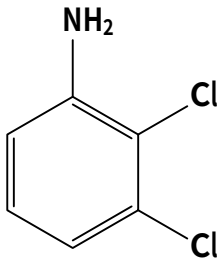
[1-2] Chlormadinone acetate



Molecular formula: $C_{23}H_{29}ClO_4$
CAS: 302-22-7
ENCS: 9-2348
MW: 404.93
mp: Uncertain
bp: Uncertain
sw: Uncertain
Specific gravities: Uncertain
logPow: Uncertain

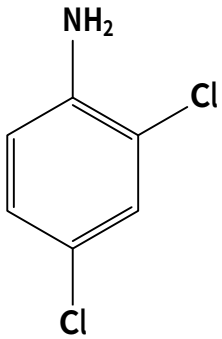
[2] Dichloroanilines

[2-1] Chlormadinone



Molecular formula: $C_6H_5Cl_2N$
CAS: 608-27-5
ENCS: 3-261
MW: 162.02
mp: 24°C [1)]
bp: 252°C [1)]
sw: Uncertain
Specific gravities: Uncertain
logPow: Uncertain

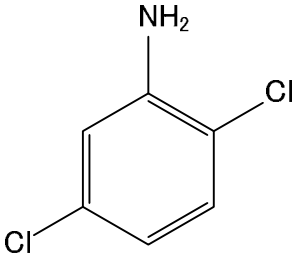
[2-2] 2,4-Dichloroaniline



Molecular formula: $C_6H_5Cl_2N$
CAS: 554-00-7
ENCS: 3-261
MW: 162.02
mp: 63-64°C [1)]
bp: 245°C [1)]
sw: 620mg/L(60°C) [2)]
Specific gravities: 1.567g/cm^3(20°C) [1)]
logPow: 2.78 [3)]

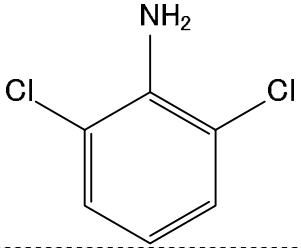
(Abbreviations) CAS CAS registry number, ENCS registry number in the Existing and New Chemical Substances List, MW molecular weight, mp melting point, bp boiling point, SW solubility in water, Specific gravities Specific gravity（no unit）or density, logPow *n*-octanol-water partition coefficient, kPa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

[2-3] 2,4-Dichloroaniline



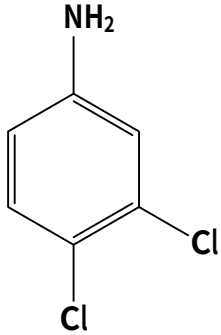
Molecular formula: $C_6H_5Cl_2N$
CAS: 95-82-9
ENCS: 3-261
MW: 162.02
mp: 44.9-45.1°C [1)]
bp: 251°C [1)]
sw: 300mg/L(25°C、estimated) [2)]
Specific gravities: 1.54g/cm^3 [4)]
logPow: 2.75 [4)]

[2-4] 2,6-Dichloroaniline



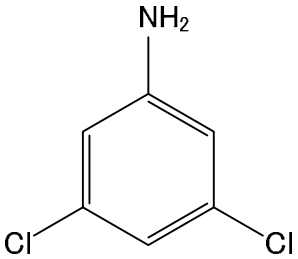
Molecular formula: $C_6H_5Cl_2N$
CAS: 608-31-1
ENCS: 3-261
MW: 162.02
mp: 39°C [1)]
bp: 97°C [5)]
sw: Uncertain
Specific gravities: Uncertain
logPow: Uncertain

[2-5] 3,4-Dichloroaniline



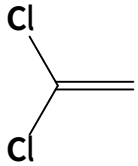
Molecular formula: $C_6H_5Cl_2N$
CAS: 95-76-1
ENCS: 3-261
MW: 162.02.
mp: 71-72°C [6)]
bp: 272°C [6)]
sw: 92mg/L(20°C) [2)]
Specific gravities: 1.57g/cm^3 [7)]
logPow: 2.69 [7)]

[2-6] 3,5-Dichloroaniline



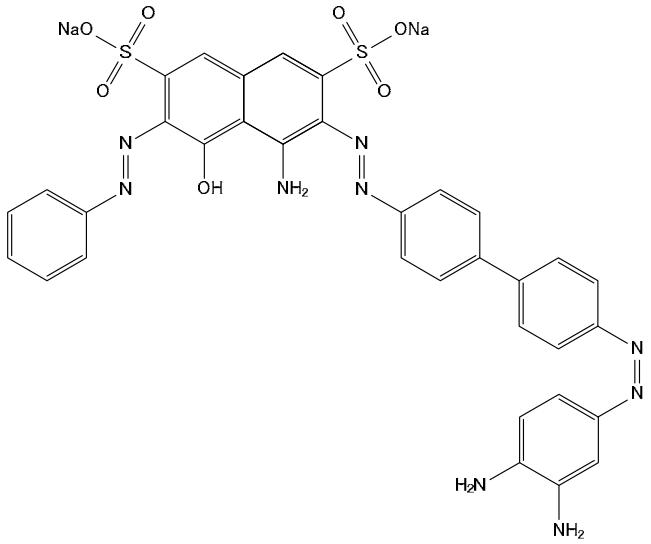
Molecular formula: $C_6H_5Cl_2N$
CAS: 626-43-7
ENCS: 3-261
MW: 162.02
mp: 52°C [1)]
bp: 261°C [1)]
sw: 784mg/L(25°C)[8)]
Specific gravities: 1.58(20/4°C) [9)]
logPow: 2.90 [10)]

[3] 1,1-Dichloroethene (synonym: Vinylidene chloride)



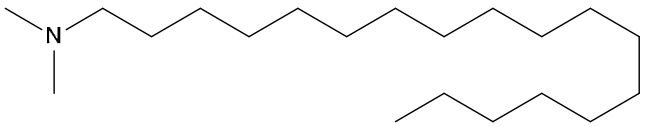
Molecular formula: $C_2H_2Cl_2$
CAS: 75-35-4
ENCS: 2-103
MW: 96.94
mp: -122.5°C [11)]
bp: 31.7°C(760mmHg) [11)]
sw: 3,100mg/L(5°C) [1)]
Specific gravities: 1.2129(20/4°C) [11)]
logPow: 2.13 [1)]

[8] Disodium 4-amino-3-[4'-(2,4-diaminophenylazo)-1,1'-biphenyl-4-ylazo]-5-hydroxy-6-phenylazo-2,7-naphthalenedisulfonate (synonym: C.I. Direct black 38)



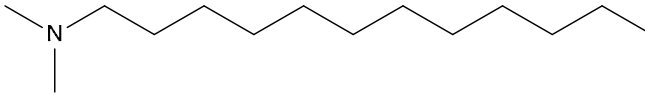
Molecular formula: $C_{34}H_{25}N_9Na_2O_7S_2$
CAS: 1937-37-7
ENCS: 5-1370
MW: 781.73
mp: Uncertain
bp: Uncertain
sw: 3,000mg/L(5°C)[1)]
Specific gravities: Uncertain
logPow: 2.04(estimated)[2)]

[5] *N*,*N*-Dimethyl-*n*-octadecylamine



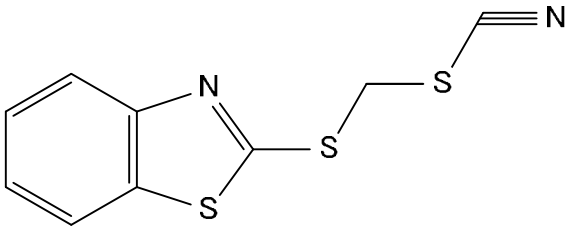
Molecular formula: $C_{20}H_{43}N$
CAS: 124-28-7
ENCS: 2-176
MW: 297.56
mp: 22.89°C [6)]
bp: 194°C(6mmHg)[12)]
sw: Uncertain
Specific gravities: 0.80502(25/4°C,liquid)[13)]
logPow: Uncertain

[6] *N*,*N*-Dimethyldodecylamine



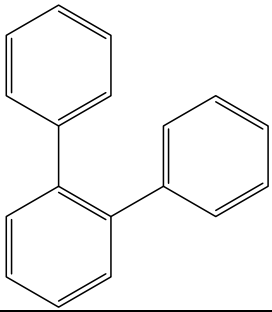
Molecular formula: $C_{14}H_{31}N$
CAS: 112-18-5
ENCS: 2-176
MW: 213.4
mp: -17°C [12)]
bp: 271°C [14)]
sw: 8.6mg/L(25°C)[15)]
Specific gravities: 0.787g/cm^3 [16)]
logPow: 5.5(calculated)[16)]

[7] 2-(Thiocyanatomethylthio)-1,3-benzothiazole (synonym: TCMTB)



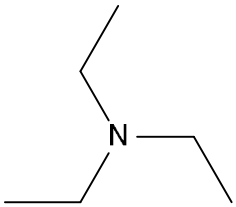
Molecular formula: $C_9H_6N_2S_3$
CAS: 21564-17-0
ENCS: 5-3424
MW: 238.35
mp: -10°C [17)]
bp: 120°C [17)]
sw: 0.0033g/100mL [17)]
Specific gravities: 1.4 [17)]
logPow: 3.3 [17)]

[8] *o*-Terphenyl



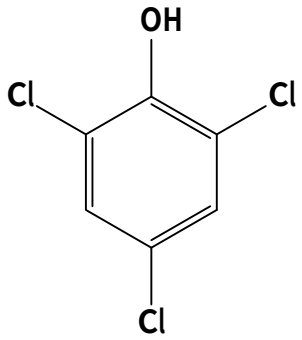
Molecular formula: $C_{18}H_{14}$
CAS: 84-15-1
ENCS: 4-17
MW: 230.3
mp: 56.19-56.24°C [1)]
bp: 332°C(760mmHg)[1)]
sw: 1.24mg/L(25°C)[2)]
Specific gravities 1.1 [18)]
logPow: 5.5 [18)]

[9] Triethylamine



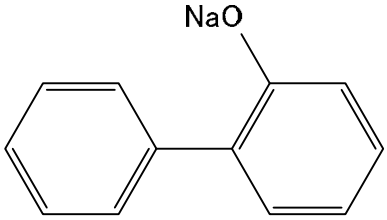
Molecular formula: $C_6H_{15}N$
CAS: 121-44-8
ENCS: 2-141
MW: 101.19
mp: -115°C [6)]
bp: 89-90°C [6)]
sw: 5.5%(20°C)[1)]
Specific gravities 0.7255(25/4°C)[6)]
logPow: 1.45 [1)]

[10] 2,4,6-Trichlorophenol



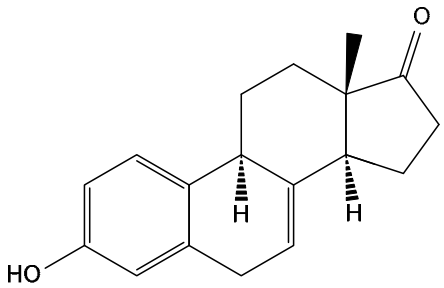
Molecular formula: $C_6H_3Cl_3O$
CAS: 88-06-2
ENCS: 3-931
MW: 197.45
mp: 69°C [6)]
bp: 246°C [6)]
sw: < 0.1g/100g [3)]
Specific gravity: 1.4901 [6)]
logPow: 3.87 [19)]

[11] Sodium (1,1'-biphenyl)-2-olate



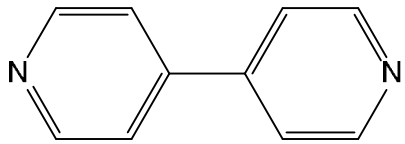
Molecular formula: $C_{12}H_9NaO$
CAS: 132-27-4
ENCS: 4-20
MW: 192.19
mp: Uncertain
bp: Uncertain
sw: 1.1kg/L(25°C) [2)]
Specific gravity: Uncertain
logPow: 0.59(estimated) [2)]

[12] 3-Hydroxyestra-1,3,5(10),7-tetraen-17-one (synonym: Equilin)



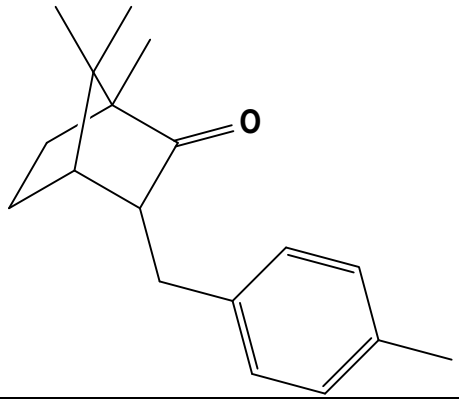
Molecular formula: $C_{18}H_{20}O_2$
CAS: 474-86-2
ENCS: Uncertain
MW: 268.35
mp: 238-240°C [6)]
bp: Sublimation(170mmHg) [1)]
sw: Sparingly sol [6)]
Specific gravity: Uncertain
logPow: Uncertain

[13] 4,4'-Bipyridyl



Molecular formula: $C_{10}H_8N_2$
CAS: 553-26-4
ENCS: 5-3723
MW: 156.18
mp: 73°C [11)]
bp: 304.8°C [11)]
sw: 4,529mg/L(25°C)[14)]
Specific gravity: 1g/cm^3 [14)]
logPow: 1.06 [14)]

[14] 3-(4-Methylbenzylidene)-1,7,7-trimethylbicyclo[2.2.1]heptan-2one



Molecular formula:	$C_{18}H_{22}O$
CAS:	36861-47-9
ENCS:	Uncertain
MW:	254.37
mp:	Uncertain
bp:	Uncertain
sw:	Uncertain
Specific gravity:	Uncertain
logPow:	Uncertain

References

1) Lide, D.R,(ed), CRC Handbook of Chemistry and Physics 95th Edition, CRC Press LLC (2014-2015)
2) Philip H. Howard, William M. Meylan, Handbook of Physical Properties of Organic Chemicals (1997)
3) IPCS, International Chemical Safety Cards, 2,4-Dichlorobenzenamine, ICSC0141 (2000)
4) IPCS, International Chemical Safety Cards, 2,5-Dichlorobenzenamine, ICSC0142 (2000)
5) National Institute of Health Sciences International Chemical Safety Cards (2001)
6) Budavari, S.,(Ed), The Merck Index Ver.12:2 (1995)
7) IPCS, International Chemical Safety Cards, 3,4-Dichlorobenzenamine, ICSC0144 (2000)
8) web sites ; Data from SRC PhysProp Database
9) Across regents Catalog 2004（2004）
10) Albert Leo et.al, Exploring QSAR:Hydrophobic, Electrpnic, and Steroc Constants, Amer Chemical Society(1995)
11) O'Neil, The Merck Index - An Encyclopedia of Chemicals, Drugs, and Biologicals 14th Edition, Merck Co. Inc. (2006)
12) R.Luckenbach, Beilstein Handbook of Organic Chemistry, J. Chem. Inf. Comput. Sci(1981)
13) Journal; Negro; Saida; NKAKB8; Nippon Kagaku Kaishi; 1973; 397,398.
14) International Uniform Chemical Information Database IUCLID Data Set
15) PRTR releases calculation manual 4th Editon(2009)
16) Sigma-Aldrich MSDS
17) IPCS, International Chemical Safety Cards, 2-(Thiocyanomethylthio)benzothiazoleipcs, ICSC1161 (1997)
18) National Institute of Health Sciences International Chemical Safety Cards(2004)
19) IPCS, International Chemical Safety Cards, 2,4,6-Trichlorophenol, ICSC1122 (1998)

3. Surveyed site and procedure

In the Initial 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	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	○	
Fukushima Pref.	Fukushima Prefectural Environmental Center		○
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.	Tokyo Metropolitan Research Institute for Environmental Protection	○	○
Kanagawa Pref.	Kanagawa Environmental Research Center		○
Yokohama City	Yokohama Environmental Science 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	○	○
Nagano Pref.	Nagano Environmental Conservation Research Institute		○
Gifu Pref.	Gifu Prefectural Research Institute for Health and Environmental Sciences		○
Shizuoka Pref.	Shizuoka Institute of Environment and Hygiene		○*3
Aichi Pref.	Aichi Environmental Research Center	○	○*2
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	○	○*3
Osaka City	Osaka City Institute of Public Health and Environmental Sciences	○	
Hyogo Pref.	Hyogo Prefectural Agricultural Administration and Environment Division, Environment Bureau		○
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 Pablic Health, Pharmaceutical and Environmental Sciences Center		○
Kagawa Pref.	Kagawa Prefectural Research Institute for Environmental Sciences and Public Health	○	○
Fukuoka Pref.	Fukuoka Institute of Health and Environmental Sciences	○	○
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	○	○

Local communities	Organisations responsible for sampling[*1]	Surveyed media	
		Surface water	Air
Oita Pref.	Oita Prefectural Institute of Health and Environment, Life and Environment Department	○	
Miyazaki Pref.	Miyazaki Prefectural Institute for Public Health and Environment		○

(Note 1) *1: Organisations responsible for sampling are described by their official names in FY2013.
(Note 2) *2: Those organizations collectedsome of the specimens, and cooperated with a private analytical laboratory to sample other specimens.
(Note 3) *3: Those organizations cooperated with a private analytical laboratory in sampling specimens.

(2) Surveyed sites and target chemicals

Surveyed sites and target chemicals for surface water are shown in Table 1-1-1 and Figure 1-1-1. Surveyed sites and target chemicals for wild life are shown in Table 1-1-2 and Figure 1-1-2. Surveyed sites and target chemicals for air are shown in Table 1-1-3 and Figure 1-1-3. The breakdown is summarized as follows.

To ensure more accurate data for areas susceptible to high concentrations in the general environment, Survey Points are selected and determined based on information regarding releases and emissions. New survey points utilized for the FY2013 surveys were finalized considering the emissions and releases reports submitted in accord with the PRTR, correlated with identification of geographical points with high particulate release volumes.

Surveyed media	Numbers of local communities	Numbers of target chemicals	Numbers of surveyed sites	Numbers of samples at a surveyed site
Surface water	32	11	45	1
Air	29	3	34	3
All media	42	14	79	

Table 1-1-1 List of surveyed sites (surface water) and target chemicals in the Initial Environmental Survey in FY2013

Local communities	Surveyed sites	Target chemicals										
		[1]	[2]	[4]	[5]	[6]	[7]	[8]	[11]	[12]	[13]	[14]
Hokkaido	Ishikarikakokyo Bridge, Mouth of Riv. Ishikari(Ishikari 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.	Takanosu-bashi Bridge, Riv. Yoneshiro (Kita-akita City)	○								○		○
	Akita Canal(Akita City)	○								○		○
	Takemi-bashi Bridge, Riv. Omono (Daisen City)	○								○		○
Tochigi Pref.	Riv. Tagawa(Utsunomiya City)						○					
Gunma Pref.	Tako-bashi Bridge, Riv. Kabura (Takasaki City)			○							○	
Saitama Pref.	Akigaseshusui of Riv. Arakawa(Shiki City)		○									
	Shiki-ohasi Bridge, Riv. Yanase(Shiki 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		○	○	○	○	○	○	○		○	○
Niigata Pref.	Lower Riv. Shinano(Niigata City)	○					○			○		
Toyama Pref.	Takata-bashi Bridge, Riv. Ida (Toyama City)									○	○	○
Ishikawa Pref.	Mouth of Riv. Sai(Kanazawa City)		○				○		○			
Fukui Pref.	Mishima-bashi Bridge, Riv. Shono (Tsuruga 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 Pref.	Miyazu Port		○		○	○			○			
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		○									
Wakayama Pref.	Kinokawa-ohashi Bridge, Mouth of Riv. Kinokawa(Wakayama City)			○	○	○						
Okayama Pref.	Otoidezeki of Riv. Asahi(Okayama City)				○	○						○
	Offshore of Mizushima				○	○						○
Yamaguchi Pref.	Tokuyama Bay						○	○				
	Offshore of Hagi						○	○				
Kagawa Pref.	Takamatsu Port							○				
Fukuoka Pref.	Kabura-bashi Bridge, Riv. Raizan (Maebaru City)		○		○	○		○	○			
	Offshore of Omuta		○		○	○		○	○			
Kitakyushu City	Dokai Bay							○	○			
Fukuoka City	Hakata Bay	○		○			○				○	

Local communities	Surveyed sites	Target chemicals										
		[1]	[2]	[4]	[5]	[6]	[7]	[8]	[11]	[12]	[13]	[14]
Saga Pref.	Imari Bay	○		○	○					○	○	○
Oita Pref.	Mouth of Riv. Oita(Oita City)	○		○								

[1] Chlormadinone and its acetate ester, [2] Dichloroanilines, [4] Disodium 4-amino-3-[4'-(2,4-diaminophenylazo)-1,1'-biphenyl-4-ylazo]-5-hydroxy-6-phenylazo-2,7-naphthalenedisulfonate (synonym: C.I. Direct black 38), [5] *N*,*N*-Dimethyl-*n*-octadecylamine, [6] *N*,*N*-Dimethyldodecylamine, [7] 2-(Thiocyanatomethylthio)-1,3-benzothiazole (synonym: TCMTB), [8] *o*-Terphenyl, [11] Sodium (1,1'-biphenyl)-2-olate, [12] 3-Hydroxyestra-1,3,5(10),7-tetraen-17-one (synonym: Equilin), [13] 4,4'-Bipyridyl, [14] 3-(4-Methylbenzylidene)-1,7,7-trimethylbicyclo[2.2.1]heptan-2one

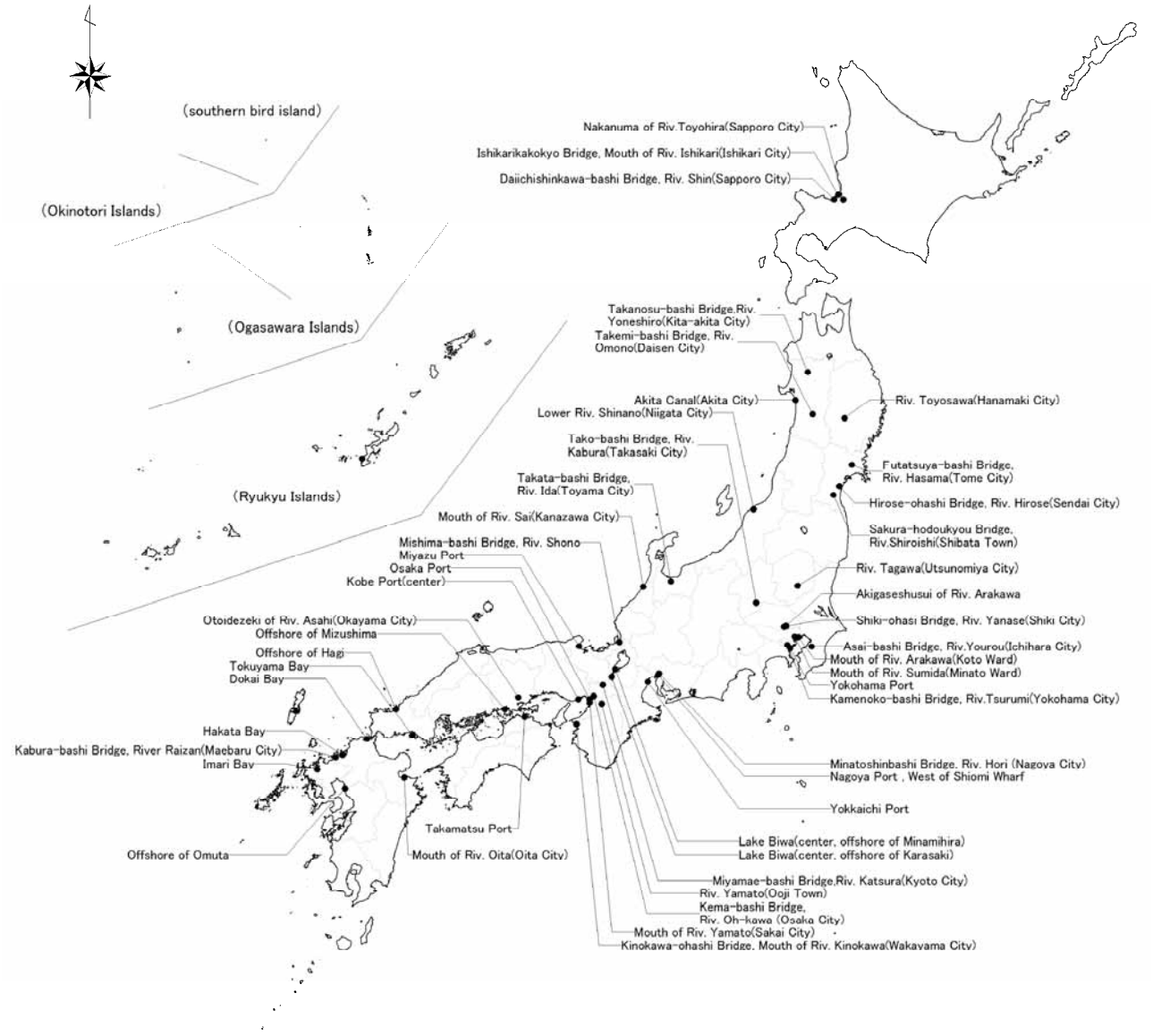


Figure 1-1-1 Surveyed sites (surface water) in the Initial Environmental Survey in FY 2013

Table 1-1-2 List of surveyed sites (air) and target chemicals in the Initial Environmental Survey in FY 2013

Local communities	Surveyed sites	Target chemicals		
		[3]	[9]	[10]
Hokkaido	Hokkaido Research Organization Environmental and Geological Research Department Institute of Environmental Sciences（Sapporo City)			○
Sapporo City	Sapporo City Institute of Public Health(Sapporo City)	○	○	
Fukushima Pref.	Kaminakada Air Quality Monitoring Station(Iwaki City)	○		
Ibaraki Pref.	Ibaraki Kasumigaura Environmental Science Center(Tsuchiura City)			○
Saitama Pref.	Center for Environmental Science in Saitama(Kazo City)	○	○	○
Saitama City	Saitama City Public Health Center(Saitama City)		○	
Chiba Pref.	Ichihara-Goi Air Quality Monitoring Station(Ichihara City)	○		
Tokyo Met.	Tokyo Metropolitan Research Institute for Environmental Protection(Koto Ward)	○	○	
	Chichijima Island	○	○	
Kanagawa Pref.	Kanagawa Environmental Research Center(Hiratsuka City)	○	○	○
Yokohama City	Yokohama Environmental Science Research Institute (Yokohama City)	○		
Toyama City	Shinminato Mikasone Air Quality Monitoring Station(Imizu City)		○	
Ishikawa Pref.	Ishikawa Prefectural Institute of Public Health and Environmental Science(Kanazawa City)		○	○
Nagano Pref.	Nagano Environmental Conservation Research Institute (Nagano City)			○
Shizuoka Pref.	Kakegawa City Government Building(Kakegawa City)	○		
Aichi Pref.	Toyokawa City Government Building(Toyokawa City)		○	
	Kotobuki Town(Kariya City)	○		
Nagoya City	Chikusa Ward Heiwa Park(Nagoya City)	○		○
Mie Pref.	Mie Prefecture Health and Environment Research Institute(Yokkaichi City)		○	○
Kyoto Pref.	Kyoto Prefectural Institute of Public Health and Environment (Kyoto City)			○
Kyoto City	Kyoto City Government Building(Kyoto City)			○
Osaka Pref.	Moriguchi City Daini Air Quality Monitoring Station(Moriguchi City)	○		
Hyogo Pref.	Amagasaki City Nanbu Air Quality Monitoring Station(Amagasaki City)		○	
	Hyogo Prefectural Environmental Research Center(Kobe City)			○
Wakayama Pref.	Wakayama Prefectural Research Center of Environment and Public Health(Wakayama City)		○	
Yamaguchi Pref.	Yamaguchi Prefectural Institute of Public Health and Environment(Yamaguchi City)	○		
	Miyanomae Children's Park Air Quality Monitoring Station (Syunan City)	○		
Tokushima Pref.	Tokushima Prefectural Public Health, Pharmaceutical and Environmental Sciences Center(Tokushima City)			○
Kagawa Pref.	Takamatsu Joint Prefectural Government Building(Takamatsu City)	○	○	○
Fukuoka Pref.	Munakata Prefectural Government Building(Munakata City)		○	
	Omuta City Government Building(Omuta City)		○	
Kitakyushu City	Kitakyushu Monitoring Station (Kitakyushu City)		○	
Saga Pref.	Saga Prefectural Environmental Research Center(Saga City)	○	○	○
Miyazaki Pref.	Shinnobeoka Air Quality Monitoring Station(Nobeoka City)	○		

[3] 1,1-Dichloroethene (synonym: Vinylidene chloride), [9] Triethylamine, [10] 2,4,6-Trichlorophenol

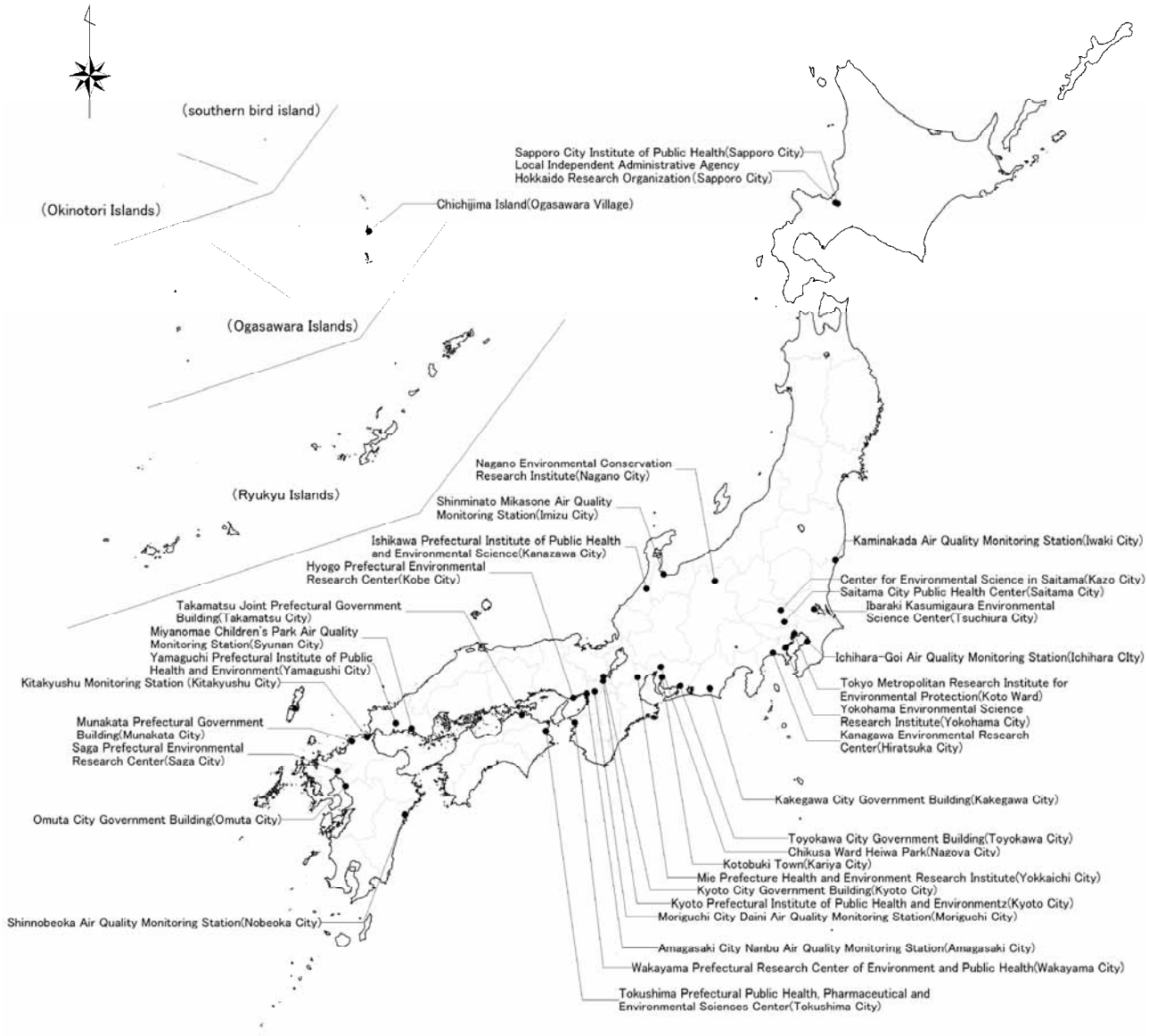


Figure 1-1-2 Surveyed sites (air) in the Initial Environmental Survey in FY 2013

(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)).

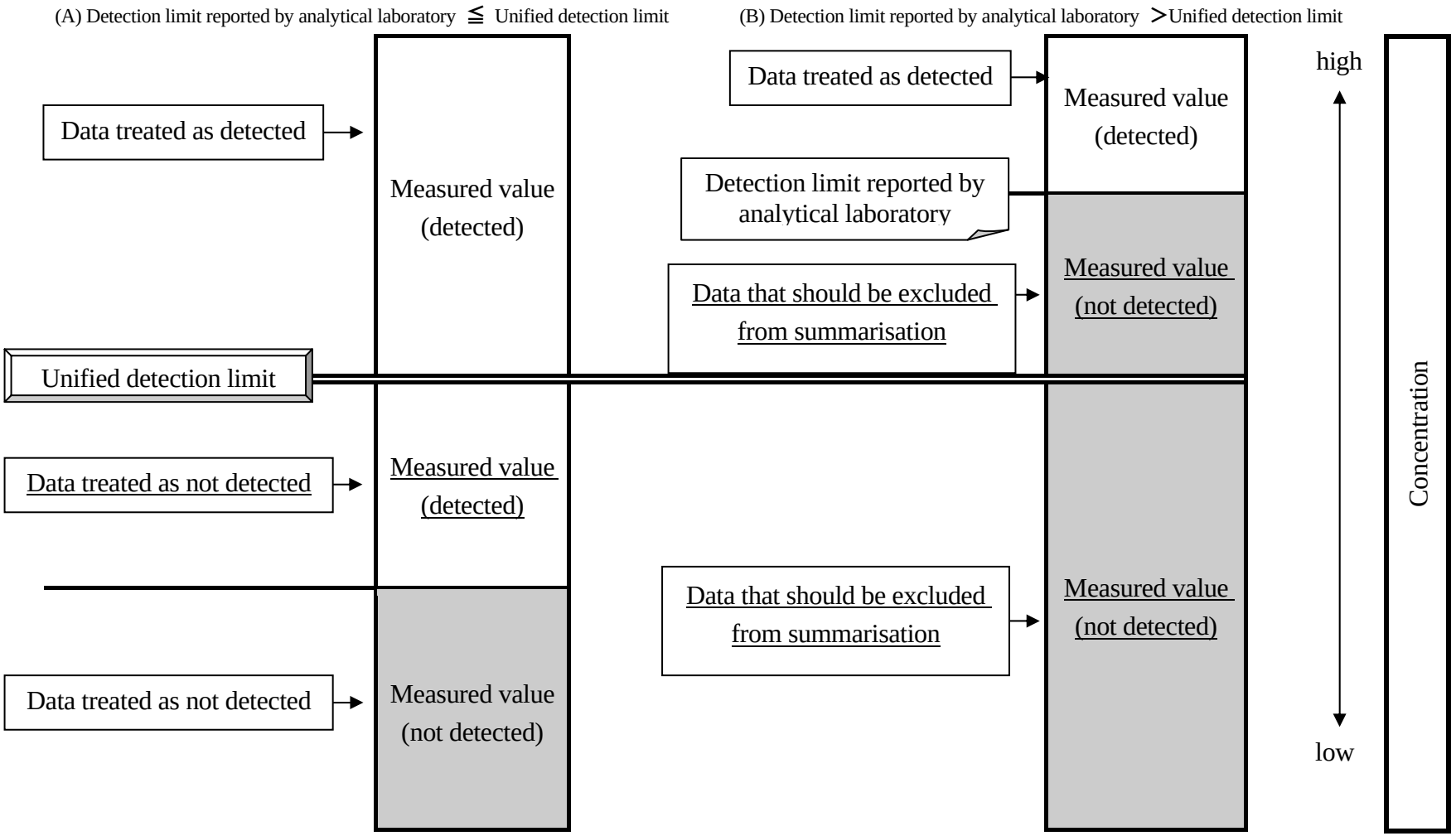
When the instrument detection limit (IDL) and the method detection limit (MDL) are given in the analytical method, which is described in reports on the investigation of the development of analytical methods for chemicals and adopted in the Initial Environmental Survey (hereafter, the Initial Environmental 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

4. Summary of survey results

The detection ranges and the detection limits are shown in Table 1-2. The survey results are summarized as follows.

In surface water, 6 out of the 11 target chemicals (groups) were detected.

・[1-2] Chlormadinone acetate : 13 of the 18 valid sites

・[2-2] 2,4-Dichloroaniline : 3 of the 18 valid sites

・[2-3] 2,5-Dichloroaniline: 1 of the 18valid sites

・[2-5] 3,4-Dichloroaniline : 7 of the 18 valid sites

・[5] *N*,*N*-Dimethyl-*n*-octadecylamine: 5 of the 12 valid sites

・[6] *N*,*N*-Dimethyldodecylamine: 3 of the 13 valid saites

・[7] 2-(Thiocyanatomethylthio)-1,3-benzothiazole (synonym: TCMTB): 1 of the 15 valid sites

・[11] Sodium (1,1'-biphenyl)-2-olate: 3 of the 11 valid sites

In air, 2 out of the 3 target chemicals were detected.

・[3] 1,1-Dichloroethene (synonym: Vinylidene chloride): 4 of the 17 valid sites

・[9] Triethylamine: 3 of the 16valid sites

Table 1-2 Summary of the detection ranges and the detection limits in the Initial Environmental Survey in FY 2013

No.	Target chemicals	Surface water [ng/L]		Air [ng/m^3]	
		Detection range and frequency	Detection limit	Detection range and frequency	Detection limit
[1]	Chlormadinone and its acetate ester				
[1-1]	Chlormadinone	nd 0/18	0.038		
[1-2]	Chlormadinone acetate	nd~0.76 13/18	0.033		
[2]	Dichloroanilines				
[2-1]	2,3-Dichloroaniline	nd 0/18	3.1		
[2-2]	2,4-Dichloroaniline	nd~2.8 3/18	1.1		
[2-3]	2,5-Dichloroaniline	nd~2.2 1/18	1.8		
[2-4]	2,6-Dichloroaniline	nd 0/18	1.5		
[2-5]	3,4-Dichloroaniline	nd~25 7/18	2.6		
[2-6]	3,5-Dichloroaniline	nd 0/18	2.3		
[3]	1,1-Dichloroethene (synonym: Vinylidene chloride)*			nd~2,700 4/17	19
[4]	Disodium 4-amino-3-[4'-(2,4-diaminophenylazo)-1,1'-biphenyl-4-ylazo]-5-hydroxy-6-phenylazo-2,7-naphthalenedisulfonate (synonym: C.I. Direct black 38)	nd 0/14	34		
[5]	*N*,*N*-Dimethyl-*n*-octadecylamine	nd~15 5/12	0.80		
[6]	*N*,*N*-Dimethyldodecylamine	nd~1,200 3/13	6.2		
[7]	2-(Thiocyanatomethylthio)-1,3-benzothiazole (synonym: TCMTB)	nd~1.1 1/15	0.82		
[8]	*o*-Terphenyl	nd 0/15	0.46		
[9]	Triethylamine *			nd~210 3/16	11
[10]	2,4,6-Trichlorophenol			nd 0/14	13
[11]	Sodium (1,1'-biphenyl)-2-olate	nd~10 3/11	2.4		
[12]	3-Hydroxyestra-1,3,5(10),7-tetraen-17-one (synonym: Equilin)	nd 0/16	0.17		
[13]	4,4'-Bipyridyl	nd 0/14	0.9		
[14]	3-(4-Methylbenzylidene)-1,7,7-trimethylbicyclo[2.2.1]heptan-2one	nd 0/17	440		

(Note 1) Detection frequency is based on the number of sites or areas, 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. 3 samples were measured for a site or area, and the detection in more than one out of samples from a site or area can be defined as one detected site or area.

(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 (or areas).

(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.