Chapter 2 Results of the Detailed Environmental Survey in FY2019

1. Purpose of the survey

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

2. Target chemicals

In the FY2019 Detailed Environmental Survey, 7 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 *1		The PRTR Law *2, 3		Surveyed media		
		Before the revision	After the revision	2000-	2008-	Surface water	Sedi-ment	Wild-life
[1]	Isocyanuric acid					○		
[2]	Cyclopolydimethylsiloxanes							
	[2-1] Octamethylcyclotetrasiloxane		Monitored			*4		○
	[2-2] Decamethylcyclopentasiloxane					*4		○
	[2-3] Dodecamethylcyclohexasiloxane		Monitored			*4		○
[3]	Clarithromycin and its metabolite							
	[3-1] Clarithromycin					○		
	[3-2] 14-(*R*)-Hydroxyclarithromycin					○		
[4]	2,6-Di-*tert*-butyl-4-methylphenol (synonym: BHT)	III Monitored	Priority Assessment Chemical Substances		I 207	○	○	○
[5]	*N*-[3-(Dimethylamino)propyl]stearamide		Priority Assessment Chemical Substances			○	○	
[6]	*N*,*N*-Dimethylalkane-1-amine *N*-oxides		Priority Assessment Chemical Substances					
	[6-1] *N*,*N*-Dimethyldecyl-1-amine *N*-oxide					○		
	[6-2] *N*,*N*-Dimethyldodecyl-1-amine *N*-oxide			I 166	I 224	○		
	[6-3] *N*,*N*-Dimethyltetradecyl-1-amine *N*-oxide					○		
	[6-4] *N*,*N*-Dimethyloctadecyl-1-amine *N*-oxide					○		
[7]	*N*,*N*′-Ethylenebis(thiocarbamoylthiozinc) bis(*N*,*N*-dimethyldithiocarbamate) (synonym: Polycarbamate)	III Monitored	Priority Assessment Chemical Substances	I 250	I 329			
	[7-1] *N*,*N*'-Ethylenebis(dithiocarbamamic acid)					○		
	[7-2] *N*,*N*-Dimethyldithiocarbamamic acid					○		

(Note 1) “Before the revision” in “The Chemical Substances Control Law” means designation before the May 20, 2009 revison of tha low (enforced April 1, 2011), and “After the revision” means designation after the law revison.

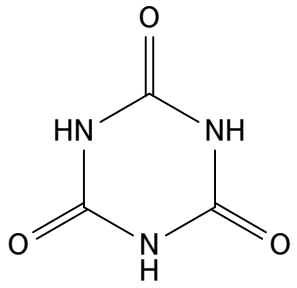
(Note 2) “The PRTR Law” hereafter means “Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (Law No. 86 of 1999).”

(Note 3) “2000-” in the “The PRTR Law” means designation at the time of enactment of government ordinance of tha low on June 7, 2000, and "2008-" means the designation after the revision of the government ordinance on November 21, 2008.

(Note 4) “*”: For Cyclopolydimethylsiloxanes, a survey was conducted in FY2019 for surface water as well as wildlife, but some doubts arose about the analytical results. The survey will be conducted again in FY2020, and based on the results, a new decision will be made whether to adopt the results of FY2019 or not. Therefore, the surface water results are not included in this report.

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

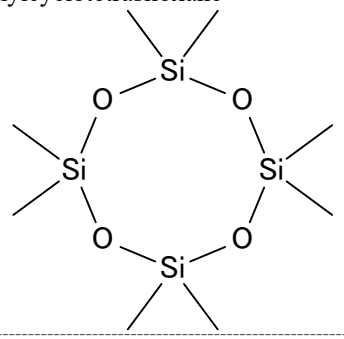
[1] Isocyanuric acid



Molecular formula: $C_3H_3N_3O_3$
CAS: 108-80-5
ENCS: 5-1037、5-1038
MW: 129.07
mp: 330 °C [1)]
bp: Sublimation at 330°C or more [2)]
sw: 1.994 g/L (25°C) [3)]
Specific gravities: 2.5 g/cm^3 [4)]
logPow: Less than 0.3 [1), 4)]

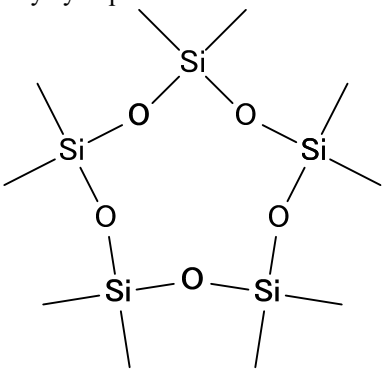
[2] Cyclopolydimethylsiloxanes

[2-1] Octamethylcyclotetrasiloxane



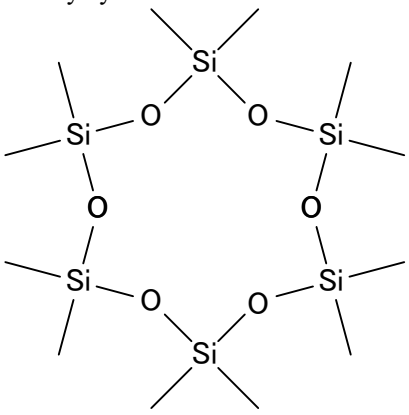
Molecular formula: $C_8H_{24}O_4Si_4$
CAS: 556-67-2
ENCS: 7-475 (Cyclopolyalkyl siloxanes (The alkyl chain has 1 - 20 carbon atoms.))
MW: 296.62
mp: 17.10°C [5)]
bp: 175.4°C [5)]
sw: 6.124 x 10^{-5} g/L (25°C) [3)]
Specific gravities: 0.9561 g/cm^3 [3, 5)]
logPow: 6.74 [2)]

[2-2] Decamethylcyclopentasiloxane



Molecular formula: $C_{10}H_{30}O_5Si_5$
CAS: 541-02-6
ENCS: 7-475 (Cyclopolyalkyl siloxanes (The alkyl chain has 1 - 20 carbon atoms.))
MW: 370.77
mp: -37.0°C [5)]
bp: 213°C [5)]
sw: 1.419 x 10^{-5} g/L (25°C) [3)]
Specific gravities: 0.9593 g/cm^3 [3, 5)]
logPow: 8.06 [2)]

[2-3] Dodecamethylcyclohexasiloxane

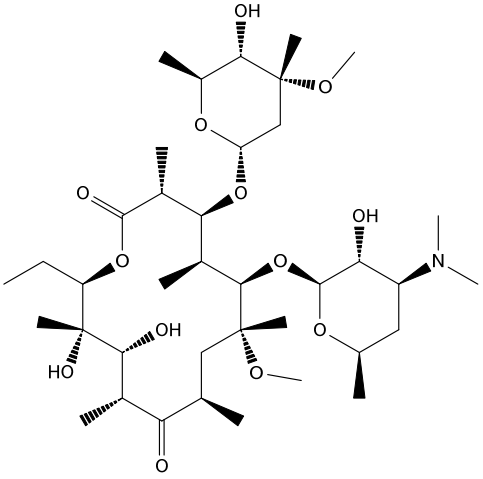


Molecular formula: $C_{12}H_{36}O_6Si_6$
CAS: 540-97-6
ENCS: 7-475 (Cyclopolyalkyl siloxanes (The alkyl chain has 1 - 20 carbon atoms.))
MW: 444.92
mp: -4.2°C [5)]
bp: 245.0°C [2), 5)]
sw: 5.266 x 10^{-6} g/L (25°C) [3)]
Specific gravities: 0.9672 g/cm^3 [2), 5)]
logPow: 8.87 [2)]

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

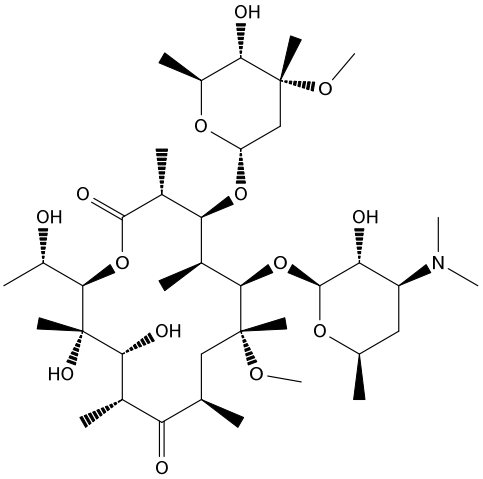
[3] Clarithromycin and its metabolite

[3-1] Clarithromycin



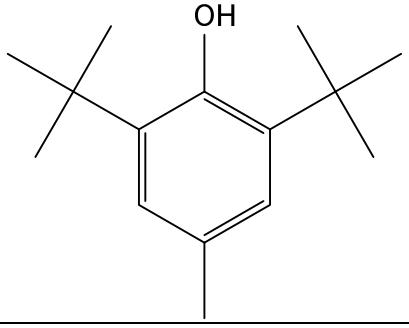
Molecular formula: $C_{38}H_{69}NO_{13}$
CAS: 81103-11-9
ENCS: No pertinence
MW: 747.95
mp: 222-225°C [6)]
bp: Uncertain
sw: 0.000342 g/L (25°C) [3)]
Specific gravities: Uncertain
logPow: 3.16 [3)]

[3-2] 14-(*R*)-Hydroxyclarithromycin



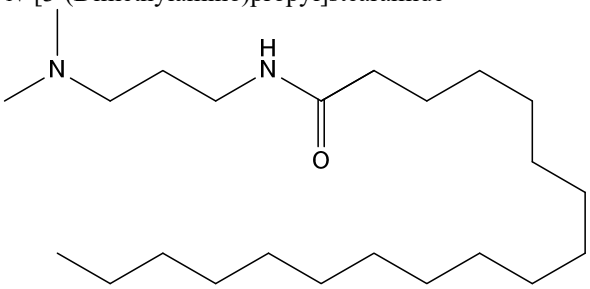
Molecular formula: $C_{38}H_{69}NO_{14}$
CAS: 116836-41-0
ENCS: No pertinence
MW: 763.95
mp: Decomposition at 217-220°C, also reported as 222-225°C [2)]
bp: Uncertain
sw: Uncertain
Specific gravities: Uncertain
logPow: 3.16 [2)]

[4] 2,6-Di-*tert*-butyl-4-methylphenol (synonym: BHT)



Molecular formula: $C_{15}H_{24}O$
CAS: 128-37-0
ENCS: 3-540 (Trialkyl (or alkenil) phenol (The alkyl (or alkenil) chains each have 1 - 20 carbon atoms.)
MW: 220.36
mp: 70°C [1), 2), 6)]
bp: 265°C [2)]
sw: 0.005748 g/L (25°C) [3)]
Specific gravities: 1.048 g/cm^3 (20°C/4°C) [2)]
logPow: 5.10 [3), 4)]

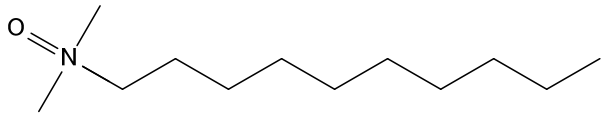
[5] *N*-[3-(Dimethylamino)propyl]stearamide



Molecular formula: $C_{23}H_{48}N_2O$
CAS: 7651-02-7
ENCS: 2-2509、2-2521
MW: 368.65
mp: Uncertain
bp: Uncertain
sw: 2.525×10^{-6} g/L (25°C) [3)]
Specific gravities: Uncertain
logPow: Uncertain

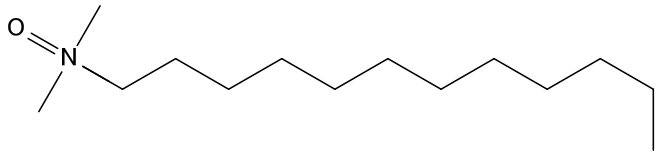
[6] *N*,*N*-Dimethylalkane-1-amine *N*-oxides

[6-1] *N*,*N*-Dimethyldecyl-1-amine *N*-oxide



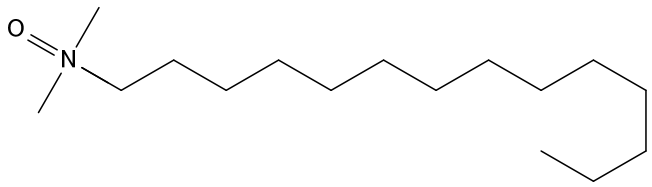
Molecular formula: $C_{12}H_{27}NO$
CAS: 2605-79-0
ENCS: 2-198 (Alkyl (or alkenil) amine oxide (One of the alkyl (or alkenil) chain has 8 - 24 carbon atoms, the others each 1- 5 arbon atoms.)
MW: 201.35
mp: Uncertain
bp: Uncertain
sw: 0.03035g/L (25°C) [3)]
Specific gravities: Uncertain
logPow: Uncertain

[6-2] *N*,*N*-Dimethyldodecyl-1-amine *N*-oxide



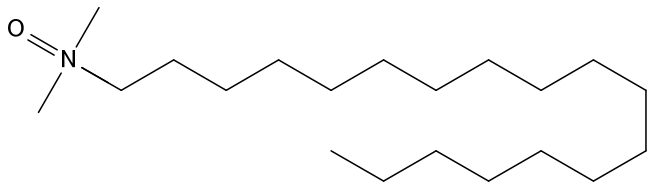
Molecular formula: $C_{14}H_{31}NO$
CAS: 1643-20-5
ENCS: 2-198 (Alkyl (or alkenil) amine oxide (One of the alkyl (or alkenil) chain has 8 - 24 carbon atoms, the others each 1- 5 arbon atoms.)
MW: 229.41
mp: 130.5°C [5)]
bp: Uncertain
sw: 0.003132g/L (25°C) [3)]
Specific gravities: Uncertain
logPow: Uncertain

[6-3] *N*,*N*-Dimethyltetradecyl-1-amine *N*-oxide



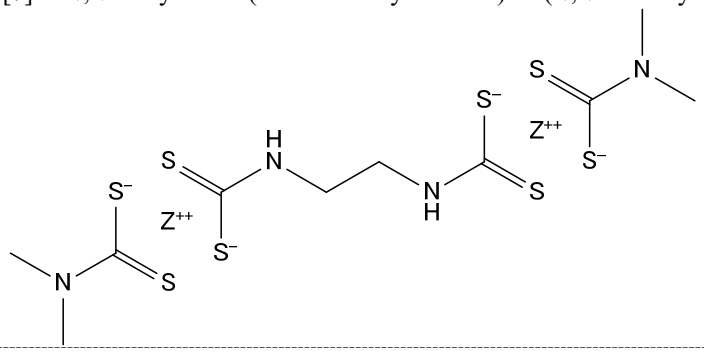
Molecular formula: $C_{16}H_{35}NO$
CAS: 3332-27-2
ENCS: 2-198 (Alkyl (or alkenil) amine oxide (One of the alkyl (or alkenil) chain has 8 - 24 carbon atoms, the others each 1- 5 arbon atoms.)
MW: 257.46
mp: Uncertain
bp: Uncertain
sw: 0.0003183g/L (25°C) [3)]
Specific gravities: Uncertain
logPow: Uncertain

[6-4] *N*,*N*-Dimethyloctadecyl-1-amine *N*-oxide



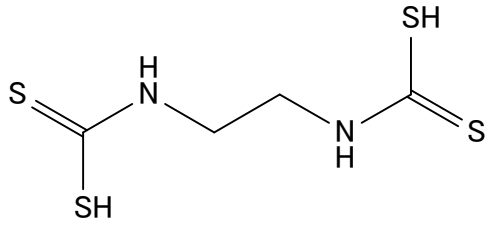
Molecular formula: $C_{20}H_{43}NO$
CAS: 2571-88-2
ENCS: 2-198 (Alkyl (or alkenil) amine oxide (One of the alkyl (or alkenil) chain has 8 - 24 carbon atoms, the others each 1- 5 arbon atoms.)
MW: 313.56
mp: Uncertain
bp: Uncertain
sw: 3.18×10^{-6} g/L (25°C) [3)]
Specific gravities: Uncertain
logPow: Uncertain

[7] *N*,*N*′-Ethylenebis(thiocarbamoylthiozinc) bis(*N*,*N*-dimethyldithiocarbamate) (synonym: Polycarbamate)



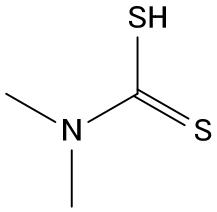
Molecular formula: $C_{10}H_{18}N_4S_8Zn_2$
CAS: 64440-88-6
ENCS: 2-1848
MW: 581.61
mp: Uncertain
bp: Uncertain
sw: 0.1077 g/L (25°C) [3)]
Specific gravities: Uncertain
logPow: Uncertain

[7-1] *N*,*N*′- Ethylenebis(dithiocarbamamic acid)



Molecular formula: $C_4H_8N_2S_4$
CAS: 115-54-6
ENCS: 2-1808
MW: 212.38
mp: Uncertain
bp: Uncertain
sw: Uncertain
Specific gravities: Uncertain
logPow: Uncertain

[7-2] *N*,*N*- Dimethyldithiocarbamamic acid



Molecular formula: $C_3H_7NS_2$
CAS: 79-45-8
ENCS: 2-1798
MW: 121.22
mp: Uncertain
bp: Uncertain
sw: Uncertain
Specific gravities: Uncertain
logPow: Uncertain

References

1) OECD, Screening Information Dataset (SIDS) for High Product inVolume Chemicals (Processed by UNEP Chemicals) (http://www.inchem.org/pages/sids.html, Browse the site in October 2020.)
2) U.S. National Library of Medicine, Hazardous Substances Data Bank (HSDB) (https://pubchem.ncbi.nlm.nih.gov/, Browse the site in October 2020.)
3) U.S. EPA, Estimation Programs Interface (EPI) Suite v4.1 (http://www.epa.gov/oppt/exposure/pubs/episuitedl.htm)
4) International Programme on Chemical Safty, International Chemical Safety Cards (ICSC) (http://www.ilo.org/safework/info/publications/WCMS_113134/lang--en/index.htm, Browse the site in October 2020.)
5) Rumble, J.R. (ed), CRC Handbook of Chemistry and Physics 98th Edition (2017), The Royal society of Chemistry.
6) O'Neil, M.J. (ed), The Merck Index 15th Edition (2013), CRC Press.

3. Surveyed site and procedure

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

(1) Organisations responsible for sampling

Local communities	Organisations responsible for sampling *	Surveyed media		
		Surface water	Sedi-ment	Wild-life
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	○	○	
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 Environmental Science Research Center	○	○	
Ibaraki Pref.	Ibaraki Kasumigaura Environmental Science Center	○	○	
Tochigi Pref.	Tochigi Prefectural Institute of Public Health and Environmental Science	○		
Saitama Pref.	Center for Environmental Science in Saitama	○		
Saitama City	Saitama City Institute of Health Science and Research	○		
Chiba Pref.	Chiba Prefectural Environmental Research Center	○	○	
Tokyo Met.	Environmental Improvement Division, Bureau of Environment, Tokyo Metropolitan Government and Tokyo Metropolitan Research Institute for Environmental Protection	○	○	○
Yokohama City	Yokohama Environmental Science Research Institute	○	○	
Kawasaki City	Kawasaki Environment Research Institute	○	○	○
Niigata Pref.	Niigata Prefectural Institute of Public Health and Environmental Sciences	○	○	
Toyama Pref.	Environment Preservation Division, Living Environmental and Cultural Affairs Department, Toyama Prefectural Government and Toyama Prefectural Environmental Science Research Center	○		
Ishikawa Pref.	Ishikawa Prefectural Institute of Public Health and Environmental Science	○	○	○
Fukui Pref.	Fukui Prefectural Institute of Public Health and Environmental Science	○		
Nagano Pref.	Nagano Environmental Conservation Research Institute	○	○	
Shizuoka Pref.	Shizuoka Institute of Environment and Hygiene	○	○	
Aichi Pref.	Aichi Environmental Research Center	○	○	
Nagoya City	Nagoya City Environmental Science Research Center, Regional Environmental measures Division, Environmental Bureau, Nagoya city	○	○	○
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	○	○	○
Osaka City	Osaka City Institute of Public Health and Environmental Sciences	○	○	
Hyogo Pref.	Water and Air Quality Control Division, Environmental Management Bureau, Agricultural and Environmental Affairs Department, Hyogo Prefectural Government and Hyogo Prefectural Institute of Environmental Sciences, Hyogo Environmental Advancement Association	○	○	○
Kobe City	Natural Environmental Symbiotic Division, Environmental Preservation Branch, Environment Bureau, Kobe City and Kobe Institute of Health, Welfare Bureau, Health Division, Health	○	○	
Nara Pref.	Nara Prefecture Landscape and Environment Center	○	○	
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	○	○	○
Kagawa Pref.	Kagawa Prefectural Research Institute for Environmental Sciences and Public Health	○	○	
Ehime Pref.	Ehime Prefectural Institute of Public Health and Environmental Science	○		
Fukuoka Pref.	Fukuoka Institute of Health and Environmental Sciences	○		
Kitakyushu City	Kitakyushu City Institute of Health and Environmental Sciences	○	○	
Fukuoka City	Fukuoka City Institute for Hygiene and the Environment	○	○	
Saga Pref.	Saga Prefectural Environmental Research Center	○	○	
Oita Pref.	Environment Preservation Division, Department of Environment, Oita Prefectural Government and Oita Prefectural Institute of Health and Environment	○	○	○

Local communities	Organisations responsible for sampling *	Surveyed media		
		Surface water	Sedi-ment	Wild-life
Okinawa Pref.	Okinawa Prefectural Institute of Health and Environment	○		

(Note) *: Organisations responsible for sampling are described by their official names in FY 2019.

(2) Surveyed sites and target chemicals

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

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

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

Surveyed media	Numbers of local communities	Numbers of target chemicals	Numbers of surveyed sites	Numbers of samples at a surveyed site
Surface water	42	6	63	1
Sediment	33	2	41	3
Wildlife	10	2	12	3
All media	42	7	75	

(3) Detection limit

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

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

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

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

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

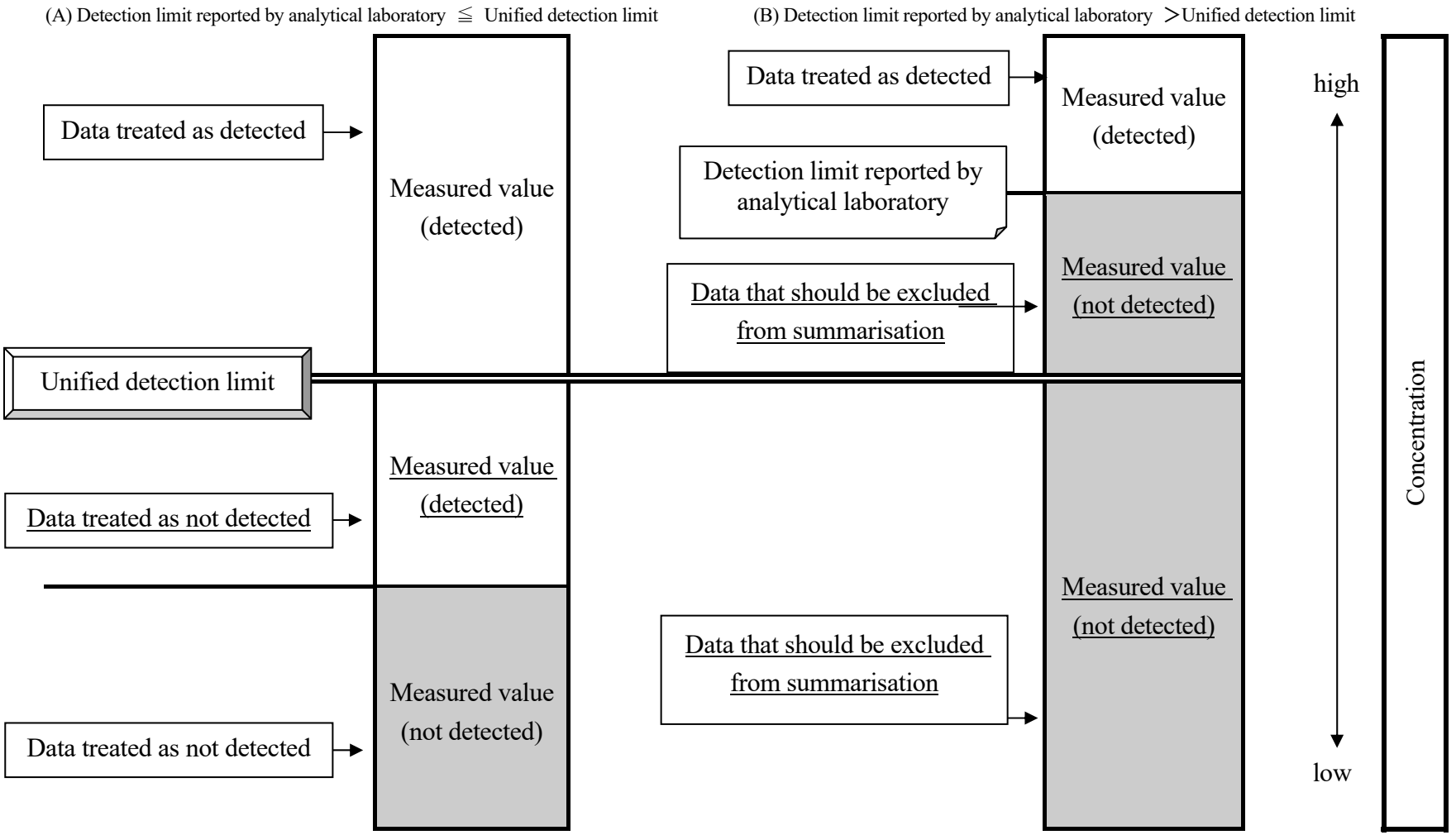
When the instrument detection limit (IDL) and the method detection limit (MDL) are given in the analytical method, which is described in reports on the investigation of the development of analytical methods for chemicals and adopted in the Initial Environmental Survey (hereafter, the Initial Environmental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

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

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

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

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



Schematic of procedure for data summarisation

Table 2-1-1 List of surveyed sites (surface water) and target chemicals in the Detailed Environmental Survey in FY2019

Local communities	Surveyed sites	Target chemicals					
		[1]	[3]	[4]	[5]	[6]	[7]
Hokkaido	Suzuran-ohashi Bridge, Riv Tokachi (Obihiro City)		○		○	○	
	Inou-ohashi Bridge, Riv. Ishikari (Asahikawa City)	○	○		○	○	
	Ishikarikakokyo Bridge, Mouth of Riv. Ishikari (Ishikari City)		○	○	○	○	○
	Tomakomai Port	○					○
Iwate Pref.	Toyosawa-bashi Bridge, Riv. Toyosawa (Hanamaki City)		○	○	○		○
Miyagi Pref.	Futatsuya-bashi Bridge, Riv. Hasama (Tome City)						○
	Sakura-hodoukyou Bridge, Riv.Shiroishi (Shibata Town)						○
Sendai City	Hirose-ohashi Bridge, Riv. Hirose (Sendai City)	○			○		
Akita Pref.	Akita Canal (Akita City)	○	○	○	○	○	○
Yamagata Pref.	Mouth of Riv. Mogami (Sakata City)				○		
Ibaraki Pref.	Tonekamome-ohasi Bridge, Mouth of Riv. Tone (Kamisu City)		○	○	○	○	○
Tochigi Pref.	Tagawa Kyubun Area Head Works, Riv. Tagawa (Utsunomiya City)	○		○			
Saitama Pref.	Akigaseshusuizeki of Riv. Arakawa (Shiki City)			○		○	
Saitama City	Nakadote-hashi Bridge, Riv. Kamo (Saitama City)					○	
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)	○	○	○	○	○	○
Yokohama City	Kamenoko-bashi Bridge, Riv.Tsurumi (Yokohama City)	○	○	○	○	○	○
	Yokohama Port	○	○	○	○	○	○
Kawasaki City	Mouth of Riv. Tama (Kawasaki City)	○	○	○	○	○	○
	Front of Chidori Town, Keihin Canal, Port of Kawasaki	○					
	Front of Ougi Town, Keihin Canal, Port of Kawasaki *		○	○			○
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)	○	○	○	○		○
Fukui Pref.	Mishima-bashi Bridge, Riv. Shono (Tsuruga City)						○
Nagano Pref.	Tategahana-bashi Bridge, Riv. Shinano (Nakano City)					○	
	Lake Suwa (center)			○			
Shizuoka Pref.	Shimizu Port	○					○
	Kaketsuka-bashi Bridge, Riv. Tenryu (Iwata City)		○	○	○		
Aichi Pref.	West of Shiomi Wharf, Nagoya Port	○		○	○		
Nagoya City	Hinode-bashi Bridge, Riv.Shin-hori (Nagoya City)			○	○	○	
	Minatoshinbashi Bridge, Riv. Hori (Nagoya City)		○		○	○	
	The pump station, Riv.Arako (Nagoya City)			○			
	South of Shiomi Wharf, Nagoya Port		○				○

Local communities	Surveyed sites	Target chemicals					
		[1]	[3]	[4]	[5]	[6]	[7]
Mie Pref.	Yokkaichi Port				○	○	○
	Toba 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	○	○	○	○	○	○
Hyogo Pref.	Offshore of Himeji	○	○		○	○	○
Kobe City	Kobe Port (center)						○
Nara Pref.	Taisho-bashi Bridge, Riv. Yamato (Oji Town)				○		
Wakayama Pref.	Kinokawa-ohashi Bridge, Mouth of Riv. Kinokawa (Wakayama City)	○	○	○		○	
Okayama Pref.	Sasagase-bashi Bridge, Riv. Sasagase (Okayama City)		○				
	Offshore of Mizushima	○		○			○
Yamaguchi Pref.	Tokuyama Bay	○		○	○		○
	Offshore of Hagi	○			○	○	
Kagawa Pref.	Takamatsu Port	○	○			○	○
Ehime Pref.	Sawadu Fishing Port	○		○			
	Mishima area, Riv. Iwamatsu (Uwajima City)		○				○
Fukuoka Pref.	Kabura-bashi Bridge, Riv. Raizan (Itoshima City)		○			○	
	Offshore of Omuta	○	○				
Kitakyushu City	Dokai Bay	○		○	○	○	○
Fukuoka City	Hakata Bay		○	○	○	○	
Saga Pref.	Imari Bay			○			○
Oita Pref.	Mouth of Riv. Oita (Oita City)		○	○	○		
Okinawa Pref.	Naha Port					○	

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

Table 2-1-2 List of surveyed sites (sediment) and target chemicals in the Detailed Environmental Survey in FY2019

Local communities	Surveyed sites	Target chemicals	
		[4]	[5]
Hokkaido	Ishikarikakokyo Bridge, Mouth of Riv. Ishikari (Ishikari City)	○	○
Iwate Pref.	Toyosawa-bashi Bridge, Riv. Toyosawa (Hanamaki City)	○	○
Sendai City	Hirose-ohashi Bridge, Riv. Hirose (Sendai City)		○
Akita Pref.	Akita Canal (Akita City)	○	○
Yamagata Pref.	Mouth of Riv. Mogami (Sakata City)		○
Ibaraki Pref.	Tonekamome-ohasi Bridge, Mouth of Riv. Tone (Kamisu City)		○
Chiba Pref.	Coast of Ichihara and Anegasaki	○	
Tokyo Met.	Mouth of Riv. Arakawa (Koto Ward)	○	○
	Mouth of Riv. Sumida (Minato Ward)	○	○

Local communities	Surveyed sites	Target chemicals	
		[4]	[5]
Yokohama City	Yokohama Port	○	○
Kawasaki City	Mouth of Riv. Tama (Kawasaki City)	○	○
	Front of Ougi Town, 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	○	
	Kaketsuka-bashi Bridge, Riv. Tenryu (Iwata City)		○
Aichi Pref.	West of Shiomi Wharf, Nagoya Port	○	○
Nagoya City	Hinode-bashi Bridge, Riv.Shin-hori (Nagoya City)	○	
	The pump station, Riv.Arako (Nagoya City)	○	
Mie Pref.	Yokkaichi Port		○
	Toba 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	○	○
Hyogo Pref.	Offshore of Himeji		○
Kobe City	Kobe Port (center)	○	
Nara Pref.	Taisho-bashi Bridge, Riv. Yamato (Oji Town)		○
Wakayama Pref.	Kinokawa-ohashi Bridge, Mouth of Riv. Kinokawa (Wakayama City)	○	
Okayama Pref.	Offshore of Mizushima	○	
Yamaguchi Pref.	Tokuyama Bay	○	○
	Offshore of Hagi		○
Kagawa Pref.	Takamatsu Port	○	
Kitakyushu City	Dokai Bay	○	○
Fukuoka City	Hakata Bay	○	○
Saga Pref.	Imari Bay	○	
Oita Pref.	Mouth of Riv. Oita (Oita City)	○	○

[4] 2,6-Di-*tert*-butyl-4-methylphenol (synonym: BHT), [5] *N*-[3-(Dimethylamino)propyl]stearamide

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

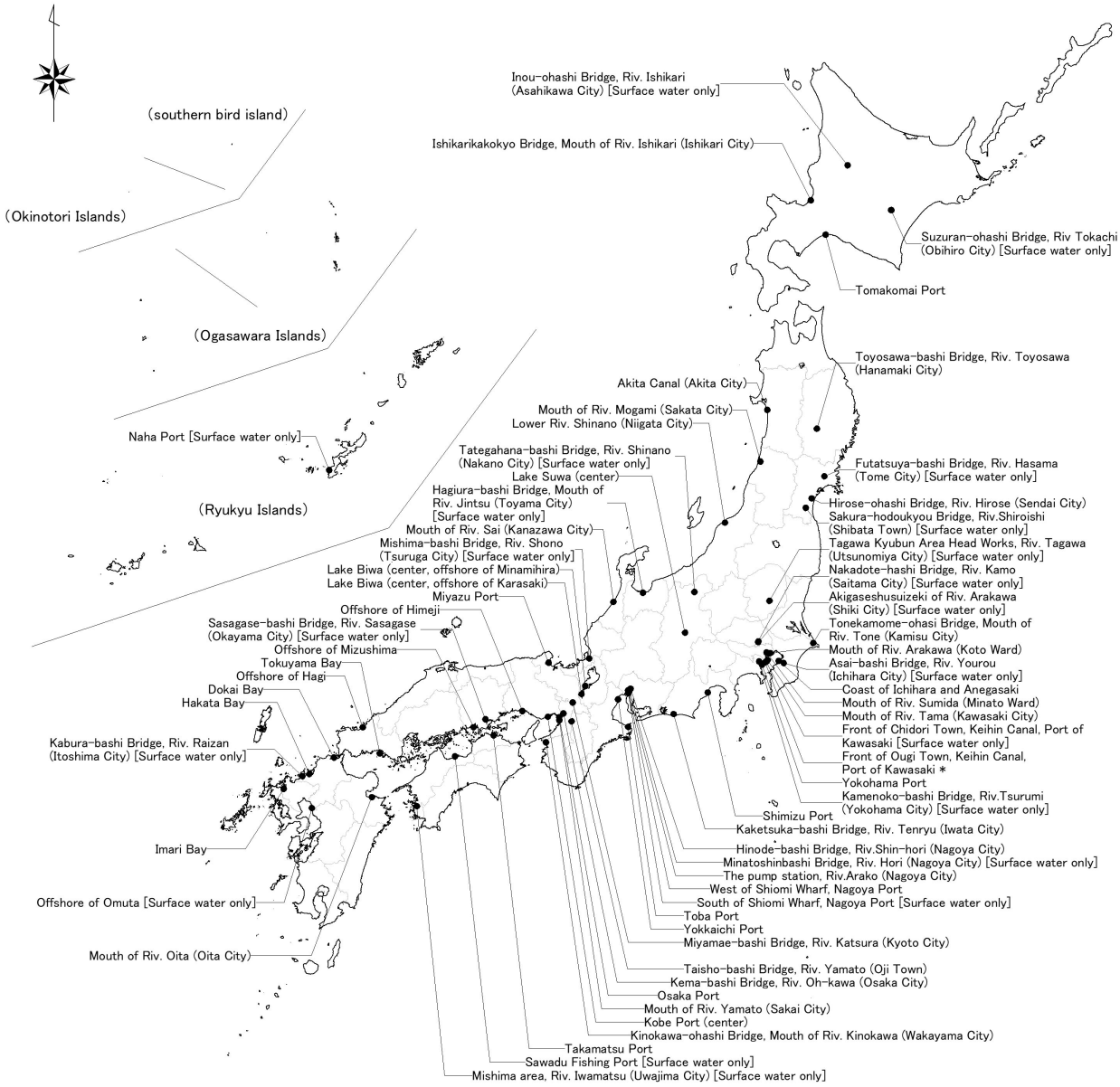


Figure 2-1-1 Surveyed sites (surface water and sediment) in the Detailed Environmental Survey in FY2019

Table 2-1-3 List of surveyed sites (wildlife) and target chemicals in the Detailed Environmental Survey in FY2019

Local communities	Surveyed sites	Wildlife species	Target chemicals	
			[2]	[4]
Iwate Pref.	Yamada Bay	Blue mussel (*Mytilus galloprovincialis*)	○	○
		Greenling (*Hexagrammos otakii*)	○	○
Tokyo Met.	Tokyo Bay	Sea bass (*Lateolabrax japonicus*)	○	○
Kawasaki City	Offshore of Ogishima Island, Port of Kawasaki	Sea bass (*Lateolabrax japonicus*)	○	○
Ishikawa Pref.	Coast of Noto Peninsula	Blue mussel (*Mytilus galloprovincialis*)	○	○
Nagoya City	Nagoya Port	Striped mullet (*Mugil cephalus*)		○
Osaka Pref.	Osaka Bay	Sea bass (*Lateolabrax japonicus*)	○	○
Hyogo Pref.	Offshore of Himeji	Sea bass (*Lateolabrax japonicus*)	○	○
Okayama Pref.	Offshore of Mizushima	Striped mullet (*Mugil cephalus*)	○	○
Yamaguchi Pref.	Tokuyama Bay	Striped mullet (*Mugil cephalus*)	○	○
	Offshore of Hagi	Sea bass (*Lateolabrax japonicus*)	○	○
Oita Pref.	Mouth of Riv. Oita (Oita City)	Sea bass (*Lateolabrax japonicus*)	○	○

[2] Cyclopolydimethylsiloxanes, [4] 2,6-Di-*tert*-butyl-4-methylphenol (synonym: BHT)

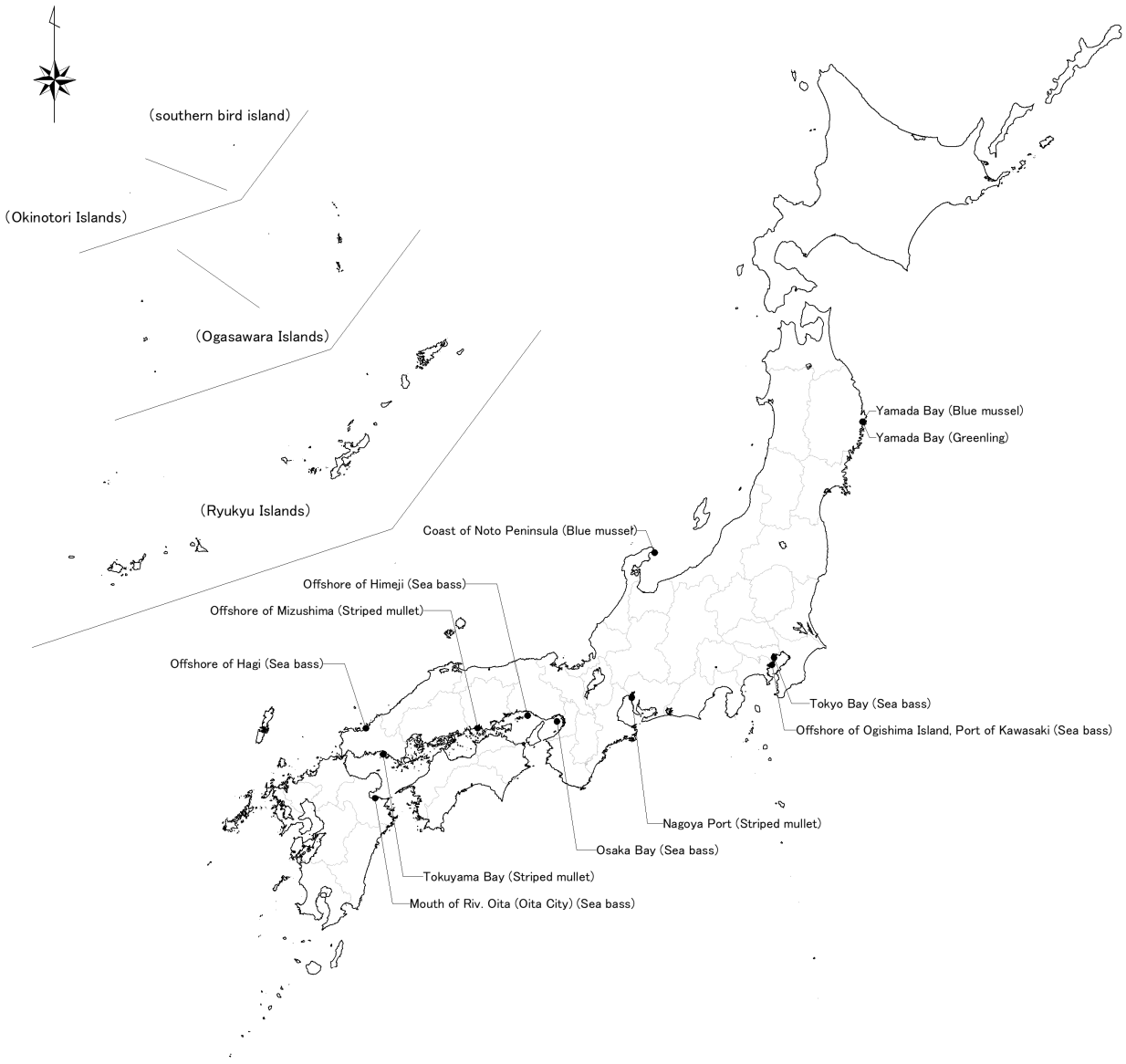


Figure 2-1-2 Surveyed sites (wildlife) in the Detailed Environmental Survey in FY 2019

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, all of the 7 target chemicals (groups) were detected. Target chemicals were categorized by analytical methods such as structurally similar chemicals capable of simultaneous analyses.

[1] Isocyanuric acid: 16 of the 30 valid sites

[3] Clarithromycin and its metabolite

[3-1] Clarithromycin: 19 of the 30 valid sites

[3-2] 14-(*R*)-Hydroxyclarithromycin: 26 of the 30 valid sites

[4] 2,6-Di-*tert*-butyl-4-methylphenol (synonym: BHT): 3 of the 29 valid sites

[5] *N*-[3-(Dimethylamino)propyl]stearamide: 30 of the 32 valid sites

[6] *N*,*N*-Dimethylalkane-1-amine *N*-oxides

[6-1] *N*,*N*-Dimethyldecyl-1-amine *N*-oxide: 8 of the 30 valid sites

[6-2] *N*,*N*-Dimethyldodecyl-1-amine *N*-oxide: 19 of the 30 valid sites

[6-3] *N*,*N*-Dimethyltetradecyl-1-amine *N*-oxide: 10 of the 30 valid sites

[7] *N*,*N*′-Ethylenebis(thiocarbamoylthiozinc) bis(*N*,*N*-dimethyldithiocarbamate) (synonym: Polycarbamate):

[7-1] *N*,*N*′-Ethylenebis(dithiocarbamamic acid): 2 of the 22 valid sites

[7-2] *N*,*N*-Dimethyldithiocarbamamic acid: 15 of the 22 valid sites

In sediment, all of the 2 target chemicals were detected.

[4] 2,6-Di-*tert*-butyl-4-methylphenol (synonym: BHT): all of the 29 valid sites

[5] *N*-[3-(Dimethylamino)propyl]stearamide: 15 of the 28 valid sites

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

[2] Cyclopolydimethylsiloxanes

[2-1] Octamethylcyclotetrasiloxane: 9 of the 11 valid sites

[2-2] Decamethylcyclopentasiloxane: all of the 11 valid sites

[2-3] Dodecamethylcyclohexasiloxane: 8 of the 11 valid sites

[4] 2,6-Di-*tert*-butyl-4-methylphenol (synonym: BHT): 9 of the 12 valid sites

Table 1-2 Summary of the detection ranges and the detection limits in theDetailed Environmental Survey in FY 2019

No.	Target chemicals	Surface water [ng/L]		Sediment [ng/g-dry]		Wildlife [ng/g-wet]	
		Detection range and frequency	Detection limit	Detection range and frequency	Detection limit	Detection range and frequency	Detection limit
[1]	Isocyanuric acid	nd - 7,800 16/30	500				
[2]	Cyclopolydimethylsiloxanes						
	[2-1] Octamethylcyclotetrasiloxane					nd - 37 9/11	0.79
	[2-2] Decamethylcyclopentasiloxane					nd - 200 11/11	1.3
	[2-3] Dodecamethylcyclohexasiloxane					nd - 4.7 8/11	0.78
[3]	Clarithromycin and its metabolite						
	[3-1] Clarithromycin	nd - 240 19/30	1.4				
	[3-2] 14-(*R*)-Hydroxyclarithromycin	nd - 230 26/30	0.62				
[4]	2,6-Di-*tert*-butyl-4-methylphenol (synonym: BHT) *	nd - 100 3/29	35	0.33 - 480 29/29	0.070	nd - 6.5 9/12	0.49
[5]	*N*-[3-(Dimethylamino)propyl]stearamide *	nd - 320 30/32	1.6	nd - 220 15/28	6.1		
[6]	*N*,*N*-Dimethylalkane-1-amine *N*-oxides						
	[6-1] *N*,*N*-Dimethyldecyl-1-amine *N*-oxide	nd - 370 8/30	3.0				
	[6-2] *N*,*N*-Dimethyldodecyl-1-amine *N*-oxide	nd - 170 19/30	7.6				
	[6-3] *N*,*N*-Dimethyltetradecyl-1-amine *N*-oxide	nd - 72 10/30	6.2				
	[6-4] *N*,*N*-Dimethyloctadecyl-1-amine *N*-oxide	nd 0/30	2.8				
[6]	*N*,*N*′-Ethylenebis(thiocarbamoylthiozinc) bis(*N*,*N*-dimethyldithiocarbamate) (synonym: Polycarbamate) *						
	[7-1] *N*,*N*′-Ethylenebis(dithiocarbamamic acid)	nd - 3.0 2/22	0.76				
	[7-2] *N*,*N*-Dimethyldithiocarbamamic acid	nd -820 15/22	6.6				

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

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

(Note 3) ☐ means the medium was not surveyed.

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