

Chapter 1 Results of the Initial Environmental Survey in FY 2012

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 FY 2012 Initial Environmental Survey, 18 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	Wild life	Air
[1]	Anisidines							
	[1-1] <i>o</i> -Anisidine	II Monitored		I 14	I 17	○		
	[1-2] <i>m</i> -Anisidine	II Monitored				○		
	[1-3] <i>p</i> -Anisidine			I 2	II 2	○		
[2]	2-Ethylhexanoic acid	II Monitored			I 51			○
[3]	3-Chloro-2-methyl-1-propene	II Monitored			I 131			○
[4]	4,6-Dinitro- <i>o</i> -cresol			II 34				○
[5]	2,4-Di- <i>tert</i> -butylphenol	II Monitored III Monitored			I 208	○		
[6]	1,2-Dibromoethane	II Monitored			II 45	○		
[7]	Dibromochloromethane				I 209			○
[8]	3,3'-Dimethylbenzidine (synonym: <i>o</i> -Tolidine)	II Monitored III Monitored		I 171	I 231	○		
[9]	1,1,2,2-Tetrachloroethane	II Monitored		II 47	II 60	○		
[10]	Tetrafluoroethylene			I 203		○		○
[11]	2,4,6-Trichlorophenol				I 287	○	○	
[12]	Propyl 4-hydroxybenzoate (synonym: Propylparaben)					○		
[13]	17 β -Hydroxyestra-4,9,11-trien-3-one (synonym: Trenbolone)					○		
[14]	Pyrocatechol (synonym: Catechol)	II Monitored	Priority Assessment Chemical Substances	I 260	I 343			○
[15]	Bromodichloromethane				I 381			○
[16]	1-Bromopropane	II Monitored			I 384	○		
[17]	Benzaldehyde			I 298	I 399			○

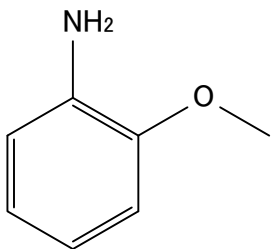
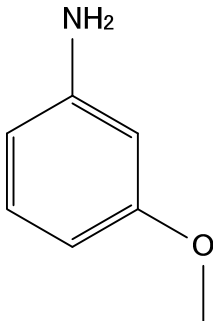
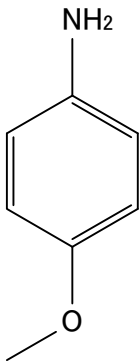
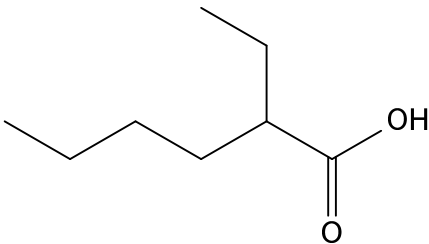
No.	Name	The Chemical Substances Control Law		The PRTR Law		Surveyed media		
		Before the revision	After the revision	Before the revision	After the revision	Surface water	Wild life	Air
[18]	Benzophenone				I 403	o		

(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.

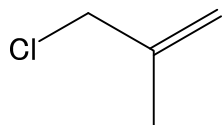
(Note 3) "Before the revision" in "The PRTR Law" means "appointments before the revision of government ordinance on November 21, 2008" and "After the revision" in "The PRTR Law" means "appointments after that revision".

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

[1] Anisidine	[1-1] <i>o</i> -Anisidine		Molecular formula: C ₇ H ₉ NO CAS: 90-04-0 ENCS: 3-682 MW: 123.15 mp: 6.2°C ¹⁾ bp: 224°C ¹⁾ sw: 12.6g/L(25°C) ¹⁾ Specific gravity: 1.0923(20°C) ¹⁾ logPow: 1.18 ¹⁾
[1-2]	<i>m</i> -Anisidine		Molecular formula: C ₇ H ₉ NO CAS: 536-90-3 ENCS: 3-682 MW: 123.15 mp: -1°C ³⁾ bp: 251°C ³⁾ sw: 2.05g/100mL ⁴⁾ Specific gravity: 1.096(20°C) ³⁾ logPow: 0.93 ⁴⁾
[1-3]	<i>p</i> -Anisidine		Molecular formula: C ₇ H ₉ NO CAS: 104-94-9 ENCS: 3-682 MW: 123.15 mp: 57.2°C ³⁾ bp: 243°C ³⁾ sw: 15,400mg/L(25°C) ⁵⁾ Specific gravity: 1.071(57°C) ³⁾ logPow: 0.95 ⁶⁾
[2]	2-Ethylhexanoic acid		Molecular formula: C ₈ H ₁₆ O ₂ CAS: 149-57-5 ENCS: 2-608 MW: 144.21 mp: -59°C ⁷⁾ bp: 228°C ³⁾ sw: 2,000mg/L ⁷⁾ Specific gravity: 0.9031 ³⁾ logPow: 2.64 ⁵⁾

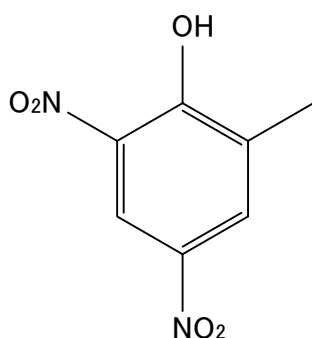
(Abbreviations) CAS CAS registry number, ENCS registry number in the Existing and New Chemical Substances List, MW molecular weight, mp melting point, bp boiling point, SW solubility in water, logPow *n*-octanol-water partition coefficient, kPa kilopascal (1 atom \approx 101.3kPa).

[3] 3-Chloro-2-methyl-1-propene



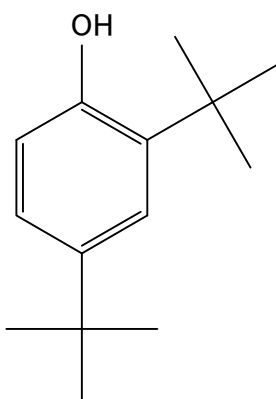
Molecular formula: C₄H₇Cl
CAS: 563-47-3
ENCS: 2-117、2-2367
MW: 90.55
mp: -80°C⁸⁾
bp: 71-72°C⁹⁾
sw: 1,400mg/L⁸⁾
Specific gravity: 0.9165⁹⁾
logPow: 1.98⁹⁾

[4] 4,6-Dinitro-*o*-cresol



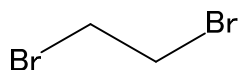
Molecular formula: C₇H₆N₂O₅
CAS: 534-52-1
ENCS: 3-2769
MW: 198.13
mp: 87.5°C⁹⁾
bp: 378°C⁵⁾
sw: 198mg/L(20°C)⁵⁾
Specific gravity: 1.58 g/cm³(20°C)¹⁰⁾
logPow: 2.12⁵⁾

[5] 2,4-Di-*tert*-butylphenol



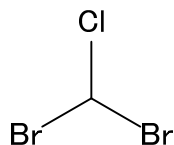
Molecular formula: C₁₄H₂₂O
CAS: 96-76-4
ENCS: 3-521、3-526
MW: 206.32
mp: 56.5°C³⁾
bp: 263.5°C³⁾
sw: 35mg/kg(25°C)⁵⁾
Specific gravity: 0.935g/cm³(22°C)²⁾
logPow: 5.19⁵⁾

[6] 1,2-Dibromoethane



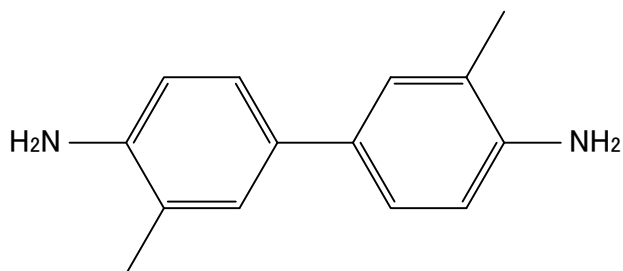
Molecular formula: C₂H₄Br₂
CAS: 106-93-4
ENCS: 2-59
MW: 187.86
mp: 9°C⁹⁾
bp: 131-132°C⁹⁾
sw: 0.034g/L(20°C)¹⁰⁾
Specific gravity: 2.172(25/25°C)⁹⁾
logPow: 1.93¹²⁾

[7] Dibromochloromethane



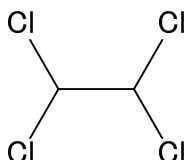
Molecular formula: CHBr₂Cl
CAS: 124-48-1
ENCS: 該当なし
MW: 208.28
mp: -20°C¹⁾
bp: 121.3-121.8°C¹²⁾
sw: 2.51g/L(30°C)¹⁾
Specific gravity: 2.445cm³(15°C)¹³⁾
logPow: 2.16¹⁴⁾

[8] 3,3'-Dimethylbenzidine (synonym: *o*-Tolidine)



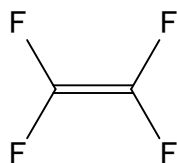
Molecular formula: $C_{14}H_{16}N_2$
CAS: 119-93-7
ENCS: 9-882
MW: 212.29
mp: 129-131°C ¹³⁾
bp: 300°C ¹⁵⁾
sw: 1.3g/L(25°C) ¹⁾
Specific gravity: 1.234g/cm³ ¹⁶⁾
logPow: 2.34 ¹⁵⁾

[9] 1,1,2,2-Tetrachloroethane



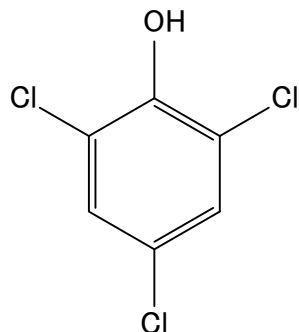
Molecular formula: $C_2H_2Cl_4$
CAS: 79-34-5
ENCS: 2-56
MW: 167.85
mp: -44°C ⁹⁾
bp: 146.5°C ⁹⁾
sw: 1g/350mL(25°C) ⁹⁾
Specific gravity: 1.58658(25/4°C) ⁹⁾
logPow: 2.39 ³⁾

[10] Tetrafluoroethylene



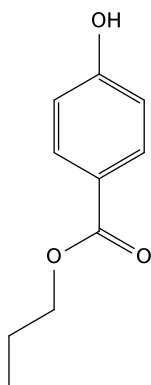
Molecular formula: C_2F_4
CAS: 116-14-3
ENCS: 2-112
MW: 100.02
mp: -142.5°C ¹³⁾
bp: -76.3°C(760mmHg) ¹³⁾
sw: 0.158g/L(25°C) ¹⁾
Specific gravity: 1.519 g/cm³ ¹³⁾
logPow: 1.21 ¹⁵⁾

[11] 2,4,6-Trichlorophenol



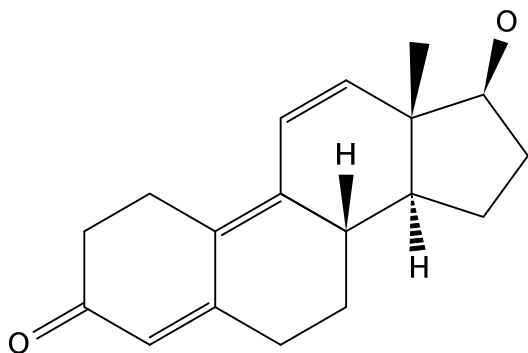
Molecular formula: $C_6H_3Cl_3O$
CAS: 88-06-2
ENCS: 3-931
MW: 197.45
mp: 69 °C ⁹⁾
bp: 246°C ⁹⁾
sw: < 0.1g/100g ⁹⁾
Specific gravity: 1.4901 ⁹⁾
logPow: 3.87 ¹⁷⁾

[12] Propyl 4-hydroxybenzoate (synonym: Propylparaben)



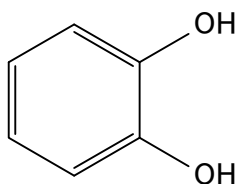
Molecular formula: $C_{10}H_{12}O_3$
CAS: 94-13-3
ENCS: 3-1585
MW: 180.20
mp: 96-97°C ⁹⁾
bp: Uncertain
sw: 0.4g/L ⁹⁾
Specific gravity: 1.287 g/cm³ ¹⁷⁾
logPow: 1.49 ¹⁹⁾

[13] 17 β -Hydroxyestra-4,9,11-trien-3-one (synonym: Trenbolone)



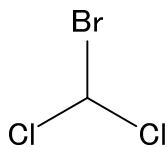
Molecular formula: C₁₈H₂₂O₂
CAS: 10161-33-8
ENCS: Uncertain
MW: 270.37
mp: Uncertain
bp: Uncertain
sw: Uncertain
Specific gravity: Uncertain
logPow: Uncertain

[14] Pyrocatechol (synonym: Catechol)



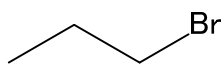
Molecular formula: C₆H₆O₂
CAS: 120-80-9
ENCS: 3-543
MW: 110.11
mp: 105°C¹³⁾
bp: 245.5°C(760mmHg)¹³⁾
sw: 461g/L(25°C)²⁰⁾
Specific gravity: 1.344g/cm³¹³⁾
logPow: 0.88¹⁴⁾

[15] Bromodichloromethane



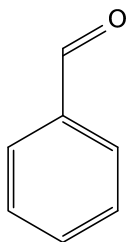
Molecular formula: CHBrCl₂
CAS: 75-27-4
ENCS: 1-381
MW: 163.83
mp: -57°C³⁾
bp: 88.4-88.6°C⁹⁾
sw: 1290mg/L(25°C)⁵⁾
Specific gravity: 1.9254(15°C)⁹⁾
logPow: 2¹⁾

[16] 1-Bromopropane



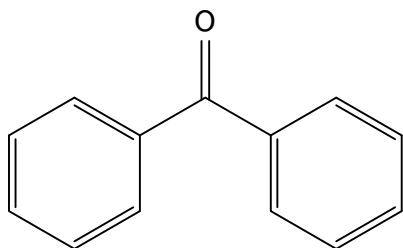
Molecular formula: C₃H₇Br
CAS: 106-94-5
ENCS: 2-73
MW: 122.99
mp: -110°C⁹⁾
bp: 71°C⁹⁾
sw: 2.5g/L(20°C)⁹⁾
Specific gravity: 1.353(20/20°C)⁹⁾
logPow: 2.1³⁾

[17] Benzaldehyde



Molecular formula: C₇H₆O
CAS: 100-52-7
ENCS: 3-1142
MW: 106.12
mp: -56.5°C¹³⁾
bp: 179°C¹³⁾
sw: 3g/L(20°C)¹⁾
Specific gravity: 1.050(15/4°C)¹³⁾
logPow: 1.48¹⁾

[18] Benzophenone



Molecular formula: C₁₃H₁₀O
CAS: 119-61-9
ENCS: 3-1258, 4-125
MW: 182.22
mp: 48.5°C ⁹⁾
bp: 305.4°C ⁹⁾
sw: 137mg/L(25°C) ⁵⁾
Specific gravity: 1.1108(18/4°C) ⁹⁾
logPow: 3.18 ³⁾

References

- 1) Lide, D.R.(ed), CRC Handbook of Chemistry and Physics 88th Edition, CRC Press LLC (2007)
- 2) International Uniform Chemical Information Database IUCLID Data Set
- 3) Lide, D.R.(ed), Budavar (2003)
- 4) IPCS, International Chemical Safety Cards, 3-Aminoanisole, ICSC0375(2002)
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- 7) IPCS, International Chemical Safety Cards, 2-Ethylcaproic acid, ICSC0477 (2005)
- 8) IPCS, International Chemical Safety Cards, 3-Chloro-2-Methyl-1-Propene, ICSC1341(2008)
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- 12) IPCS, International Chemical Safety Cards, 1,2-Dibromoethane, ICSC0045(1993)
- 13) O'Neil, The Merck Index - An Encyclopedia of Chemicals, Drugs, and Biologicals 14th Edition, Merck Co. Inc. (2006)
- 14) web sites ; Data from SRC PhysProp Database
- 15) PRTR releases calculation manual 4th Editon(2009)
- 16) IPCS, International Chemical Safety Cards, o-Tolodone, ICSC0960(1998)
- 17) IPCS, International Chemical Safety Cards, 2,4,6-Trichlorophenol, ICSC1122(1998)
- 18) Giordano et ol; J. Pharm.Sci.; EN; 88; 11; 1210 - 1216.(1999)
- 19) Hansch,C.et ol :Exploring QSAR-Hydrophobic,Electronic and Steric Constants,American Chemical Society (1995)
- 20) Samuel H. Yalkowsky, Handbook of Aqueous Solubility Data, (2010)

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	Wild life	Air
Hokkaido	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.	Tokyo Metropolitan Research Institute for Environmental Protection	○	○	○
Kanagawa Pref.	Kanagawa Environmental Research Center			○
Yokohama City	Yokohama Environmental Science Research Institute	○		
Kawasaki City	Kawasaki Environmental Research Institute		○	○* ²
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	○		○* ²
Aichi Pref.	Aichi Environmental Research Center	○		
Nagoya City	Nagoya City Environmental Science Research Institute	○		○
Mie Pref.	Mie Prefecture Health and Environment Research Institute	○		○
Shiga Pref.	Lake Biwa Environmental Research Institute	○		○
Kyoto Pref.	Kyoto City Prefectural Institute of Public Health and Environment	○		○
Kyoto City	Kyoto Prefectural Institute of Public Health and Environment			○
Osaka Pref.	Research Institute of Environment, Agriculture and Fisheries, Osaka Prefectural Government	○	○	○* ²
Osaka City	Osaka City Institute of Public Health and Environmental Sciences	○		
Hyogo Pref.	Hyogo Prefectural Agricultural Administration and Environment Division, Environment Bureau	○	○	○
Kobe City	Environmental Conservation and Guidance Division, Environment Bureau	○		
Nara Pref.	Nara Prefectural Institute for Hygiene and Environment	○		
Wakayama Pref.	Wakayama Prefectural Research Center of Environment and Public Health	○		○
Okayama Pref.	Okayama Prefectural Institute for Environmental Science and Public Health	○	○	
Hiroshima City	Hiroshima City of Public Health	○	○	○
Yamaguchi Pref.	Yamaguchi Prefectural Public Health and Environment			○
Tokushima Pref.	Tokushima Prefectural Public Health, Pharmaceutical and Environmental Science Center	○	○	○
Kagawa Pref.	Kagawa Prefectural Research Institute for Environmental Sciences	○		○
Fukuoka Pref.	Fukuoka Institute of Health and Environmental Science	○		○

Local communities	Organisations responsible for sampling*1	Surveyed media		
		Surface water	Wild life	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	○	○	○
Kumamoto Pref.	Kumamoto Prefectural Institute of Public Health and Environmental Science			○
Oita Pref.	Oita Prefectural Environmental Preservation Division, Life and Environment Department	○		
Miyazaki Pref.	Miyazaki Prefectural Institute for Public Health and Environment	○		○
Okinawa Pref.	Okinawa Prefectural Institute of Health and Environment	○		○

(Note 1) *1: Organisations responsible for sampling are described by their official names in FY 2012.

(Note 2) *2: 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 FY 2012 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	39	10	55	1
Wild life	10	1	12	3
Air	30*	8	39	3
All media	47	18	106	

(Note) *:For 3 of the 30 specific organizations, a private analysis service, with support, handled all sampling of substances subject to survey.

Table 1-1-1 List of surveyed sites (surface water) and target chemicals in the Initial Environmental Survey in FY 2012

Local communities	Surveyed sites	Target chemicals									
		[1]	[5]	[6]	[8]	[9]	[11]	[12]	[13]	[16]	[18]
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.	Hutatsuya-bashi Bridge, Riv. Hasama(Tome City)		○	○	○			○	○	○	
	Funaoka-ohashi Bridge, Riv.Shiraishi(Shibata Town)		○	○	○			○	○	○	
Sendai City	Hirose-ohashi Bridge, Riv. Hirose(Sendai City)						○	○			○
Yamagata Pref.	Mouth of Riv. Mogami(Sakata City)	○									
Ibaraki Pref.	Isonare-bashi Bridge, Riv. Hanazono (Kitaibaraki City)			○						○	
	Tonekamome-ohasi Bridge, Mouth of Riv. Tone (Kamisu City)	○									
Tochigi Pref.	Riv. Tagawa(Utsunomiya City)				○		○				○
Gunma Pref.	Tako-bashi Bridge, Riv. Kabura(Takasaki City)		○								
Saitama Pref.	Kachi-hashhi Bridge, Riv. Ichino(Yoshimi Town)							○			
	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	○	○	○	○	○	○	○	○	○	○
	Offshore Isogo					○					
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)		○				○	○			○
Gifu Pref.	Hachibe-bashi Bridge, Riv. Mito (Ogaki City)			○						○	
Shizuoka Pref.	Shimizu Port						○				
	Riv. Tenryu(Iwata City)								○		
Aichi Pref.	Nagoya Port , West of Shiomi Wharf		○	○	○	○				○	
Nagoya City	Minatoshinbashi Bridge, Riv. Hori (Nagoya City)		○	○	○	○				○	
Mie Pref.	Mouth of Riv. Nagara(Kuwana City)					○					
	Yokkaichi Port	○	○			○	○	○			○
	Toba Port					○					
Shiga Pref.	Lake Biwa(center, offshore of Minamihira)							○	○		
	Lake Biwa(center, offshore of Karasaki)				○						○
Kyoto Pref.	Miyazu Port				○						○
Osaka Pref.	Mouth of Riv. Yamato(Sakai City)	○	○	○	○	○	○	○	○	○	○
Osaka City	Kema Bridge, Riv. Oh-kawa (Osaka City)			○						○	○
	Osaka Port			○		○				○	○
Hyogo Pref.	Offshore of Himeji		○			○		○			○
Kobe City	Kobe Port(center)	○									
Nara Pref.	Riv. Yamato(Ooji Town)				○						
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, River Raizan(Maebaru City)	○		○		○	○			○	○
	Offshore of Omuta	○		○		○	○			○	○
Kitakyushu City	Dokai Bay					○					○
Fukuoka City	Hakata Bay							○			
Saga Pref.	Imari Bay			○		○				○	

Local communities	Surveyed sites	Target chemicals									
		[1]	[5]	[6]	[8]	[9]	[11]	[12]	[13]	[16]	[18]
Kumamoto Pref.	Ariake Sea								○		
	Heiseisougata-ohashi Bridge, Riv. Hamato (Udo City)						○				
Oita Pref.	Mouth of Riv. Oita(Oita City)		○		○						
Okinawa Pref.	Naha Port					○					

[1] Anisidine, [5] 2,4-Di-tert-butylphenol, [6] 1,2-Dibromoethane, [8] 3,3'-Dimethylbenzidine (synonym: o-Tolidine), [9] 1,1,2,2-Tetrachloroethane, [11] 2,4,6-Trichlorophenol, [12] Propyl 4-hydroxybenzoate (synonym: Propylparaben), [13] 17 β -Hydroxyestra-4,9,11-trien-3-one (synonym: Trenbolone), [16] 1-Bromopropane, [18] Benzophenone

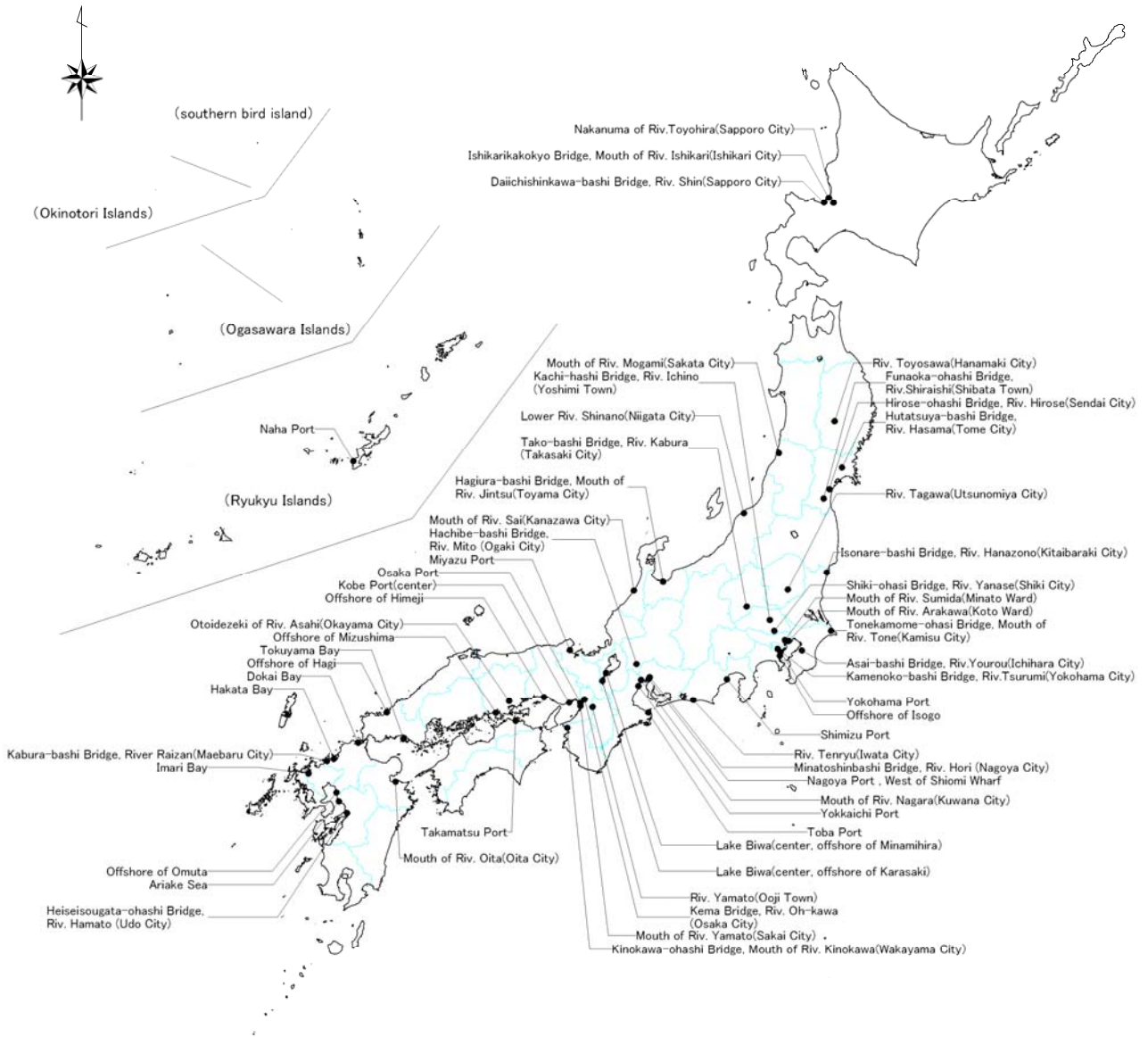


Figure 1-1-1 Surveyed sites (surface water) in the Initial Environmental Survey in FY 2012

Table 1-1-2 List of surveyed sites (wild life) and target chemicals in the Initial Environmental Survey in FY 2012

Local communities	Surveyed sites	Wildlife species	Target chemicals
			[11]
Iwate Pref.	Yamada Bay	Greenling	○
		Blue mussel	○
Tokyo Met.	Tokyo Bay	Sea bass	○
Kawasaki City	Offshore of Ogishima Island, Port of Kawasaki	Sea bass	○
Niigata Pref.	Lower Riv. Shinano(Niigata City)	Carp	○
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	○
Kagawa Pref.	Takamatsu Port	Striped mullet	○
Oita Pref.	Mouth of Riv. Oita(Oita City)	Sea bass	○

[11] 2,4,6-Trichlorophenol

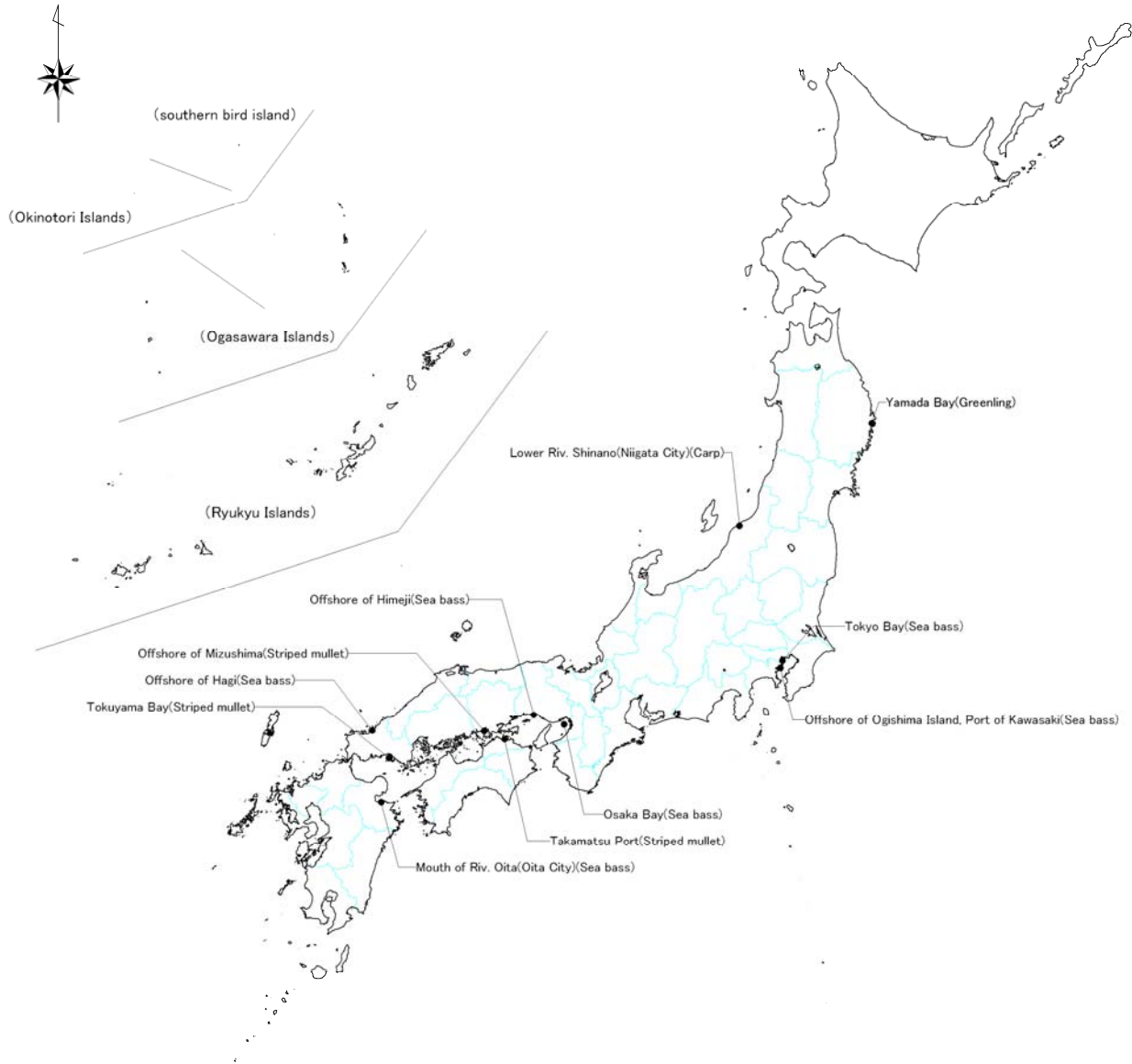


Figure 1-1-2 Surveyed sites (wild life) in the Initial Environmental Survey in FY 2012

Table 1-1-3 List of surveyed sites (air) and target chemicals in the Initial Environmental Survey in FY 2012

Local communities	Surveyed sites	Target chemicals							
		[2]	[3]	[4]	[7]	[10]	[14]	[15]	[17]
Hokkaido	Hokkaido Institute of Environmental Sciences		○	○				○	
Sapporo City	Sapporo City Institute of Public Health(Sapporo City)				○				○
Akita Pref.	Honjo Air Quality Monitoring Station(Yurihonjo City)							○	
Yamagata Pref.	Yonezawa-Kaneike Air Quality Monitoring Station (Yonezawa City)								○
Ibaraki Pref.	Mito-Ishikawa Air Quality Monitoring Station(Mito City)			○	○			○	○
	Hasaki-Oota Air Quality Monitoring Station(Kamisu City)		○						
Saitama Pref.	Center for Environmental Science in Saitama(Kazo City)	○	○	○	○			○	○
Saitama City	Saitama City Public Health Center(Saitama City)	○						○	○
Chiba Pref.	Ichihara-Iwasakinishi 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)				○			○	○
Kawasaki City	Air and Water Pollution Monitoring Center (Kitaibaraki City)							○	○
Ishikawa Pref.	Ishikawa Prefectural Institute of Public Health and Environmental Science(Kanazawa City)	○	○	○	○			○	○
Nagano Pref.	Toyono Air Quality Monitoring Station(Nagano City)	○							
Shizuoka Pref.	Shimizu-miho-daichi Elementary School (Shizuoka City)					○			
Nagoya City	Chikusa Ward Heiwa Park(Nagoya City)	○			○	○		○	○
Mie Pref.	Mie Prefecture Health and Environment Research Institute (Yokkaichi City)	○			○			○	○
Shiga Pref.	Moriyama Air Quality Monitoring Station(Moriyama City)	○							
Kyoto Pref.	Kyoto Prefectural Institute of Public Health and Environmentz(Kyoto City)					○			
	Uji Prefectural Government Building(Uji City)			○				○	○
Kyoto City	Kyoto City Life Environmental Clean Center(Kyoto City)	○							
Osaka Pref.	Research Institute of Environment, Agriculture and Fisheries, Osaka Prefectural Government(Osaka City)	○	○	○	○	○		○	○
	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)			○	○			○	○
	Tatsuno City Government Building(Tatsuno City)		○					○	○
Wakayama Pref.	Wakayama Prefectural Research Center of Environment and Public Health(Wakayama City)	○							
Yamaguchi Pref.	Yamaguchi Prefectural Public Health and Environment(Yamaguchi City)		○		○			○	○
	Miyanomae Children's Park Air Quality Monitoring Station (Syunan City)					○			
Tokushima Pref.	Ohno Air Quality Monitoring Station(Anan 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)		○	○	○			○	○
Oita Pref.	Hijimachi-Takaiyo Air Quality Monitoring Station(Hiji Town)							○	
Miyazaki Pref.	Shinnobeoka Air Quality Monitoring Station(Nobeoka City)					○			
	Miyazaki Prefectural Institute for Public Health and Environment(Miyazaki City)							○	

[2] 2-Ethylhexanoic acid, [3] 3-Chloro-2-methyl-1-propene, [4] 4,6-Dinitro-*o*-cresol, [7] Dibromochloromethane, [10] Tetrafluoroethylene, [14] Pyrocatechol (synonym: Catechol), [15] Bromodichloromethane, [17] Benzaldehyde

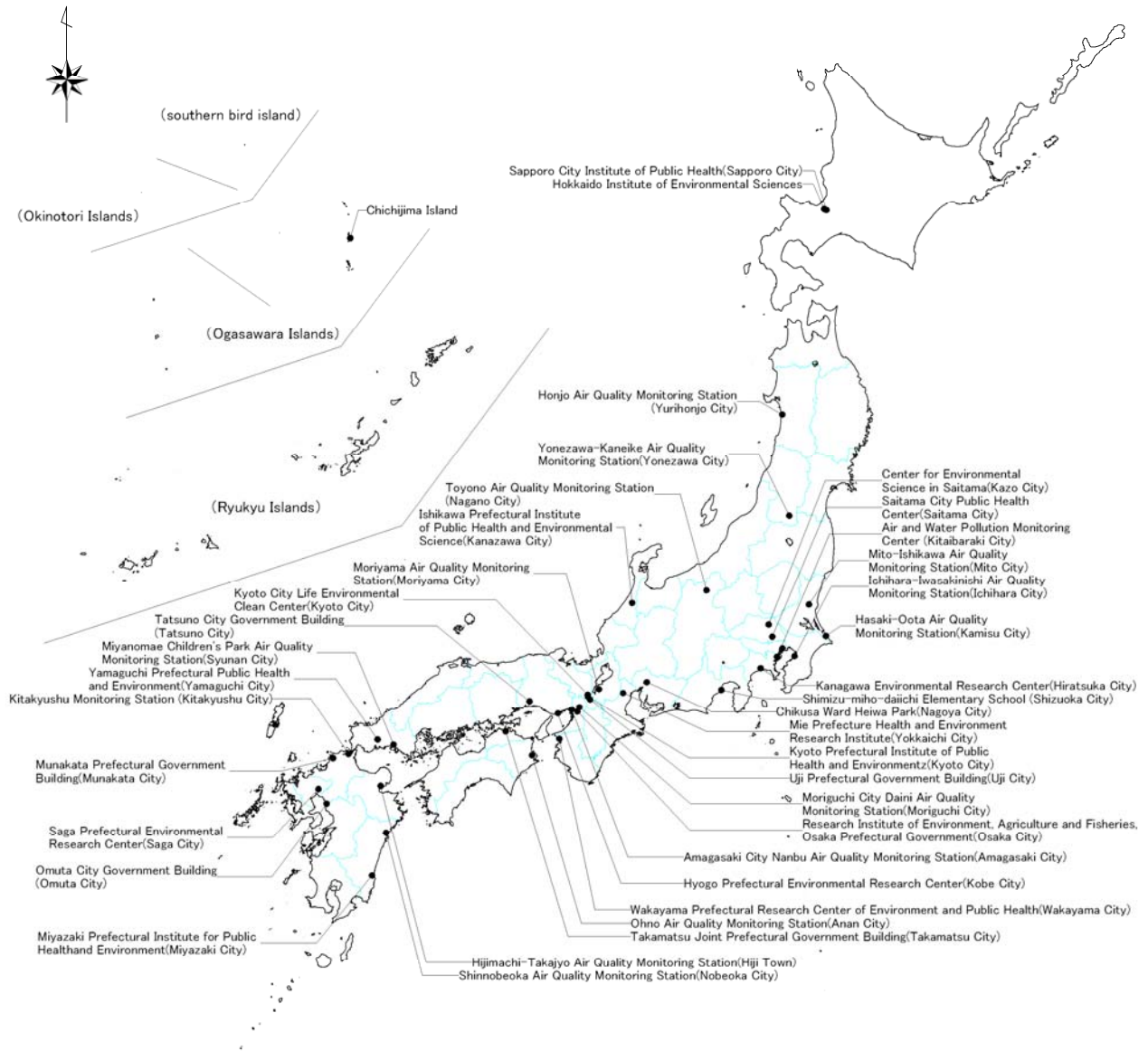


Figure 1-1-3 Surveyed sites (air) in the Initial Environmental Survey in FY 2012

(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.

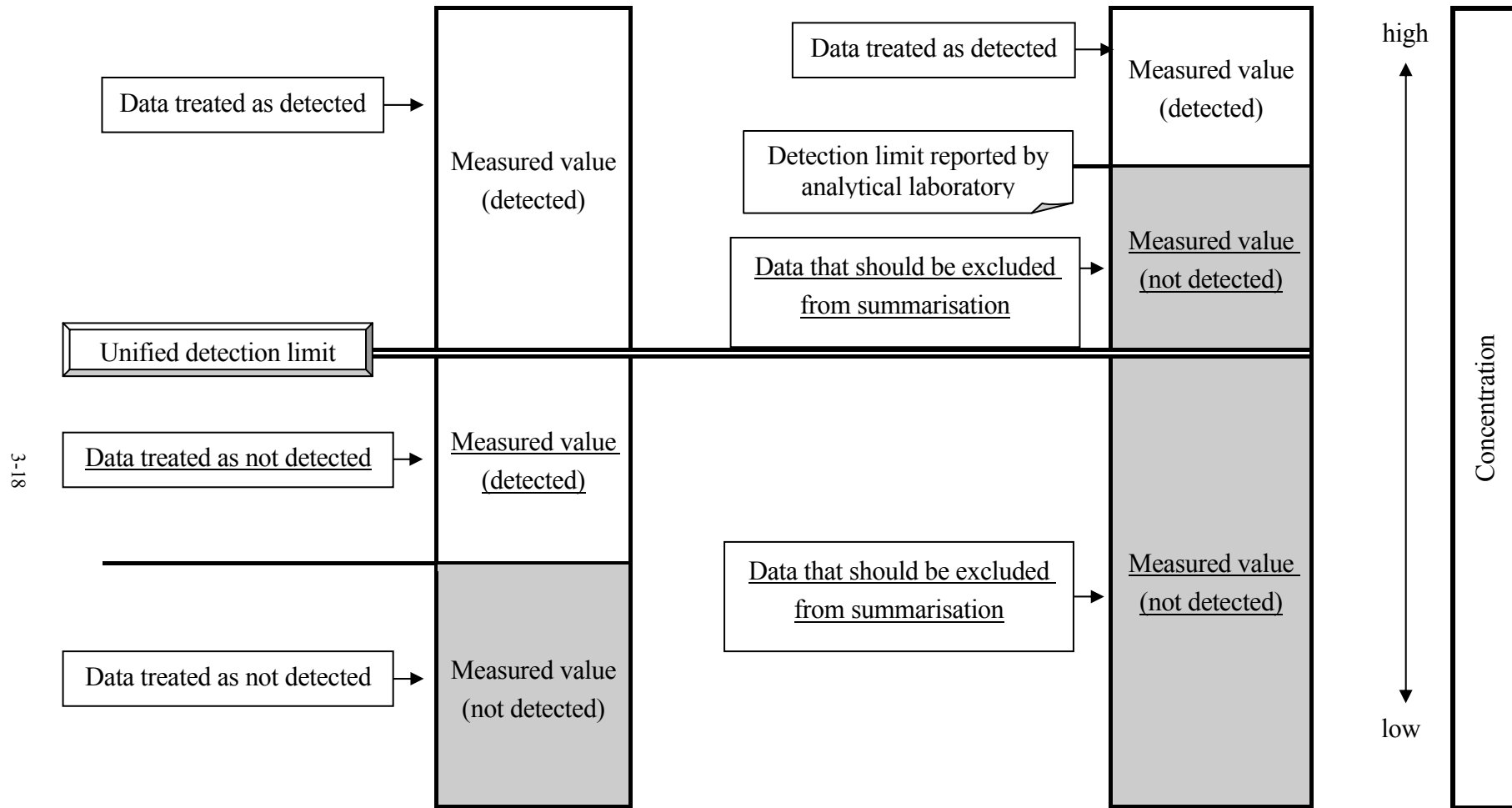
When the analytical laboratory calculates the appropriate IDL and MDL following the calculation method stated in the analytical method development instruction manuals, this calculated MDL is used as the detection limit by the analytical laboratory.

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

(A) Detection limit reported by analytical laboratory \leq Unified detection limit

(B) Detection limit reported by analytical laboratory $>$ Unified detection limit



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, 5 out of the 10 target chemicals (groups) were detected.

- [9] 1,1,2,2-Tetrachloroethane : 2 of the 24 valid sites
- [11] 2,4,6-Trichlorophenol : 11 of the 16 valid sites
- [12] Propyl 4-hydroxybenzoate (synonym: Propylparaben): 1 of the 16 valid sites
- [16] 1-Bromopropane : 2 of the 21 valid sites
- [18] Benzophenone: 7 of the 25 valid sites

In wild life, 1 target chemical was detected.

- [11] 2,4,6-Trichlorophenol: 10 of the 12 valid sites

In air, 6 out of the 8 target chemicals were detected.

- [4] 4,6-Dinitro-*o*-cresol : 9 of the 9 valid sites
- [7] Dibromochloromethane : 13 of the 18 valid sites
- [10] Tetrafluoroethylene : 4 of the 10 valid sites
- [14] Pyrocatechol (synonym:Catechol): 7 of the 23 valid sites
- [15] Bromodichloromethane: 15 of the 18 valid sites
- [17] Benzaldehyde: 6 of the 12 valid sites

Table 1-2 Summary of the detection ranges and the detection limits in the Initial Environmental Survey in FY 2012

No.	Target chemicals	Surface water [ng/L]		Wild life [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
[1]	Anisidine						
[1-1]	<i>o</i> -Anisidine	nd 0/16	13				
[1-2]	<i>m</i> -Anisidine	nd 0/16	10				
[1-3]	<i>p</i> -Anisidine	nd 0/16	6.8				
[2]	2-Ethylhexanoic acid*					nd 0/14	390
[3]	3-Chloro-2-methyl-1-propene *					nd 0/9	4.8
[4]	4,6-Dinitro- <i>o</i> -cresol					nd~2.3 9/9	0.11
[5]	2,4-Di- <i>tert</i> -butylphenol*	nd 0/14	57				
[6]	1,2-Dibromoethane	nd 0/21	3.7				
[7]	Dibromochloromethane*					nd~33 13/18	1.8
[8]	3,3'-Dimethylbenzidine (synonym: <i>o</i> -Tolidine)*	nd 0/14	1.6				
[9]	1,1,2,2-Tetrachloroethane	nd~120 2/24	100				
[10]	Tetrafluoroethylene					nd~2,800 4/10	61
[11]	2,4,6-Trichlorophenol*	nd~27 11/16	0.94	nd~0.26 10/12	0.006		
[12]	Propyl 4-hydroxybenzoate (synonym: Propylparaben)	nd~16 1/16	14				
[13]	17 β -Hydroxyestra-4,9,11-trien -3-one (synonym: Trenbolone)	nd 0/16	0.017				
[14]	Pyrocatechol (synonym: Catechol)*					nd~25 7/23	5.0
[15]	Bromodichloromethane*					nd~37 15/18	2.4
[16]	1-Bromopropane*	nd~7.3 2/21	1.5				
[17]	Benzaldehyde*					nd~570 6/12	230
[18]	Benzophenone*	nd~38 7/25	4.3				

(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.