

Chapter 2 Results of the Detailed Environmental Survey in FY 2007

1. Purpose of the survey

The Detailed Environmental Survey is aimed at understanding the environmental persistence of the Specified Chemical Substances and the Monitored Chemical Substances under the Chemical Substances Control Law (Law No.117 of 1973) and chemicals requiring the Initial Environmental Risk Assessment.

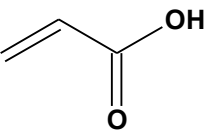
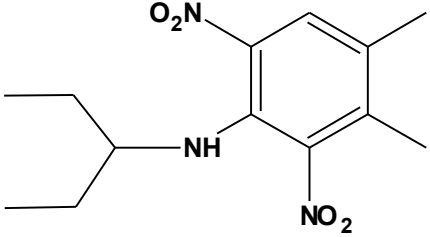
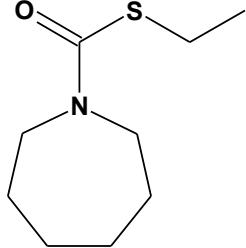
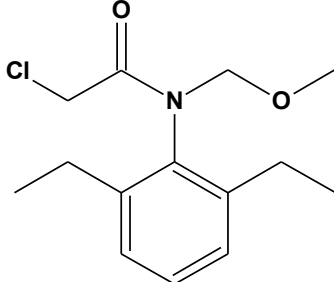
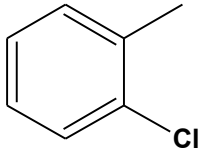
2. Target chemicals

In the FY 2007 Detailed Environmental Survey, 24 chemicals (groups) that were selected and designated as target chemicals. The combinations of target chemicals and the surveyed media are given below.

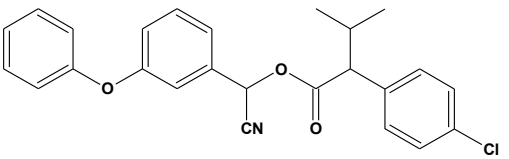
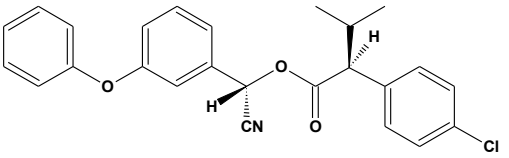
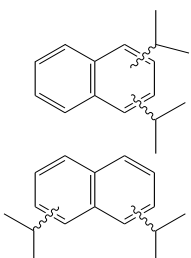
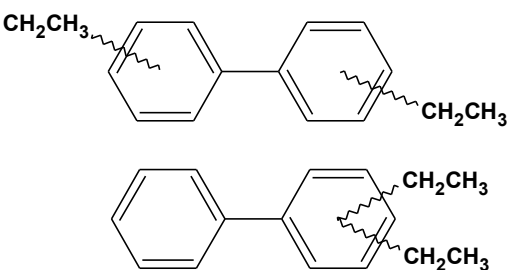
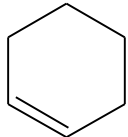
No.	Target chemicals Name	Designated Class in			Surveyed media			
		The Chemical Substances Control Law	The PRTR Law (Current)	The PRTR Law (New) Effective from October 1, 2009	Surface water	Sediment	Wildlife	Air
[1]	Acrylic acid		I	I	○			○
[2]	<i>N</i> -(1-ethylpropyl)-2,6-dinitro-3,4-xylidine (synonym: Pendimethalin)		I	I	○			
[3]	<i>S</i> -Ethylhexahydro-1 <i>H</i> -azepine-1-carbothioate (synonym: Molinate)		I	I	○			
[4]	2-Chloro-2',6'-diethyl- <i>N</i> -(methoxymethyl)acetanilide (synonym: Alachlor)		I	I	○	○		
[5]	<i>o</i> -Chlorotoluene	III Monitored	I	I	○			
[6]	<i>α</i> -Cyano-3-phenoxybenzyl 2-(4-chlorophenyl)-3-methylbutyrate (synonym: Fenvalerate)		I		○			
[7]	(<i>S</i>)- <i>α</i> -Cyano-3-phenoxybenzyl 2-(4-chlorophenyl)-3-methylbutyrate (synonym:S-Fenvalerate)			II	○			
[8]	Diisopropyl naphthalene	I Monitored			○			
[9]	Diethyl diphenyl	I Monitored			○	○	○	
[10]	Cyclohexene	III Monitored			○	○		
[11]	2,4-Dichlorophenoxyacetic acid (synonym: 2,4-D or 2,4-PA)	II Monitored III Monitored	I	I	○			
[12]	Diphenylamine	III Monitored	I	I	○			
[13]	6,6'-Di- <i>tert</i> -butyl-2,2'-methylenedi- <i>p</i> -cresol	II Monitored			○			
[14]	Dibenzyltoluene	I Monitored			○	○	○	
[15]	Ethyl 2-[(dimethoxyphosphinothioyl)thio]-2-phenylacetate (synonym: Phenthoate or PAP)	II Monitored	I	I	○	○		
[16]	Hydrogenated terphenyl	I Monitored		I	○	○		
[17]	2-Thioxo-3,5-dimethyltetrahydro-2 <i>H</i> -1,3,5-thiadiazine (synonym: Dazomet)		I	I	○			
[18]	<i>O,O</i> -Dimethyl <i>O</i> -3-methyl-4-(methylthio)phenylphosphorothioate (synonym: Fenthion or MPP)		I	I	○		○	
[19]	Testosterone				○			
[20]	Naphthalene			I				○
[21]	1,1-Bis(<i>tert</i> -butyldioxy)-3,3,5-trimethylcyclohexane	I Monitored			○	○		
[22]	Biphenyl		II	I				○
[23]	Hexachlorobuta-1,3-diene	I Monitored			○	○		
[24]	6-Methylheptyl 3-(3,5-di- <i>tert</i> -butyl-4-hydroxyphenyl)propionate	II Monitored			○			

(Note) "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)."

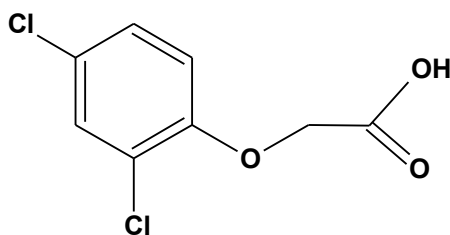
Chemical and physical properties of target chemicals of the Detailed Environmental Survey are as follows.

<p>[1] Acrylic acid</p> 	<p>Molecular formula: C₃H₄O₂ CAS: 79-10-7 ENCS: 2-984 MW: 72.06 mp: 14°C¹⁾ bp: 141°C¹⁾ SW: Readily Soluble¹⁾ Specific gravity: 1.0621 (16/4°C)¹⁾ logPow: 0.35²⁾</p>
<p>[2] <i>N</i>-(1-ethylpropyl)-2,6-dinitro-3,4-xylidine (synonym: Pendimethalin)</p> 	<p>Molecular formula: C₁₃H₁₉N₃O₄ CAS: 40487-42-1 ENCS: Uncertain MW: 281.31 mp: 56~57 °C¹⁾ bp: 330°C⁴⁾ SW: 0.3mg/L (20°C)¹⁾ Specific gravity: Uncertain logPow: 5.18⁵⁾</p>
<p>[3] <i>S</i>-Ethylhexahydro-1<i>H</i>-azepine-1-carbothioate (synonym: Molinate)</p> 	<p>Molecular formula: C₉H₁₇NOS CAS: 2212-67-1 ENCS: Uncertain MW: 187.30 mp: <25°C⁴⁾ bp: 202°C⁶⁾ SW: 990mg/L (25°C)⁵⁾ Specific gravity: Uncertain logPow: 2.88⁵⁾</p>
<p>[4] 2-Chloro-2',6'-diethyl-<i>N</i>-(methoxymethyl)acetanilide (synonym: Alachlor)</p> 	<p>Molecular formula: C₁₄H₂₀ClNO₂ CAS: 15972-60-8 ENCS: Uncertain MW: 269.77 mp: 40-41 °C¹⁾ bp: 135°C⁴⁾ SW: 140mg/L (23°C)¹⁾ Specific gravity: 1.133 (25/15.6°C)¹⁾ logPow: 3.5⁷⁾</p>
<p>[5] <i>o</i>-Chlorotoluene</p> 	<p>Molecular formula: C₇H₇Cl CAS: 95-49-8 ENCS: 3-39 MW: 126.59 mp: -35.59°C¹⁾ bp: 158.97°C¹⁾ SW: 374 mg/L (25°C)²⁾ Specific gravity: 1.0826 (20/4°C)¹⁾ logPow: 3.42⁸⁾</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, logPow: *n*-octanol-water partition coefficient, kPa: kilopascal (1 atom \approx 101.3kPa).

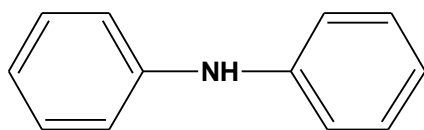
<p>[6] α-Cyano-3-phenoxybenzyl 2-(4-chlorophenyl)-3-methylbutyrate (synonym: Fenvalerate)</p> 	<p>Molecular formula: $C_{25}H_{22}ClNO_3$ CAS: 51630-58-1 ENCS: Uncertain MW: 419.91 mp: $45^{\circ}C^{4)}$ bp: $300^{\circ}C$ (37 mmHg) ⁹⁾ SW: $0.085mg/L^2)$ Specific gravity: 1.17 ($23^{\circ}C$) ¹⁾ logPow: $4.4-6.2^{10)}$</p>
<p>[7] (S)- α-Cyano-3-phenoxybenzyl 2-(4-chlorophenyl)-3-methylbutyrate (synonym: S-Fenvalerate)</p> 	<p>Molecular formula: $C_{25}H_{22}ClNO_3$ CAS: 66230-04-4 ENCS: Uncertain MW: 419.91 mp: $59\sim 60.2^{\circ}C^{1)}$ bp: $151\sim 167^{\circ}C^{3)}$ SW: $1mg/L^2)$ Specific gravity: 1.163 ($23/23^{\circ}C$) ¹⁾ logPow: $6.76^{2)}$</p>
<p>[8] Diisopropylnaphthalene</p> 	<p>Molecular formula: $C_{16}H_{20}$ CAS: 38640-62-9 ENCS: 4-961 MW: 212.33 mp: Uncertain bp: $290\sim 299^{\circ}C^{11)}$ SW: $0.11mg/L$ ($25^{\circ}C$) ¹²⁾ Specific gravity: 0.96 ($25^{\circ}C$) ⁶⁾ logPow: $6.08^{13)}$</p>
<p>[9] Diethyl diphenyl</p> 	<p>Molecular formula: $C_{16}H_{18}$ CAS: 28575-17-9 ENCS: 4-16 MW: 210.32 mp: Uncertain bp: Uncertain SW: Almost Insoluble ¹⁴⁾ Specific gravity: 0.986 ($25/4^{\circ}C$) ¹⁴⁾ logPow: Uncertain</p>
<p>[10] Cyclohexene</p> 	<p>Molecular formula: C_6H_{10} CAS: 110-83-8 ENCS: 3-2234 MW: 82.15 mp: $-103.5^{\circ}C^{1)}$ bp: $83^{\circ}C$ (760 mmHg) ¹⁾ SW: 0.016% ($25^{\circ}C$) ⁶⁾ Specific gravity: 0.8098 ($20/4^{\circ}C$) ¹⁾ logPow: $2.86^{6)}$</p>

[11] 2,4-Dichlorophenoxyacetic acid (synonym: 2,4-D or 2,4-PA)



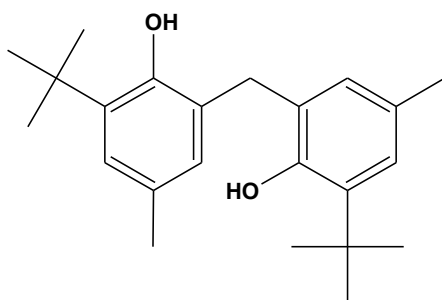
Molecular formula: $C_8H_6Cl_2O_3$
 CAS: 94-75-7
 ENCS: 3-927
 MW: 221.04
 mp: $138^{\circ}C^{1)}$
 bp: $160^{\circ}C$ (0.4 mmHg)¹⁾
 SW: 677 mg/L (25°C)¹⁵⁾
 Specific gravity: 0.7~0.8(water=1) (30°C)¹⁶⁾
 logPow: 2.81⁸⁾

[12] Diphenylamine



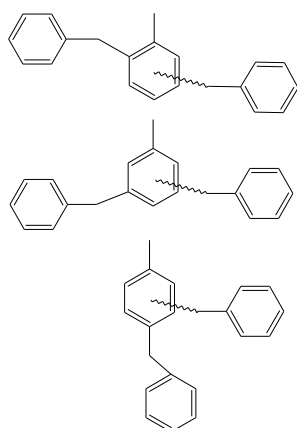
Molecular formula: $C_{12}H_{11}N$
 CAS: 122-39-4
 ENCS: 3-133
 MW: 169.23
 mp: $53\sim 54^{\circ}C^{1)}$
 bp: $302^{\circ}C^{1)}$
 SW: 40 mg/L (25°C)³⁾
 Specific gravity: 1.160 (22°C/20°C)¹⁷⁾
 logPow: 3.50³⁾⁸⁾

[13] 6,6'-Di-*tert*-butyl-2,2'-methylene-di-p-cresol



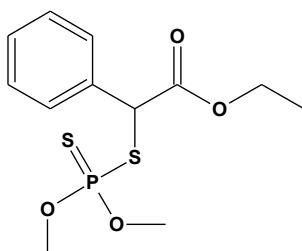
Molecular formula: $C_{23}H_{32}O_2$
 CAS: 119-47-1
 ENCS: 4-100
 MW: 340.51
 mp: $131^{\circ}C^{6)}$
 bp: $187^{\circ}C$ (0.07 hPa)¹⁸⁾
 SW: 0.02mg/L¹⁸⁾
 Specific gravity: Uncertain
 logPow: 6.25¹⁸⁾

[14] Dibenzyltoluene

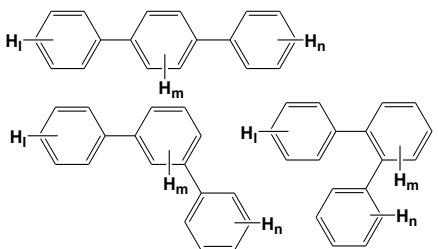
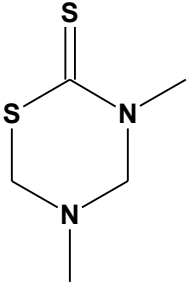
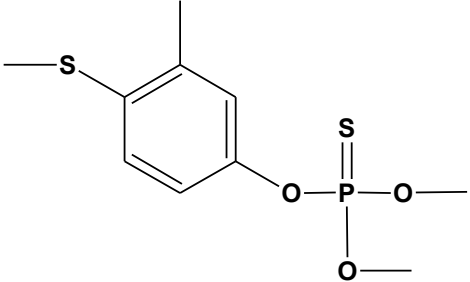
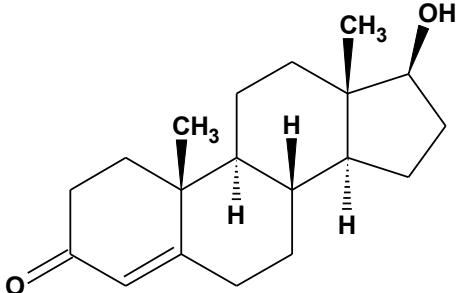
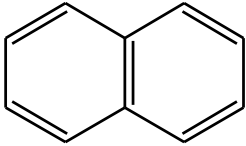


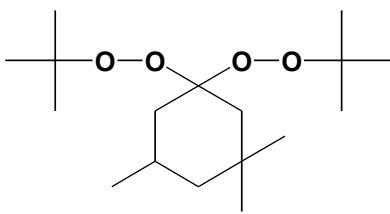
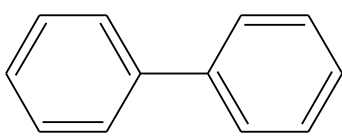
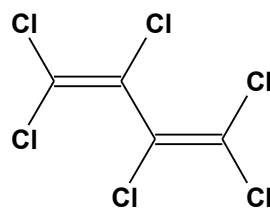
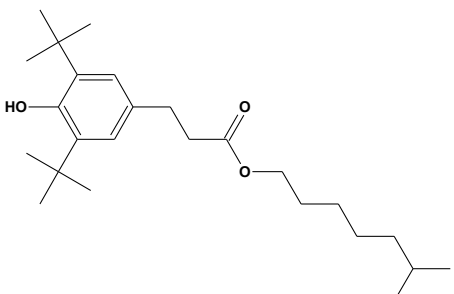
Molecular formula: $C_{21}H_{20}$
 CAS: 26898-17-9
 ENCS: 4-638
 MW: 272.39
 mp: Uncertain
 bp: Uncertain
 SW: Uncertain
 Specific gravity: Uncertain
 logPow: Uncertain

[15] Ethyl 2-[(dimethoxyphosphinothioyl)thio]-2-phenylacetate (synonym: Phenthoate or PAP)



Molecular formula: $C_{12}H_{17}O_4PS_2$
 CAS: 2597-03-7
 ENCS: 3-2615
 MW: 320.36
 mp: $17\sim 18^{\circ}C^{5)}$
 bp: $123^{\circ}C$ (0.01mmHg)⁶⁾
 SW: 11mg/L (24°C)¹⁹⁾
 Specific gravity: 1.226 (20/4°C)¹⁹⁾
 logPow: 3.69²⁾

<p>[16] Hydrogenated terphenyl</p> 	<p>Molecular formula: $C_{18}H_{(14+i)}$ ($i = 1+m+n = 1 \sim 14$) CAS: 61788-32-7 ENCS: 4-41 MW: 232.32~248.45 mp: Dependent on the molecule bp: Dependent on the molecule SW: Dependent on the molecule Specific gravity: Dependent on the molecule logPow: Dependent on the molecule</p>
<p>[17] 2-Thioxo-3,5-dimethyltetrahydro-2H-1,3,5-thiadiazine (synonym: Dazomet)</p> 	<p>Molecular formula: $C_5H_{10}N_2S_2$ CAS: 533-74-4 ENCS: 5-1085 MW: 162.269 mp: 106-107°C¹⁾ bp: Uncertain SW: 0.3g/100ml²⁰⁾ Specific gravity: 1.3 (water=1)²⁰⁾ logPow: 1.4²⁰⁾</p>
<p>[18] <i>O,O</i>-Dimethyl <i>O</i>-3-methyl-4-(methylthio)phenylphosphorothioate (synonym: Fenthion or MPP)</p> 	<p>Molecular formula: $C_{10}H_{15}O_3PS_2$ CAS: 55-38-9 ENCS: Uncertain MW: 278.34 mp: 7.5°C⁶⁾ bp: 87°C (0.01mmHg)¹⁾ SW: 55mg/L¹⁾ Specific gravity: 1.250 (20/4°C)¹⁾ logPow: 4.091²²⁾</p>
<p>[19] Testosterone</p> 	<p>Molecular formula: $C_{19}H_{28}O_2$ CAS: 58-22-0 ENCS: Uncertain MW: 288.43 mp: 155°C¹⁾ bp: Uncertain SW: 30mg/L²⁾ Specific gravity: Uncertain logPow: 3.32⁸⁾</p>
<p>[20] Naphthalene</p> 	<p>Molecular formula: $C_{10}H_8$ CAS: 91-20-3 ENCS: 4-311 MW: 128.17 mp: 80.2°C¹⁾ bp: 217.9°C¹⁾ SW: 31mg/L (25°C)¹⁵⁾ Specific gravity: 1.162 (20/4°C)¹⁾ logPow: 3.30⁸⁾</p>

<p>[21] 1,1-Bis(<i>tert</i>-butyldioxy)-3,3,5-trimethylcyclohexane</p> 	<p>Molecular formula: C₁₇H₃₄O₄ CAS: 6731-36-8 ENCS: 3-2341 MW: 302.45 mp: -30°C⁶⁾ bp: 63°C⁶⁾ SW: 0.6mg/L²³⁾ Specific gravity: Uncertain logPow: 6.53²³⁾</p>
<p>[22] Biphenyl</p> 	<p>Molecular formula: C₁₂H₁₀ CAS: 92-52-4 ENCS: 4-13 MW: 154.21 mp: 69~71°C¹⁾ bp: 254~255°C¹⁾ SW: 7.5mg/L (25°C)²⁵⁾ Specific gravity: 1.041 (20°C)²⁶⁾ logPow: 4.01²⁷⁾</p>
<p>[23] Hexachlorobuta-1,3-diene</p> 	<p>Molecular formula: C₄Cl₆ CAS: 87-68-3 ENCS: 2-121 MW: 260.76 mp: -21°C¹⁾ bp: 215°C¹⁾ SW: 0.0005% (20°C)¹⁾ Specific gravity: 1.682 (20/4°C)¹⁾ logPow: 4.9²⁸⁾</p>
<p>[24] 6-Methylheptyl 3-(3,5-di-<i>tert</i>-butyl-4-hydroxyphenyl)propionate</p> 	<p>Molecular formula: C₂₅H₄₂O₃ CAS: 146598-26-7 ENCS: 3-4150 MW: 390.61 mp: Uncertain bp: Uncertain SW: Uncertain Specific gravity: Uncertain logPow: Uncertain</p>

References

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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 analyzed by private analytical laboratories. In the survey of surface water for target chemicals [2], [3], [4], [6], [7], [11], [15], and [18] (mainly used as pesticides), the water was sampled taking into consideration the time of pesticide spraying.

(1) Organisations responsible for sampling

Local communities	Organisations responsible for sampling	Surveyed media			
		Surface water	Sediment	Wildlife	Air
Hokkaido	Hokkaido Institute of Environmental Sciences	○	○		○
Sapporo City	Sapporo City Institute of Public Health	○			○
Aomori Pref.	Aomori Prefectural Government Sanpachi District Administration Office Management and Local Coordination Division Hachinohe Environmental Management Office			○	
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	○			○
Yamagata Pref.	Environmental Science Research Center of Yamagata Prefecture	○	○		
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	○			○
Chiba Pref.	Chiba Prefectural Environmental Research Center	○	○		○
Tokyo Met.	Tokyo Metropolitan Research Institute for Environmental Protection	○	○		○
Yokohama City	Yokohama Environmental Science Research Institute	○	○	○	
Kawasaki City	Kawasaki Municipal Research Institute for Environmental Protection	○	○	○	
Niigata Pref.	Niigata Prefectural Institute of Public Health and Environmental Sciences	○	○	○	
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	○	○		
Aichi Pref.	Aichi Environmental Research Center	○	○		
Nagoya City	Nagoya City Environmental Science Research Institute	○	○		
Mie Pref.	Mie Prefectural Science and Technology Promotion Center	○			○
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.	Research Institute of Environment, Agriculture and Fisheries, Osaka Prefectural Government	○	○	○	○
Osaka City	Osaka City Institute of Public Health and Environmental Sciences	○	○		
Hyogo Pref.	Hyogo Prefectural Institute of Public Health and Environmental Sciences	○	○	○	
Kobe City	Environmental Conservation and Guidance Division, Environment Bureau	○			

Local communities	Organisations responsible for sampling	Surveyed media			
		Surface water	Sediment	Wildlife	Air
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 Prefectural Technology Research Institute Health and Environment Center	○	○		
Yamaguchi Pref.	Yamaguchi Prefectural Public Health and Environment	○	○	○	
Tokushima Pref.	Tokushima Prefectural Institute of Public Health and Environmental Sciences				
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 Science	○			
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		○		
Kagoshima Pref.	Kagoshima Prefectural Institute for Environmental Research and Public Health	○			

(Note) Organisations responsible for sampling are described by their official names in FY 2007

(2) Surveyed sites (or areas) and target chemicals

Surveyed sites and target chemicals for surface water are shown in Table 2-1-1 and Figure 2-1-1. Surveyed sites and target chemicals for sediment are shown in Table 2-1-2 and Figure 2-1-1. Surveyed sites and target chemicals for wildlife are shown in Table 2-1-3 and Figure 2-1-2. Surveyed sites and target chemicals for air are shown in Table 2-1-4 and Figure 2-1-3. The breakdown is summarized as follows.

Surveyed media	Numbers of local communities	Numbers of target chemicals	Numbers of surveyed sites (or areas)	Numbers of samples at a surveyed site (or area)
Surface water	36	22	53	3 ^{**1}
Sediment	23	8	31	3 ^{**2}
Wildlife	10	3	11	3
Air	12	3	13	3

(Note 1) For target chemicals [2], [3], [4], [6], [7], [11], [15] and [18], specimens were sampled during 3 days taking into consideration the time of pesticide spraying at Azuma-bashi Bridge, Riv. Toyohira in Sapporo city, Nishimae Bridge of Riv. Hasama(Tome City) in Miyagi Pref., Fukawasakae Bridge of Mouth of Riv. Tone(Tone Town) and Katta-bashi Bridge, Riv. Naka(Hitachinaka City) in Ibaraki Pref., 3 sites of reservoirs along the Sekido Bridge of Riv. Tama(Tama City), Arai Bridge of Riv. Asakawa(Hino City), and Tajima Bridge of Riv. Yaji (Hachioji City), Kamenoko Bridge over Riv.Tsurumi in Yokohama City, Mouth of Riv. Yamato(Osaka City, Sakai City) in Osaka Pref., Otoidezeki of Riv. Asahi(Okayama City) in Okayama Pref., and Mishima area, Riv. Iwamatsu(Uwajima City) in Ehime Pref.

(Note 2) One specimen was sampled per day at Sekido Bridge of Riv. Tama(Tama City), Arai Bridge of Riv. Asakawa(Hino City), and Tajima Bridge of Riv. Yaji (Hachioji City) in Tokyo Met..

Table 2-1-1 List of surveyed sites (surface water) and target chemicals in the Detailed Environmental Survey in FY 2007

Local communities	Surveyed sites	Target chemicals																							
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[21]	[23]	[24]		
Hokkaido	Ishikarikakokyo Bridge, Mouth of Riv. Ishikari(Ishikari City)					○			○				○									○			
Sapporo City	Nakanuma of Riv. Toyohira(Sapporo City)																				○				
	Azuma-bashi Bridge, Riv. Toyohira(Sapporo City)		○	○	○		○	○				○	○		○				○			○			
Iwate Pref.	Riv. Toyosawa(Hanamaki City)	○								○		○		○		○				○					
Miyagi Pref.	Nishimae Bridge of Riv. Hasama(Tome City)		○	○	○		○	○				○			○			○	○	○					
Sendai City	Hirose-ohashi Bridge, Riv. Hirose(Sendai City)	○																							
Yamagata Pref.	Mouth of Riv. Mogami(Sakata City)									○	○			○		○									
Ibaraki Pref.	Katta-bashi Bridge, Riv. Naka(Hitachinaka City)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○		
	Tonekamome-ohashi Bridge, Mouth of Riv. Tone(Kamisu City)								○																
	Fukawasakae Bridge of Mouth of Riv. Tone(Tone Town)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○		
Tochigi Pref.	Riv. Tagawa(Utsunomiya City)																	○							
Gunma Pref.	Tako Bridge of Riv. Kabura(Yoshii Town)													○									○		
Saitama Pref.	Shiki-ohashi Bridge, Riv. Yanase(Shiki City)	○																					○		
	Kachi-hashi Bridge, Riv. Ichino(Yoshimi Town)	○																					○		
Chiba Pref.	Asai-bashi Bridge, Riv. Yourou(Ichihara City)																				○		○		
	Coast of Ichihara and Anegasaki					○				○	○			○		○									
Tokyo Met.	Mouth of Riv. Arakawa(Koto Ward)												○												
	Mouth of Riv. Sumida(Minato Ward)												○												
	Sekido Bridge of Riv. Tama(Tama City)		○	○	○		○	○				○				○				○					
	Arai Bridge of Riv. Asakawa(Hino City)		○	○	○		○	○				○				○				○					
	Tajima Bridge of Riv. Yaji(Hachioji City)		○	○	○		○	○				○				○				○					
Yokohama City	Kamenoko Bridge over Riv. Tsurumi (Yokohama City)		○	○	○		○	○	○	○		○		○	○	○	○	○	○	○					
Kawasaki City	Mouth of Riv. Tama(Kawasaki City)	○				○			○	○	○			○		○							○		
	Keihin Canal, Port of Kawasaki	○				○			○	○	○			○		○							○		
Niigata Pref.	Lower Riv. Shinano(Niigata City)	○							○									○		○					
Ishikawa Pref.	Mouth of Riv. Sai(Kanazawa City)												○					○					○		
Nagano Pref.	Lake Suwa(center)					○			○				○									○			
Shizuoka Pref.	Shimizu Port										○														
Aichi Pref.	Nagoya Port											○									○	○	○		
Nagoya City	Minatoshinbashi Bridge, Riv. Hor (Nagoya City)										○										○		○		
Mie Pref.	Yokkaichi Port	○				○			○				○					○							
Shiga Pref.	Lake Biwa(center, offshore of Karasaki)					○			○	○				○		○				○	○				
Osaka Pref.	Mouth of Riv. Yamato(Osaka City, Sakai City)		○	○	○		○	○			○				○				○						
	Mouth of Riv. Yamato(Sakai City)					○			○			○										○			
Osaka City	Osaka Port					○			○	○	○		○	○	○		○			○	○				
Hyogo Pref.	Offshore of Himeji								○	○			○	○	○	○									
Kobe City	Kobe Port(center)												○								○				
Wakayama Pref.	Kinokawa-ohashi Bridge, Mouth of Riv. Kinokawa(Wakayama City)		○	○	○					○		○	○		○		○		○	○					
Okayama Pref.	Otoidezeki of Riv. Asahi(Okayama City)		○	○	○		○	○			○			○					○						
	Offshore of Mizushima					○			○		○		○								○		○		
Hiroshima Pref.	Kure Port																					○			
	Hiroshima Bay																					○			
Yamaguchi Pref.	Tokuyama Bay					○							○	○					○						
	Offshore of Hagi					○							○	○					○						
Kagawa Pref.	Takamatsu Port	○				○	○	○					○						○			○			

Local communities	Surveyed sites	Target chemicals																							
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[21]	[23]	[24]		
Ehime Pref.	Mishima area, Riv. Iwamatsu(Uwajima City)		○	○	○		○	○				○			○			○							
Fukuoka Pref.	Offshore of Omuta											○								○					
	Kabura-bashi Bridge, River Raizan(Maebaru City)											○								○					
Kitakyushu City	Kanmon Strait					○			○			○													
	Dokai Bay					○			○																
Fukuoka City	Hakata Bay	○				○			○	○	○				○		○			○			○		
Kagoshima Pref.	Riv. Amori(Kirishima City)	○																							
	Gotanda-bashi Bridge, Riv. Gotanda(Ichikikushikino City)	○																							

- [1] Acrylic acid,
[2] *N*-(1-ethylpropyl)-2,6-dinitro-3,4-xylidine (synonym: Pendimethalin)
[3] *S*-Ethylhexahydro-1*H*-azepine-1-carbothioate (synonym: Molinate)
[4] 2-Chloro-2',6'-diethyl-*N*-(methoxymethyl)acetanilide (synonym: Alachlor)
[5] *o*-Chlorotoluene
[6] *α*-Cyano-3-phenoxybenzyl 2-(4-chlorophenyl)-3-methylbutyrate (synonym: Fenvalerate))
[7] (*S*)- *α*-Cyano-3-phenoxybenzyl 2-(4-chlorophenyl)-3-methylbutyrate (synonym:S-Fenvalerate)
[8] Diisopropylnaphthalene
[9] Diethyl diphenyl
[10] Cyclohexene
[11] 2,4-Dichlorophenoxyacetic acid (synonym: 2,4-D or 2,4-PA)
[12] Diphenylamine
[13] 6,6'-Di-*tert*-butyl-2,2'-methylenedi-p-cresol
[14] Dibenzyltoluene
[15] Ethyl 2-[(dimethoxyphosphinothioyl)thio]-2-phenylacetate (synonym: Phenthoate or PAP)
[16] Hydrogenated terphenyl
[17] 2-Thioxo-3,5-dimethyltetrahydro-2*H*-1,3,5-thiadiazine (synonym: Dazomet)
[18] *O,O*-Dimethyl *O*-3-methyl-4-(methylthio)phenylphosphorothioate (synonym: Fenthion or MPP)
[19] Testosterone
[21] 1,1-Bis(*tert*-butyldioxy)-3,3,5-trimethylcyclohexane
[23] Hexachlorobuta-1,3-diene
[24] 6-Methylheptyl 3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)propionate

Table 2-1-2 List of surveyed sites (sediment) and target chemicals in the Detailed Environmental Survey in FY 2007

Local communities	Surveyed sites	Target chemicals							
		[4]	[9]	[10]	[14]	[15]	[16]	[21]	[23]
Hokkaido	Ishikarikakokyo Bridge, Mouth of Riv. Ishikari(Ishikari City)							○	
Yamagata Pref.	Mouth of Riv. Mogami(Sakata City)		○	○	○		○		
Chiba Pref.	Coast of Ichihara and Anegasaki		○	○	○		○		
Tokyo Met.	Mouth of Riv. Arakawa(Koto Ward)							○	
	Mouth of Riv. Sumida(Minato Ward)							○	
	Sekido Bridge of Riv. Tama(Tama City)	○				○			
	Arai Bridge of Riv. Asakawa (Hino City)	○				○			
	Tajima Bridge of Riv. Yaji (Hachioji City)	○				○			
Yokohama City	Kamenoko Bridge over Riv. Tsurumi(Yokohama City)	○				○			
Kawasaki City	Mouth of Riv. Tama(Kawasaki City)	○	○	○	○	○	○		
	Keihin Canal, Port of Kawasaki		○	○	○		○		
Niigata Pref.	Lower Riv. Shinano(Niigata City)	○	○		○	○	○		
Ishikawa Pref.	Mouth of Riv. Sai(Kanazawa City)								○
Nagano Pref.	Lake Suwa(center)							○	
Shizuoka Pref.	Shimizu Port		○	○	○		○		
Aichi Pref.	Nagoya Port							○	
Nagoya City	Minatoshinbashi Bridge, Riv. Hori(Nagoya City)			○					
Shiga Pref.	Lake Biwa(center, offshore of Karasaki)		○		○		○	○	
Osaka Pref.	Mouth of Riv. Yamato(Sakai City)	○				○		○	
Osaka City	Osaka Port		○	○	○		○	○	
Hyogo Pref.	Offshore of Himeji	○	○		○	○	○		
Wakayama Pref.	Kinokawa-ohashi Bridge, Mouth of Riv. Kinokawa(Wakayama City)		○	○	○		○		
Okayama Pref.	Otoidezeki of Riv. Asahi(Okayama City)	○				○			
	Offshore of Mizushima	○		○		○			
Hiroshima Pref.	Kure Port							○	
	Hiroshima Bay							○	
Yamaguchi Pref.	Tokuyama Bay	○				○			
	Offshore of Hagi	○				○			
Kagawa Pref.	Takamatsu Port							○	
Fukuoka City	Hakata Bay		○	○	○		○		
Saga Pref.	Imari Bay			○					

[4] 2-Chloro-2',6'-diethyl-N-(methoxymethyl)acetanilide (synonym: Alachlor) [9] Diethyl diphenyl, [10] Cyclohexene, [14] Dibenzyltoluene, [15] Ethyl 2-[(dimethoxyphosphinothioyl)thio]-2-phenylacetate (synonym: Phenthoate or PAP), [16] Hydrogenated terphenyl, [21] 1,1-Bis(*tert*-butyldioxy)-3,3,5-trimethylcyclohexane, [23] exachlorobuta-1,3-diene,

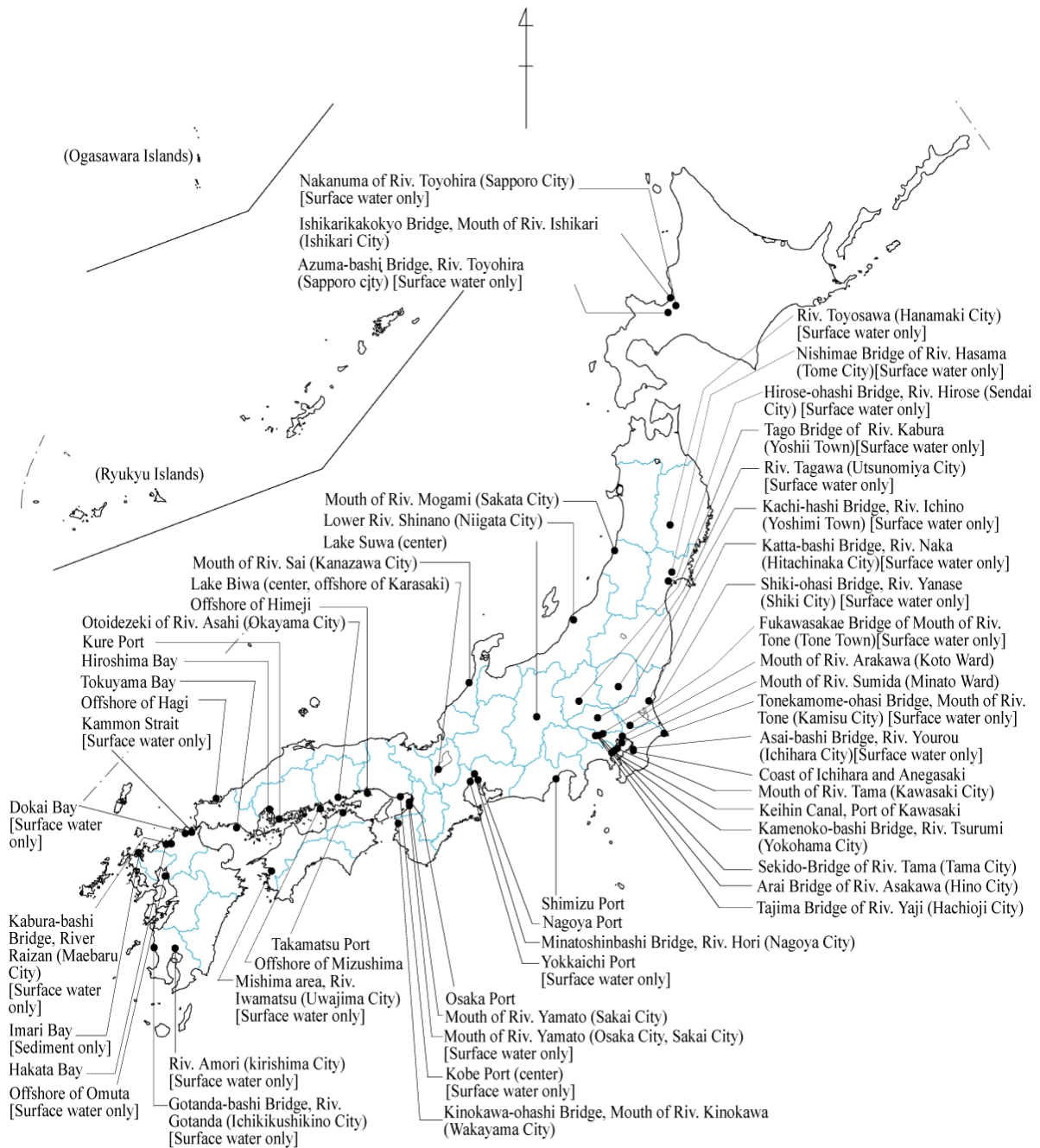


Figure 2-1-1 Surveyed sites (surface water and sediment) in the Detailed Environmental Survey in FY 2007

Table 2-1-3 List of surveyed sites (Wildlife) and target chemicals in the Detailed Environmental Survey in FY 2007

Local communities	Surveyed sites	Wildlife species	Target chemicals		
			[9]	[14]	[18]
Aomori Pref.	Kabu Is.(Hachinohe City)	Black-tailed gull			○
Iwate Pref.	Suburb of Morioka City	Gray starling	○	○	○
Yokohama City	Riv.Tsurumi(Yokohama City)	Carp	○	○	
Kawasaki City	Offshore of Ogishima Island, Port of Kawasaki	Sea bass	○	○	
Niigata Pref.	Lower Riv. Shinano(Niigata City)	Carp and Barbel steed	○	○	
Shiga Pref.	Lake Biwa, Riv. Azumi(Takashima City)	Dace	○	○	
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	Striped mullet	○	○	

[9] Diethyl diphenyl, [14] Dibenzyltoluene,

[18] *O,O*-Dimethyl *O*-3-methyl-4-(methylthio)phenylphosphorothioate (synonym: Fenthion or MPP)

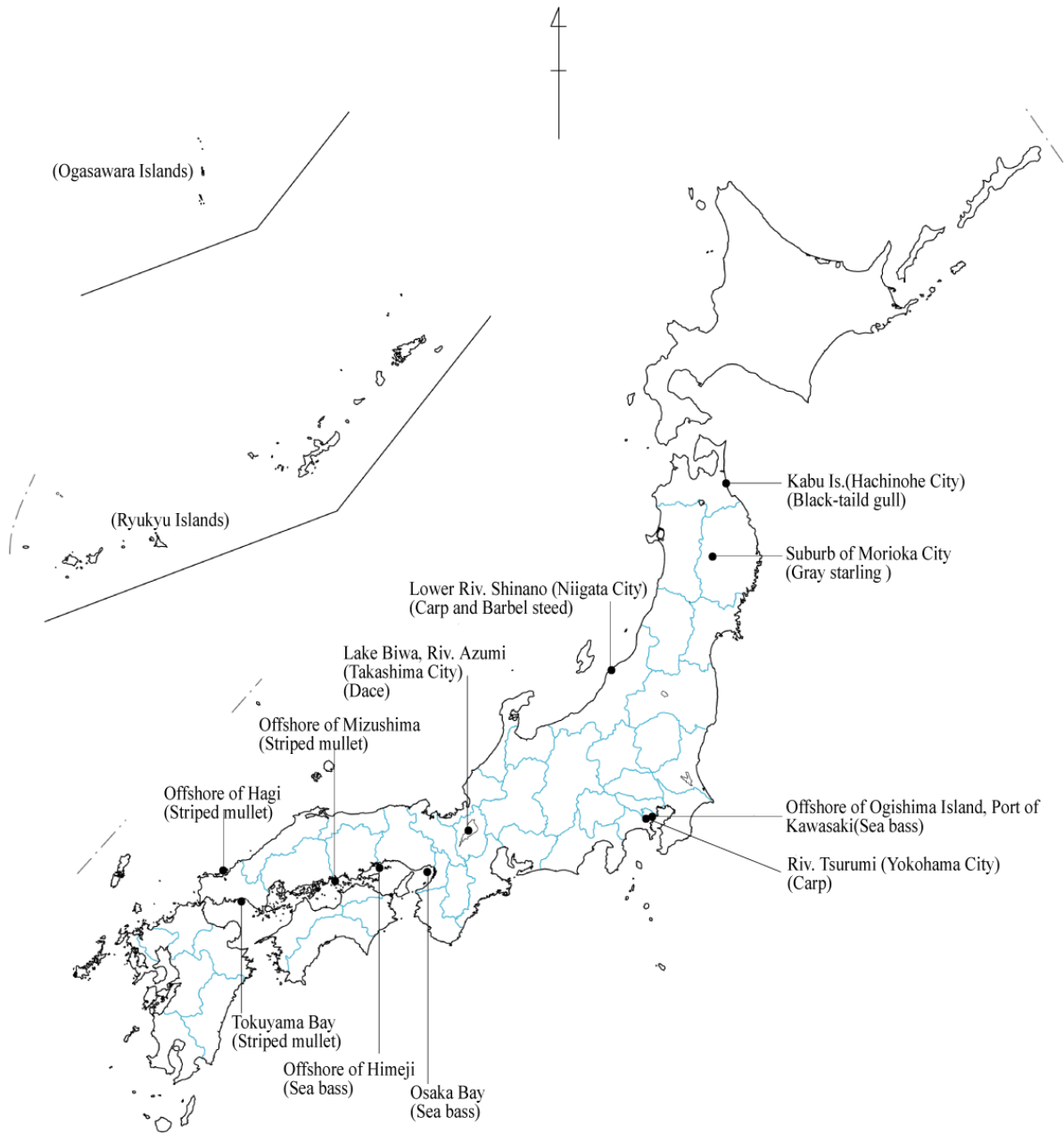


Figure 2-1-2 Surveyed areas(wildlife) in the Detailed Environmental Survey in FY 2007

Table 2-1-4 List of surveyed sites (air) and target chemicals in the Detailed Environmental Survey in FY 2007

Local communities	Surveyed sites	Target chemicals		
		[1]	[20]	[22]
Hokkaido	Hokkaido Institute of Environmental Sciences(Sapporo City)		○	○
Sapporo City	Sapporo City Institute of Public Health(Sapporo City)	○		
Sendai City	Tsutsujigaoka Park(Sendai City)	○		
Saitama Pref.	Center for Environmental Science in Saitama(Kisai Town)	○		
Chiba Pref.	Ichihara-Matsuzaki Air Quality Monitoring Station(Ichihara City)	○	○	○
Tokyo Met.	Tokyo Metropolitan Research Institute for Environmental Protection(Koto Ward)		○	○
	Chichijima Island		○	○
Nagano Pref.	Nagano Environmental Conservation Research Institute(Nagano City)		○	○
Gifu Pref.	Gifu Prefectural Research Institute for Health and Environmental Sciences(Kakamigahara City)	○		
Mie Pref.	Mie Prefectural Science and Technology Promotion Center(Yokkaichi City)	○	○	○
Kyoto Pref.	Kyoto Prefectural Joyo High School(Joyo City)		○	○
Kyoto City	Kyoto City Hall(Kyoto City)	○		
Osaka Pref.	Research Institute of Environment, Agriculture and Fisheries, Osaka Prefectural Government(Osaka City)	○	○	○

[1] Acrylic acid, [20] Naphthalene [22] Biphenyl

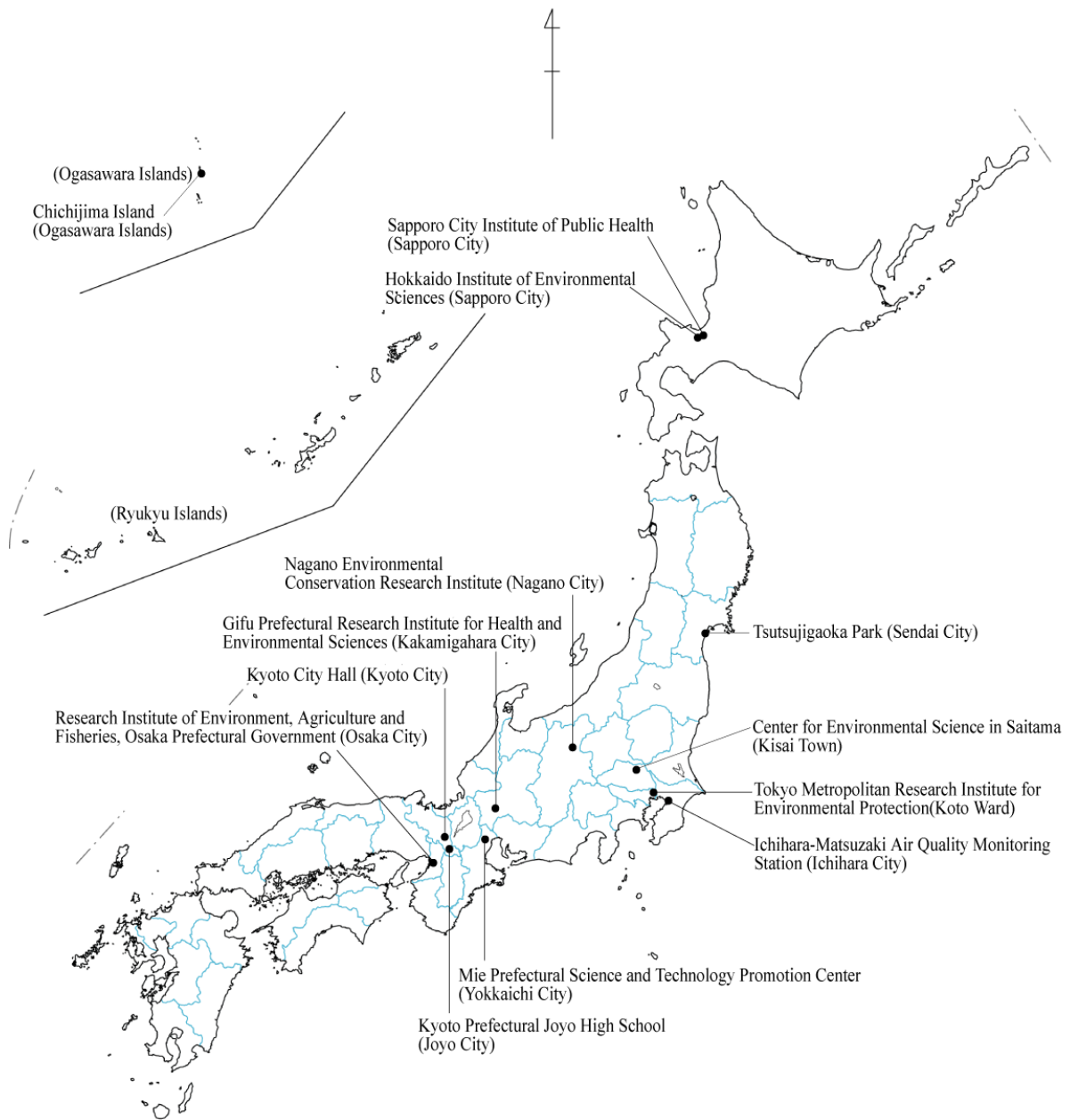


Figure 2-1-3 Surveyed sites (air) in the Detailed Environmental Survey in FY 2007

(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 ①).

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 ②).

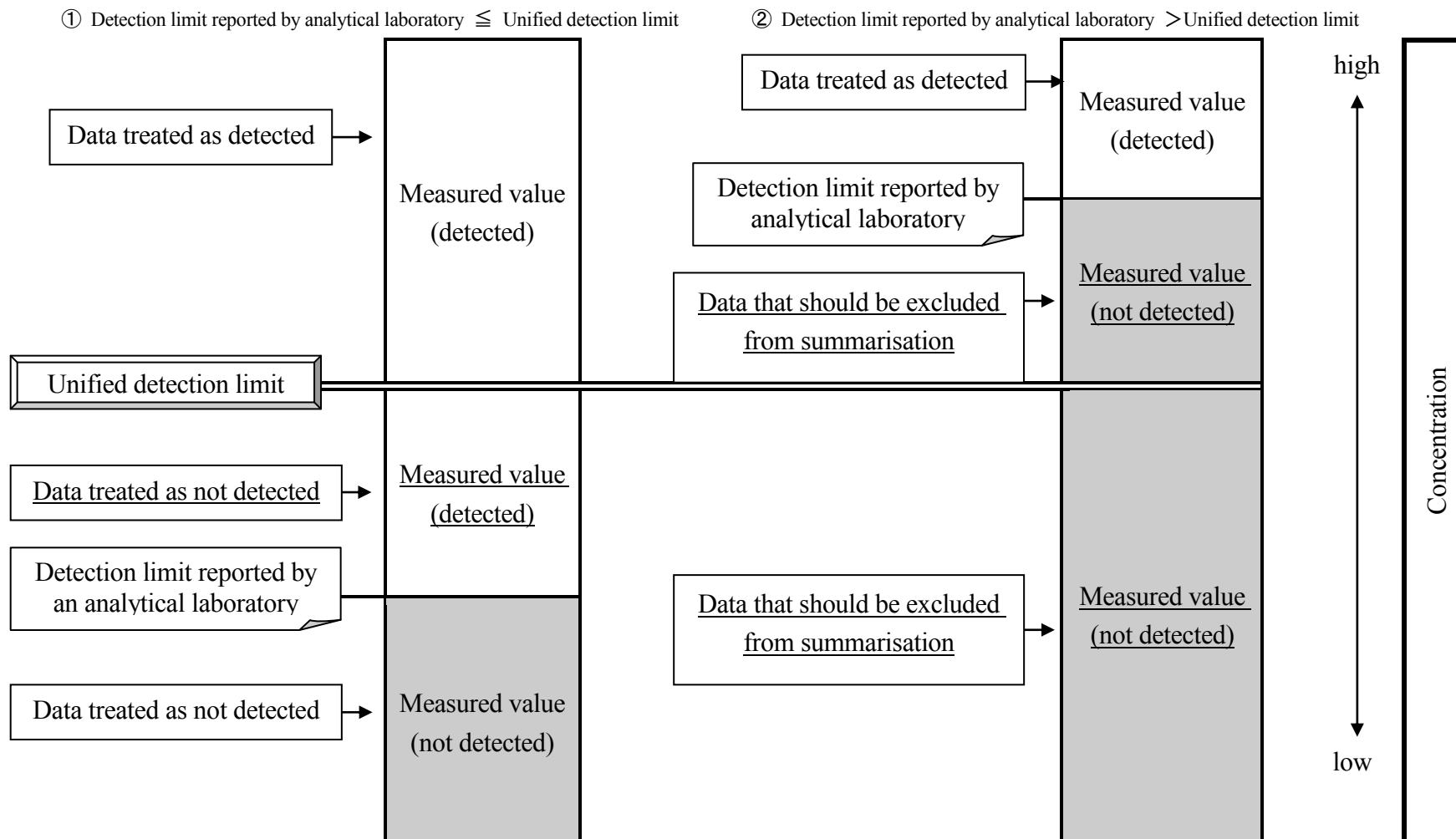
When the instrument detection limit (IDL) and the method detection limit (MDL) are given in the analytical method, which is described in reports on the investigation of the development of analytical methods for chemicals and adopted in the Detailed Environmental Survey (hereafter, the Detailed Environmental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

When IDL and MDL are not given in the Detailed 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 Detailed 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 2-2. The survey results are summarized as follows.

In surface water, 10 out of the 22 target chemicals (groups) were detected.

- [1] Acrylic acid: 3 of the 10 valid sites
- [3] *S*-Ethylhexahydro-1*H*-azepine-1-carbothioate (synonym: Molinate): 1 of the 12 valid sites
- [4] 2-Chloro-2',6'-diethyl-*N*-(methoxymethyl)acetanilide (synonym: Alachlor): 2 of the 12 valid sites
- [8] Diisopropylnaphthalene: 6 of the 18 valid sites
- [10] Cyclohexene: 6 of the 11 valid sites
- [11] 2,4-Dichlorophenoxyacetic acid (synonym: 2,4-D or 2,4-PA): 10 of the 12 valid sites
- [12] Diphenylamine: 8 of the 19 valid sites
- [14] Dibenzyltoluene: 8 of the 13 valid sites
- [16] Hydrogenated terphenyl: 6 of the 13 valid sites
- [18] *O,O*-Dimethyl *O*-3-methyl-4-(methylthio)phenylphosphorothioate (synonym: Fenthion or MPP): 1 of the 12 valid sites

In sediment, 5 out of the 8 target chemicals (groups) were detected.

- [9] Diethyl diphenyl: 2 of the 11 valid sites
- [10] Cyclohexene: 1 of the 11 valid sites
- [14] Dibenzyltoluene: 9 of the 11 valid sites
- [16] Hydrogenated terphenyl: 9 of the 11 valid sites
- [21] 1,1-Bis(*tert*-butyldioxy)-3,3,5-trimethylcyclohexane: 1 of the 11 valid sites

In wildlife (bivalves or fish), 2 out of the 3 target chemicals (groups) were detected.

- [9] Diethyl diphenyl: 1 of the 10 valid sites
- [14] Dibenzyltoluene: 5 of the 10 valid sites

In air, 3 out of the 3 target chemical were detected.

- [1] Acrylic acid: 4 of the 4 valid sites
- [20] Naphthalene: 7 of the 8 valid sites
- [22] Biphenyl: 7 of the 8 valid sites

Table 2-2 Summary of the detection ranges and the detection limits in the Detailed Environmental Survey in FY 2007

Target chemicals		Surface water [ng/L]		Sediment [ng/g-dry]		Wildlife [ng/g-wet]		Air [ng/m ³]	
No.	Name	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]	Acrylic acid	nd~2,900 3/10	100					nd~180 4/4	16
[2]	<i>N</i> -(1-ethylpropyl)-2,6-dinitro-3,4-xylidine (synonym: Pendimethalin)	nd 0/12	1.4						
[3]	<i>S</i> -Ethylhexahydro-1 <i>H</i> -azepine-1-carbothioate (synonym: Molinate)	nd~9.9 1/12	4.1						
[4]	2-Chloro-2',6'-diethyl- <i>N</i> -(methoxymethyl)acetanilide (synonym: Alachlor)	nd~31 2/12	11	nd 0/12	0.6				
[5]	<i>o</i> -Chlorotoluene	nd 0/18	1.6						
[6]	α -Cyano-3-phenoxybenzyl 2-(4-chlorophenyl)-3-methylbutyrate (synonym: Fenvalerate)	nd 0/12	※2.6						
[7]	(<i>S</i>)- α -Cyano-3-phenoxybenzyl 2-(4-chlorophenyl)-3-methylbutyrate (synonym: <i>S</i> -Fenvalerate)	nd 0/12	2.3						
[8]	Diisopropyl naphthalene	nd~4.4 6/18	1.5						
[9]	Diethyl diphenyl	nd 0/13	※0.55	nd~7.1 2/11	※0.53	nd~0.090 1/10	※0.30		
[10]	Cyclohexene	nd~14 6/11	0.28	nd~2.7 1/11	0.55				
[11]	2,4-Dichlorophenoxyacetic acid (synonym: 2,4-D or 2,4-PA)	nd~390 10/12	0.10						
[12]	Diphenylamine	nd~26 8/19	8.5						
[13]	6,6'-Di- <i>tert</i> -butyl-2,2'-methylene-di- <i>p</i> -cresol	nd 0/10	7.0						
[14]	Dibenzyltoluene	nd~5.3 8/13	※1.4	nd~740 9/11	※0.66	nd~36 5/10	※0.65		
[15]	Ethyl 2-[(dimethoxyphosphinothioyl)thio]-2-phenylacetate (synonym: Phenthoate or PAP)	nd 0/12	22	nd 0/12	0.45				
[16]	Hydrogenated terphenyl	nd~0.75 6/13	※1.3	nd~82 9/11	※0.35				
[17]	2-Thioxo-3,5-dimethyltetrahydro-2 <i>H</i> -1,3,5-thiadiazine (synonym: Dazomet)	nd 0/11	420						
[18]	<i>O,O</i> -Dimethyl <i>O</i> -3-methyl-4-(methylthio)phenylphosphorothioate (synonym: Fenthion or MPP) □	nd~1.7 1/12	1.2			nd 0/2	0.095		

Target chemicals		Surface water [ng/L]		Sediment [ng/g-dry]		Wildlife [ng/g-wet]		Air [ng/m ³]	
No.	Name	Detection range and frequency	Detection limit	Detection range and frequency	Detection limit	Detection range and frequency	Detection limit	Detection range and frequency	Detection limit
[19]	Testosterone	nd 0/17	0.079						
[20]	Naphthalene							nd~530 7/8	21
[21]	1,1-Bis(<i>tert</i> -butyldioxy)-3,3,5-trimethylcyclohexane	nd 0/11	0.10	nd~0.17 1/11	0.034				
[22]	Biphenyl							nd~28 7/8	3.8
[23]	Hexachlorobuta-1,3-diene	nd 0/4	0.096	nd 0/1	0.0092				
[24]	6-Methylheptyl 3-(3,5-di- <i>tert</i> -butyl-4-hydroxyphenyl)propionate	nd 0/10	40						

(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) ※ is the sum value of for detection limits of each congener, and therefore a detection range that does not exceed this value can be shown instead of “nd”.