

Research on Washed-up Driftage on the Coasts of the Northwest Pacific Region

Report

FY 2003 Summary

Published by
Northwest Pacific Region Environmental Cooperation Center
Civic Affairs and Environment Department, Toyama Prefecture



Research on Washed-up Driftage on the Coasts of the Northwest Pacific Region

Report FY 2003 Summary



Table of Contents

1 Introduction ③

2 Framework ④

- 1) Period 4
- 2) Methodology..... 4
- 3) Organizations responsible 4
for the research
- 4) Research Areas..... 4

3 Results ⑤

- 1) Count of Washed-up Driftage 5
- 2) Weight of Washed-up Driftage 7
- 3) Comparison of the average
numbers of Washed-up Driftage by 9
area between FY2002 and FY2003
- 4) Weight and Count of the Buried11
Objects

4 Conclusion ⑫

Appendix (1) ⑬

- 1) Research on Washed-up Driftage13
- 2) Research on Buried Objects13

Appendix (2) ⑭

1 Introduction

The Northwest Pacific Region is a semi-enclosed sea area surrounded mainly by Japan, the Republic of Korea, and the Russian Federation, in which economies and cultures of these countries have been exchanged historically. It is also a precious common property that contributes fishery resources and recreation places to people living in this coastal area. Therefore, cooperative activities of the countries in this area are required to prevent environmental destructions and preserve the environment.

Recently concern has been growing about buried objects and driftage, which cause marine pollution in the near-shore waters and coasts, and ecosystem deterioration in this rich and beautiful Northwest Pacific Region. Floating waste, especially plastic waste, is reported as its main pollutant. This has been becoming an international issue.

“Research on buried objects and washed-up driftage on the coasts along the Northwest Pacific Region” has been conducted every year since Fiscal Year 1996, in order to figure out the actual condition of pollution caused by these objects on the beaches along the Northwest Pacific Region. Ten local governments in Japan collaboratively implemented the initial research. Then in FY 1997, 13 Japanese local governments with those of the Republic of Korea and the Russian Federation conducted the international joint survey along the coasts of the Japan Sea. Additionally in FY2002, other 3 Japanese local governments in Kyushu area and one Korean civilian organization participated in this survey. In FY2003, one Korean and one Chinese local government got involved in this project, and the research area was extended to the coastal area of this region. In FY 2003, 24 local governments in 4 countries (Japan, the People’s Republic of China, the Republic of Korea and the Russian Federation) conducted research on buried objects and washed-up driftage on 48 coasts. The numbers of local governments, participants, and the research areas have been increasing year by year as shown in Figure 1.

This research report is expected to be used as basic data to take measures for protection of marine environment, waste material measures and fisheries conservation. It is also hoped that the research activity encourages people living in the coastal area to raise a will “do not dispose of waste into the ocean and preserve the marine environment.”

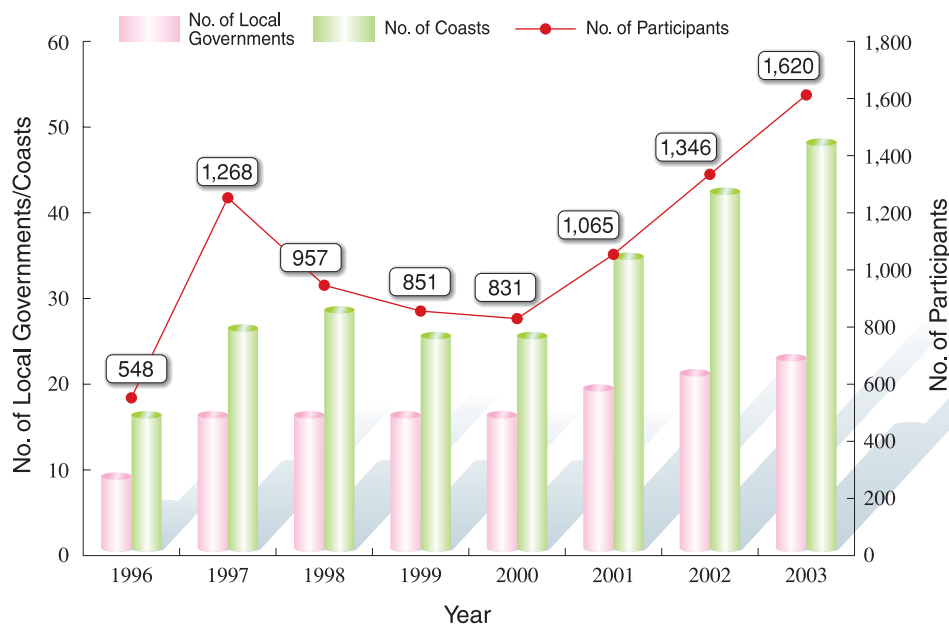


Figure 1 Transition of the Number of Local Governments, Coasts and Participants ever Participated

2 Framework

1) Period

From July 2003 to November 2003

2) Methodology (*See Appendix 1 for more detail)

【Washed-up Driftage】

The research teams collect all washed-up artificial materials in each 10 meter-squared area, which are set in sandy beaches. The collected objects in each square are categorized into 8 constituent classifications, such as plastic, rubber and glass/ceramics, and those objects are counted and weighed. A summary of research of washed-up driftage is shown below:

Aggregated research area : 18,761m²

Total count of driftage collected : 70,652 pieces

Total weight of driftage collected : 377,769g (in FY 2003 research)

【Buried objects】

The procedures of the method used is as follows; (1) place a 40cm-squared frame onto the sand beach; (2) scoop out the certain amount of sand (40cm x 40cm x 5cm); (3) mix collected sand with sea water in a bucket; (4) collect floating bits of plastic and other objects with a net; (5) categorize the collected samples by size, counted and weighed. A summary of research of buried object is shown below:

Research area aggregated : 5.76m²

Total count of buried objects collected : 8,085 pieces

Total weight of collected:85.05g (in FY 2004 research)

3) Organizations responsible for the research

The research was conducted by local authorities that each prefecture administers, NGOs and “Ecology Children’s Clubs”. As a whole, 1,620 people participated in this research from 24 local governments and 140 organizations.(*See Appendix 2 for details about organizations and total number of participants)

4) Research Areas

The research on Washed-up Driftage was done on 48 beaches in Japan, China, Korea and Russia which are facing the Northwest Pacific Region. Figure 2 illustrates the research area. The Research on Buried Objects was put in place at 12 beaches managed by 11 local authorities in 3 countries, Japan, Korea and Russia. (*See Appendix 2 for the names of beaches)



Figure 2 The Coasts Researched in FY 2003

3 Results

1) Count of the Washed-up Driftage

The count of the washed-up driftage per 100m² in each researched are listed in Table 3.1. The ratio of the average counts of the collected objects to the total number in each constituent class are shown in Figure 3.1-1. The average counts of the collected driftage per 100m² by the categories of area are shown in Figure 3.1-2.

The average count of collected objects per 100m² was 427 pieces in FY 2003 research. The collected objects consisted of the following materials:

Plastic and vinyl – 308 pieces/100m² (Accounts for 72.2% in total pieces)

Formed styrene – 79 pieces/100m² (18.5%)

Glass and ceramics – 15 pieces/100m² (3.5%)

Other artificial objects – 9 pieces/100m² (2.2%)

Materials such as plastic and formed styrene shared a significantly high proportion to the whole amount of washed-up driftage. The results of research of the average counts of pieces by area are as follows:

“Area A” – 1,673 pieces/100m² (in with a greatest numbers)

“Area B” – 778 pieces /100m² in the second place

“Area C” – 443 pieces/100m²

“Area D” – 313 pieces/100m²

Few objects were categorized in “Area E” through “Area I”.

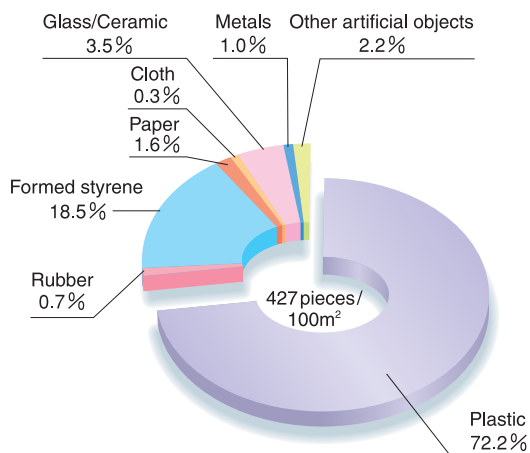


Figure 3.1-1 Ratios of constituent classifications by average count

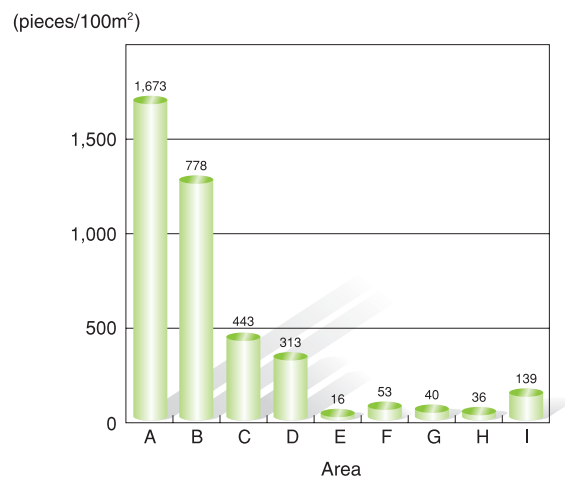


Figure 3.1-2 Average count of the collected driftage per 100m² by area

Table 3.1 Count of Washed-up Driftage per 100m² of each beach

Area	No.	Location	Beach Researched	No. of Pieces collected per 100m ² (pieces/100m ²)								
				Plastic	Rubber	Formed styrene	Paper	Cloth	Glass/Ceramic	Metals	Other artificial objects	Total
A	1	Nagasaki	Komodahama Beach	32	0	15	0	0	0	1	1	48
	2		Yoshihama Bathing Beach	2,711	57	2,301	0	0	2	12	3	5,146
	3	Saga	Ouganohama Beach	1,361	7	14	5	0	1	5	11	1,405
	4	Fukuoka	Fukunoura Beach	60	3	15	3	0	5	3	5	94
	Subtotal		Total	4,244	67	2,344	8	1	9	21	19	6,693
		Average	1,056	17	586	2	0	2	5	5	1,673	
B	5	Yamaguchi	Niinohama Beach	222	4	53	3	4	4	3	22	313
	6	Shimane	Sanrigahama Beach	78	0	14	11	0	1	6	19	129
	7		Saname Beach	39	1	1	1	1	4	2	4	52
	8		Inome Beach	100	2	6	1	0	23	14	0	145
	9		Kawashita Beach	352	4	522	9	0	26	7	7	925
	10	Tottori	Uratomi Beach	4,425	3	17	3	1	1	2	10	4,462
	11	Hyogo	Hamasaka People Sun Beach	268	2	93	6	0	2	1	14	387
	12		Kuntanihama Beach	241	0	10	2	1	2	3	1	259
	13	Kyoto	Kotobikihama Beach	298	5	7	2	3	8	8	3	334
Subtotal		Total	6,024	20	724	36	9	71	45	78	7,006	
		Average	669	2	80	4	1	8	5	9	778	
C	14	Fukui	Hamachi Bathing Beach	42	0	10	1	0	1	1	1	56
	15	Ishikawa	Shioya Bathing Beach	331	2	5	1	3	14	2	0	358
	16		Noto Chirihama People's Village Bathing Beach	270	1	19	8	1	2	1	0	302
	17	Toyama	Shimao/Matsudaehama Beach	765	2	212	1	1	10	4	19	1,012
	18		Matsudaehama Beach	669	5	235	8	1	1	3	32	954
	19		Iwasehama Beach	252	5	20	5	1	8	6	20	316
	20		Miyazaki/Sakai Beach	42	0	19	4	1	1	3	32	100
	Subtotal		Total	2,370	15	519	27	7	37	19	103	3,098
		Average	339	2	74	4	1	5	3	15	443	
D	21	Niigata	Yotsugouya Beach	337	3	11	2	0	1	1	12	367
	22	Yamagata	Hamanaka Bathing Beach	421	5	15	1	0	6	2	3	454
	23	Akita	Nishime Bathing Beach	142	2	1	0	0	0	0	2	147
	24	Aomori	Dekishima Bathing Beach	187	3	1	0	0	1	0	0	193
	25		Fukigoe Beach	390	2	5	0	0	6	1	0	404
	Subtotal		Total	1,476	16	32	3	1	15	5	17	1,565
		Average	295	3	6	1	0	3	1	3	313	
E	26	Hokkaido	Ishikarihama Beach	11	1	1	2	0	0	1	1	16
F	27	Khabarovsk	Muchke Bay	11	1	0	7	1	4	3	3	28
	28		Toki Bay	2	0	3	3	0	65	5	4	83
	29		Obmannaya Bay	1	0	0	0	0	0	0	1	3
	30	Littoral Province	Engelima cove of Ussury bay	24	2	1	4	2	15	2	13	63
	31		Pogranichnaya cove of Popov Island	63	3	3	4	1	9	3	3	88
	Subtotal		Total	101	6	7	17	3	93	13	23	264
		Average	20	1	1	3	1	19	3	5	53	
G	32	Kangwon-do	Hazode Bathing Beach	20	0	1	0	1	1	2	0	24
	33		Kyongpo Bathing Beach	30	0	4	1	1	1	2	0	39
	34		Mansan Bathing Beach	46	0	4	3	1	1	1	1	57
	Subtotal		Total	96	1	9	4	3	2	4	1	120
		Average	32	0	3	1	1	1	1	0	40	
H	35	Chungchong-namdo	Chungjande Bathing Beach	30	5	4	1	1	6	3	10	59
	36		Dejong Bathing Beach	1	1	0	0	0	1	10	2	14
	Subtotal		Total	30	6	4	1	1	7	13	12	73
		Average	15	3	2	1	1	3	6	6	36	
I	37	Liaoning	Haizhiyun Bathing Beach	26	1	5	5	8	103	18	84	249
	38		Bayuquan Bathing Beach	75	1	3	36	2	26	9	15	168
	39		Bijiashan Bathing Beach	84	0	4	32	3	60	21	25	227
	40		Xingcheng Bathing Beach	49	1	7	84	2	44	13	37	238
	41	Pebei	Dongshan Bathing Beach	29	2	4	14	4	2	2	4	61
	42	Shandong	Yantaidiy Bathing Beach	26	0	8	21	1	26	2	13	95
	43		Putaobang Bathing Beach	64	1	17	24	3	15	3	7	132
	44		Shilaoren Bathing Beach	9	1	15	10	0	4	1	2	41
	45		Zhangjiataixinan Beach	11	3	5	7	3	5	5	4	41
	46	Jiangsu	Lianyungang Beach	31	5	41	3	15	16	8	2	120
	47		Yanchengdafenggang Beach	16	1	32	0	1	3	1	3	57
	48		Nantonglusigang Beach	45	1	2	1	0	186	2	0	238
Subtotal			Total	463	17	143	237	41	488	83	196	1,667
		Average	39	1	12	20	3	41	7	16	139	
Total				14,795	148	3,782	334	66	722	204	448	20,500
Average				308	3	79	7	1	15	4	9	427
Ratio of collected objects per 100m ²				72.2%	0.7%	18.5%	1.6%	0.3%	3.5%	1.0%	2.2%	

2) Weight of the Washed-up Driftage

The weights of washed-up driftage per 100m² of each beach are listed in Table 3.2. The ratio of the average weights of the collected objects to the total count in each constituent class are listed in Figure 3.2-1. The average weights of the collected driftage per 100m² by the categories of area are shown in Figure 3.2-2.

The average weight of collected objects per 100m² was 2,133g in FY 2003 research. The collected objects consisted of the following materials:

Plastic – 1,038g/100m² (Accounts for 48.7% of total weight)

Other artificial objects – 452 g/100m² (21.2%)

Glass and ceramics – 252 g/100m² (11.8%)

Formed styrene – 121 g/100m² (5.7%)

Rubber – 97 g/100m² (4.6%)

The weight of plastic (1,038g/100m²) shared a significantly large proportion (48.7 %) as it also showed high proportion in its number.

The results of research of the average weight of washed-up driftage by area indicated that “Area D” has the greatest number with 4,083g/100m² ; “Area A” with 4,030g/100m² in the second place, followed by “Area I” with 2,313g/100m² ; and the small amount of objects by weight are collected in “Area E” through “Area H”.

The result of overall research found that the amount of washed-up driftage decreases as it goes to north both in number and weight in the Northwest Pacific Region.

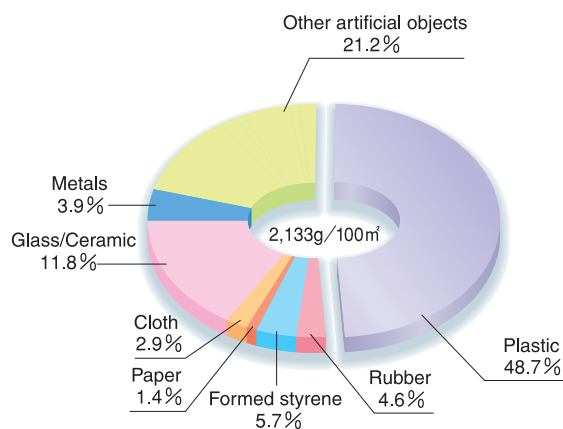


Figure 3.2-1 Ratios of constituents by average weight

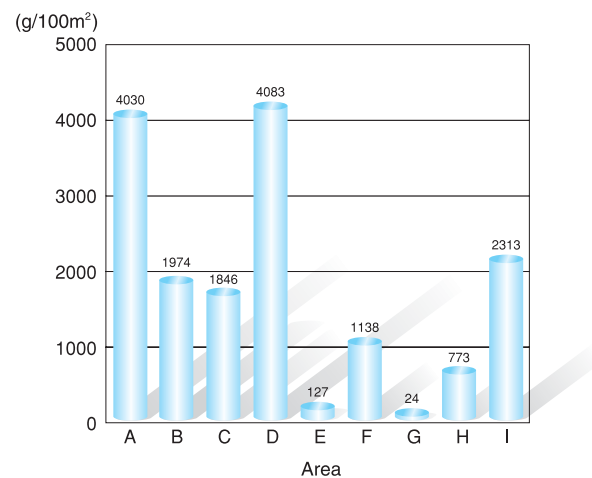


Figure 3.2-2 Average weights of driftage by area

Table 3.2 Weights of driftage per 100m² by consitituent

Area	No.	Location	Beach Researched	No. of Pieces collected per 100m ² (g/100m ²)								Total
				Plastic	Rubber	Formed styrene	Paper	Cloth	Glass/ Ceramic	Metals	Other artificial objects	
A	1	Nagasaki	Komodahama Beach	3,730.0	0.0	3,371.7	0.0	0.0	56.7	25.0	200.0	7,383.3
	2		Yoshihama Bathing Beach	5,028.7	164.7	197.7	0.0	1.3	19.7	218.0	42.7	5,672.7
	3	Saga	Ouganohama Beach	1,647.0	26.7	33.7	0.7	26.7	6.3	6.7	63.7	1,811.3
	4	Fukuoka	Fukunoura Beach	877.0	141.2	55.5	29.2	3.3	79.8	53.3	11.3	1,250.7
	Subtotal		Total	11,283	333	3,659	30	31	163	303	318	16,118
		Average	2,821	83	915	7	8	41	76	79	4,030	
B	5	Yamaguchi	Niinohama Beach	415.7	36.4	31.4	9.4	33.0	149.3	61.9	512.5	1,249.6
	6	Shimane	Sanrigahama Beach	183.7	0.0	3.0	21.7	0.0	26.0	27.0	20.0	281.3
	7		Saname Beach	2,596.4	107.0	30.9	4.6	17.3	714.3	46.7	1,194.1	4,711.2
	8		Inome Beach	75.0	126.0	5.0	5.0	0.0	107.5	403.0	0.0	721.5
	9		Kawashita Beach	537.5	120.0	122.0	20.0	0.0	242.5	30.0	3,720.0	4,792.0
	10	Tottori	Uratomi Beach	3,801.3	55.0	10.3	9.2	4.0	78.3	11.7	106.7	4,076.5
	11	Hyogo	Hamasaka People Sun Beach	177.2	1.0	15.4	13.2	0.0	61.2	3.0	46.8	317.8
	12		Kuntanihama Beach	140.8	0.2	9.3	4.8	0.7	75.0	12.8	7.0	250.7
	13	Kyoto	Kotobikihama Beach	766.7	57.7	10.3	3.7	62.3	102.7	37.0	323.3	1,363.7
Subtotal		Total	8,694	503	238	92	117	1,557	633	5,930	17,764	
		Average	966	56	26	10	13	173	70	659	1,974	
C	14	Fukui	Hamachi Bathing Beach	618.3	5.5	47.5	5.3	0.7	113.9	9.7	118.0	918.9
	15	Ishikawa	Shioya Bathing Beach	932.4	13.0	7.2	9.8	67.2	28.8	24.8	0.0	1,083.2
	16		Noto Chirihama People's Village Bathing Beach	877.5	2.7	30.3	30.8	10.0	26.2	8.7	0.0	986.2
	17	Toyama	Shimao/Matsudaehama Beach	2,071.0	41.0	52.0	9.5	15.0	610.0	90.0	1,985.0	4,873.5
	18		Matsudaehama Beach	1,828.0	7.0	151.2	28.5	5.0	141.2	102.8	527.5	2,791.2
	19		Iwasehama Beach	617.8	38.5	35.5	14.0	8.8	288.0	146.5	567.8	1,716.8
	20		Miyazaki/Sakai Beach	166.1	0.0	8.5	23.0	46.5	60.0	61.8	187.8	553.6
Subtotal		Total	7,111	108	332	121	153	1,268	444	3,386	12,923	
		Average	1,016	15	47	17	22	181	63	484	1,846	
D	21	Niigata	Yotsugouya Beach	2,390.3	1,812.3	109.7	6.0	0.0	108.7	1.3	349.0	4,777.3
	22	Yamagata	Hamanaka Bathing Beach	1,647.6	37.8	11.4	1.2	0.2	172.2	57.2	145.0	2,072.6
	23	Akita	Nishime Bathing Beach	3,303.0	152.2	1.7	0.3	0.6	44.1	0.0	493.9	3,995.8
	24	Aomori	Dekishima Bathing Beach	2,103.3	70.0	3.3	0.0	3.3	50.0	3.3	0.0	2,233.3
	25		Fukigoe Beach	6,560.0	103.3	10.0	6.7	0.0	633.3	23.3	0.0	7,336.7
	Subtotal		Total	16,004	2,176	136	14	4	1,008	85	988	20,416
		Average	3,201	435	27	3	1	202	17	198	4,083	
E	26	Hokkaido	Ishikarihama Beach	66.0	0.1	5.0	40.5	0.0	0.0	14.0	1.3	126.9
F	27	Khabarovsk	Muchke Bay	912.4	5.8	0.0	21.7	139.4	212.0	41.7	588.9	1,922.0
	28		Toki Bay	36.5	14.5	9.5	2.5	0.0	1,054.5	526.8	49.5	1,693.8
	29		Obmannaya Bay	40.0	0.0	0.0	0.0	0.0	0.3	0.3	162.0	202.7
	30	Littoral Province	Engelima cove of Ussury bay	145.5	23.8	36.6	10.7	3.3	319.9	29.8	102.4	672.0
	31		Pogranichnaya cove of Popov Island	741.5	123.7	2.0	12.3	42.3	200.0	54.7	21.8	1,198.3
	Subtotal		Total	1,876	168	48	47	185	1,787	653	925	5,689
		Average	375	34	10	9	37	357	131	185	1,138	
G	32	Kangwon-do	Hazode Bathing Beach	13.8	0.2	0.0	0.0	0.0	0.3	2.6	0.0	17.1
	33		Kyongpo Bathing Beach	10.2	0.0	1.9	0.3	0.1	0.2	17.0	0.0	29.6
	34		Mansan Bathing Beach	17.6	1.5	1.1	0.3	0.1	1.6	1.8	0.3	24.4
	Subtotal		Total	42	2	3	1	0	2	21	0	71
		Average	14	1	1	0	0	1	7	0	24	
H	35	Chungchong-namdo	Chungjande Bathing Beach	185.0	40.5	10.0	2.5	30.0	104.0	53.5	563.5	989.0
	36		Dejong Bathing Beach	0.5	1.0	0.0	0.0	0.0	475.0	72.0	7.5	556.0
	Subtotal		Total	186	42	10	3	30	579	126	571	1,545
			Average	93	21	5	1	15	290	63	286	773
I	37	Liaoning	Haizhiyun Bathing Beach	127.3	40.7	117.7	330.0	156.3	505.0	289.0	7,266.7	8,832.7
	38		Bayuquan Bathing Beach	138.3	6.0	41.3	99.7	45.3	168.0	74.7	169.3	742.7
	39		Bijiashan Bathing Beach	415.7	0.0	53.0	78.0	63.3	210.0	55.0	230.7	1,105.7
	40		Xingcheng Bathing Beach	120.0	3.3	55.0	146.0	48.3	774.7	101.7	396.7	1,645.7
	41	Pebei	Dongshan Bathing Beach	950.0	216.7	66.7	166.7	133.3	166.7	483.3	533.3	2,716.7
	42	Shandong	Yantaiyiyi Bathing Beach	56.0	0.0	13.5	55.0	0.5	209.0	2.5	129.5	466.0
	43		Putaoabang Bathing Beach	762.5	4.5	71.1	24.8	135.0	202.3	11.0	228.5	1,439.6
	44		Shilaoren Bathing Beach	11.5	0.1	2.1	0.4	11.5	10.7	0.6	0.1	37.0
	45		Zhangjiataixinan Beach	140.0	55.0	57.5	62.5	32.5	325.0	135.0	210.0	1,017.5
	46	Jiangsu	Lianyungang Beach	493.3	933.3	610.0	116.7	1,740.0	1,166.7	523.3	216.7	5,800.0
	47		Yanchengdafenggang Beach	275.0	66.7	275.0	0.0	33.3	70.7	33.3	181.7	935.7
	48	Nantonglusigang Beach	1,070.0	6.7	13.3	3.3	0.0	1,906.7	8.3	6.7	3,015.0	
Subtotal		Total	4,560	1,333	1,376	1,083	2,400	5,715	1,718	9,570	27,754	
		Average	380	111	115	90	200	476	143	797	2,313	
Total				49,821	4,663	5,807	1,430	2,921	12,079	3,997	21,689	102,407
Average				1,038	97	121	30	61	252	83	452	2,133
Ratio of collected objects per 100m ²				48.7%	4.6%	5.7%	1.4%	2.9%	11.8%	3.9%	21.2%	

3) Comparison between average counts of washed-up driftage by area in FY 2002 and FY 2003

The count of washed-up driftage per 100m² in each area in FY 2002 and FY 2003 are illustrated in Figure 3.3.

The large counts of driftage were found on Japanese coasts, especially in “Area A” and “Area B”, in comparison with those in Chinese, Korean, and Russian coasts.

Driftages categorized in “Glass and ceramics”, which is rarely seen in other areas, were found in relatively large numbers in “Area F” and “Area I”. A large number of “Metals” and “Other artificial objects” are collected in “Area H”. This result is reflection of the lifestyle and consumption pattern in these areas.

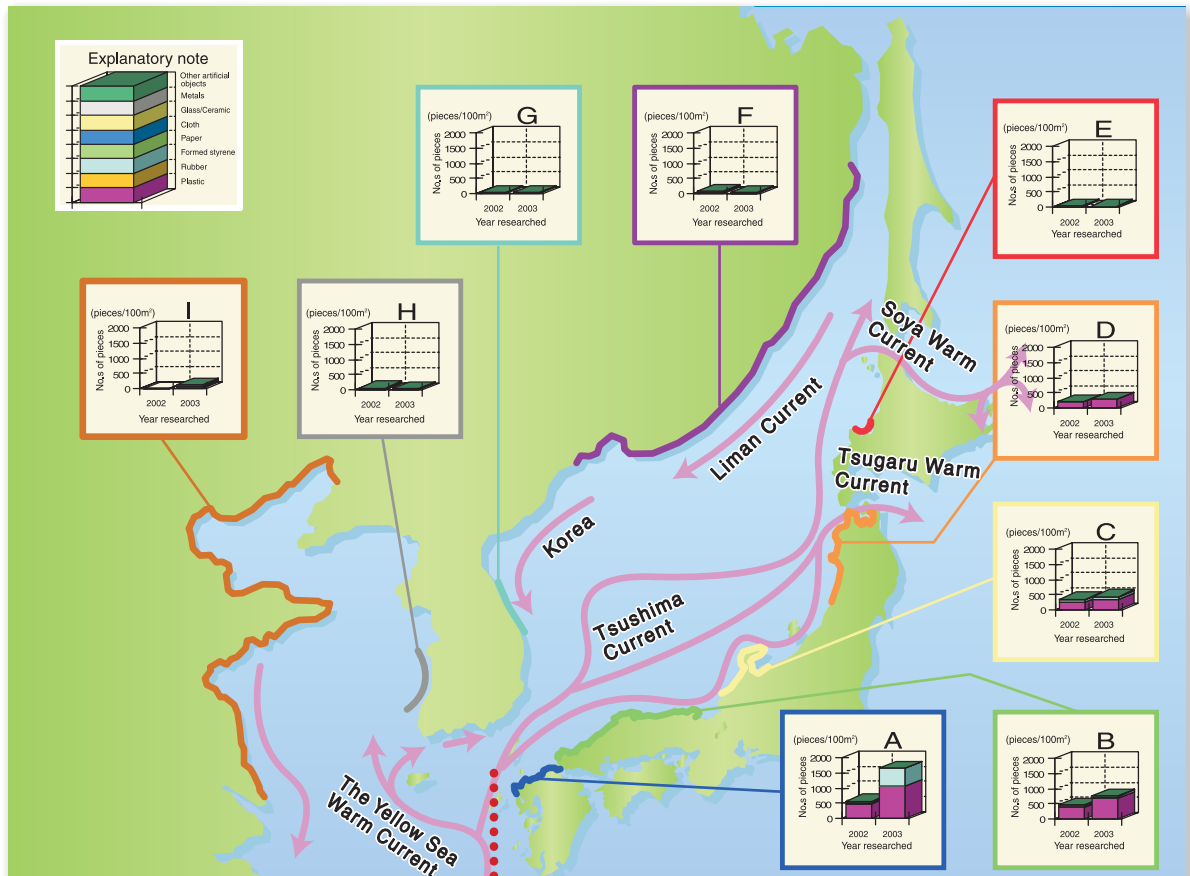


Figure 3.3 No. of pieces per 100m² in FY 2002 and FY 2003 by area



[The Washed-up Driftage in an isolated island (Tsushima, Nagasaki Pref.)]

Pictures of field research in FY 2003



[China Shandong Shilaoren Bathing Beach]



[Japan Saga Ouganohama Beach]



[Russia Littoral Province
Pogranichnaya cove of Popov Island]



[Japan Toyama Matsudaehama Beach]



[Korea Kangwon-do Kyongpo Bathing Beach]



[Japan Kyoto Kotobikihama Beach]

4) Count and Weight of the Buried Objects

The ratio of the average count of buried objects is shown in Figure 3.4-1. Comparisons of the collected objects in different countries are shown in Figure 3.4-2. In order to compare the researches conducted by different countries, the average weight and count of pieces per “1m²” are used.

In FY 2003 research, the average count of the Buried Objects collected per designated square was 2,695 pieces/0.008m³. “Formed styrene” objects indicated the highest proportion with 2,290 pieces, which is 85.0% of the total buried objects, and “Bits of plastic” in the second place with 309 pieces (11.5%).

It was found by comparing the research from countries in this area that the average weight per 1m² in Japan is 14.9 times heavier than that in Russia, and 4.7 times than that in Korea. The average count of objects in Japan is 35.9 times more than that in Russia, and 7.1 times than that in Korea.

Particularly, there is a big difference between Japan and Russia in the count of collected “Plastic” objects. These results imply the difference in consumptions and the usage of plastic products between both countries.

Generally speaking, the weight of some buried objects increases their number; meanwhile, the count of “Bits of plastic” and “Formed styrene” showed extremely high proportion against its weight of those objects. (Formed styrene: Japan:1,563 pieces/m², Russia:36 pieces/m², Korea:162 pieces/m²)

Consequently, it can be explained that the washed-up driftages are cast ashore, buried, and then accumulated without natural decompositions in the coasts along the Northwest Pacific Region after they are fragmentized and degraded with age by hydrodynamics and climate.

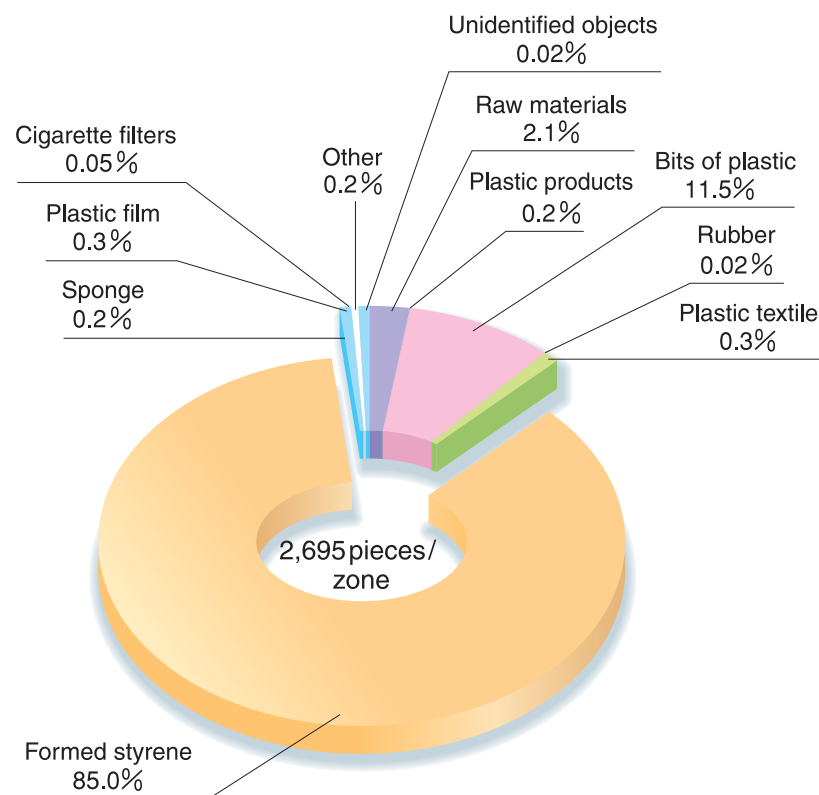


Figure 3.4-1 Ratios of constituents by average Counts of Buried Objects

4 Conclusion

The research in FY 2003 was conducted as an international collaboration between 4 countries, Japan, China, Korea and Russia, with the first-time participation from Chungchong-namdo in Korea and Liaoning Province in China. 24 local governments (22 governments in previous year) and 1,620 people (1,346 people in previous year) participated in this collaborative research project.

The count and weight of washed-up driftage decreased as it goes to north in the Northwest Pacific Region. It is considered that the Tsushima Current, which runs along with the coast of the Northwest Pacific Region from south to north, transfer a part of the driftage to the Japanese coasts areas. In addition, most of the driftage is classified in “Plastic wastes” which cannot be decomposed naturally and were carried in a great distance across the ocean. This kind of wastes, such as small fragments of plastic, will stay or travel forever unless our human beings remove them. Therefore, those wastes not only damage the scenery but also kill sea birds and aquatic animals by accidentally feeding small plastics as their food. Along with continuous survey research, appropriate measures for the source of pollutants and effective disposal of these objects need to be considered. Northwest Pacific Region Environmental Cooperation Center plays arouses the resident’s consciousness of the marine environment preservation through encouraging local governments and in the coastal area along the Northwest Pacific Region to participate in this research project and understanding the actual situation of washed-up driftage and buried objects.

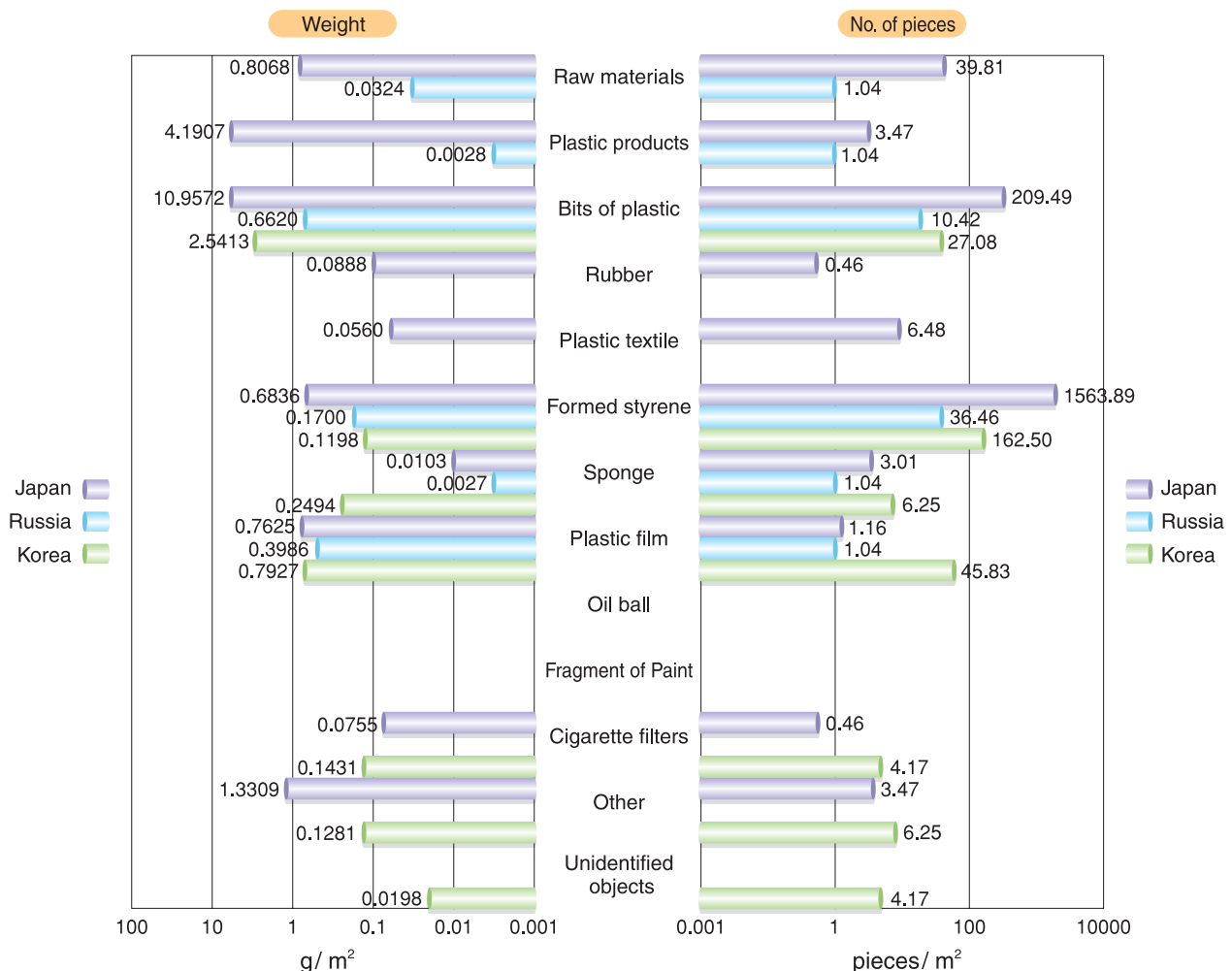


Figure 3.4-2 Country-by-Country Comparison of Buried Objects

Research Method

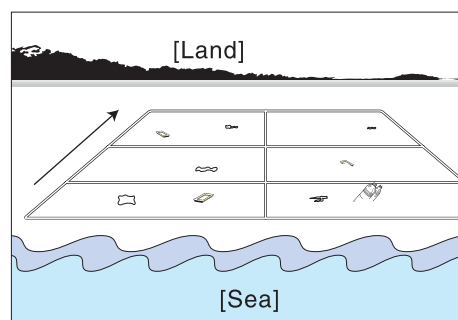
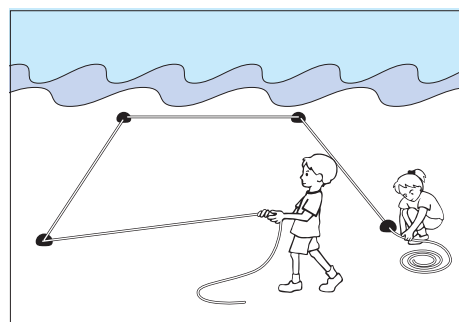
1) Washed-up Driftage

① Preliminary research

Prior to the main research, preliminary research is conducted to check on the use of the beach, circumstance around beaches, and cleaning activities.

② Setting up designated zone for the research

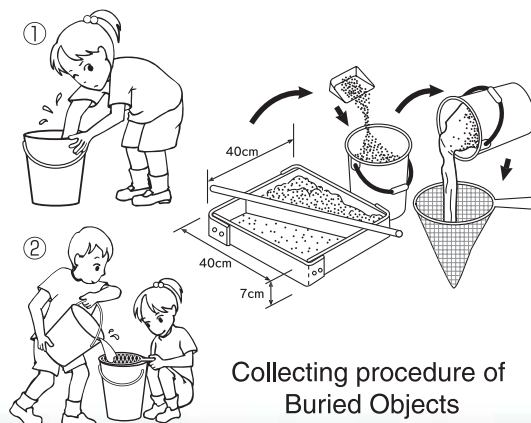
- In order to collect the appropriate data for washed-up driftages on an entire beach, research zones of 10 meter-squares each, so called “Designated Zones”, are lined up in a line landward from water edge to the end of beach.
- Designated Zones are supposed to be set side by side in a single line. Plural lines are acceptable in case that the sand beach is too narrow to allocate a sequence of 3 zones on a line.
- Each Designated Zone is to be picketed with 4 stakes on each corner and nylon rope between each corners is connected so that the zone can be obvious.
- All Washed-up Driftage collected in Designated Zones are categorized by the following 8 main constituent classifications. Then the collected driftage are counted and weighed. In addition, collected objects are categorized into either domestic or foreign sources by judging from printings on the objects.



- | | |
|------------------|----------------------------|
| ① Plastic | ⑤ Cloth |
| ② Rubber | ⑥ Glass/Ceramic |
| ③ Formed styrene | ⑦ Metals |
| ④ Paper | ⑧ Other artificial objects |

2) Buried Objects

- Research spots of buried objects are to be set up outside the Designated Zones for Washed-up Driftage in each beach. Three different types of research spots are to be selected by: (1) One with many visible objects: (2) one with less visible: (3) the other where average number of object can be seen.
- A 40cm-squared frame is set on the sand beach and scoop out the certain amount of sand after the objects on the surface are removed. This collected sand is mixed with seawater in a bucket, and then floating bits of plastic and other objects are collected with a net.



- | | |
|----------------------------|------------------------|
| ① Plastic raw materials | ⑧ Plastic film |
| ② Plastic products | ⑨ Oil ball |
| ③ Bits of plastic products | ⑩ Fragment of Paint |
| ④ Rubber | ⑪ Cigarette filters |
| ⑤ Plastic textile | ⑫ Other |
| ⑥ Formed styrene | ⑬ Unidentified objects |
| ⑦ Sponge | |

Beaches researched and participants in FY 2003

Area	No.	Location	Beach Researched	Organization
A	1	Nagasaki	Komodahama Beach	Tsushima Health Center, Nagasaki
	2		Yoshihama Bathing Beach	IKI Island Environment Meeting, Municipalities with jurisdiction of Iki Health Center (Gounoura, Katsumoto, Ashibe, Ishida), Iki Health Center
	3	Saga	Ouganohama Beach	Minato Junior High School, Karatsu(1st-Year Students), Environmental Measures Dept., Karatsu City Gov't, Environment Dept. Saga Pref.
	4	Fukuoka	Fukunoura Beach	Hikitsu Elementary School, Shima-cho, Resident Dept., Shima Municipal Gov't, Itoshima Health Welfare and Environment Center, Fukuoka, Waste Material Measures Dept. Environment Div. Fukuoka Pref.
B	5	Yamaguchi	Niinohama Beach	Heki Juniro High School, Hioki(Staff and students), Staff at Hioki City Gov't, Nagato Prefectural Health and Welfare Center, Wastes and Recycling Measures Div., Yamaguchi Pref.
	6	Shimane	Sanrigahama Beach	Surging Club WEST, Masuda Junior Chamber Inc., Iwami Environmental Protection Groupe, Environment Net AO-no-kai, Masuda City Gov't
	7		Saname Beach	Kawanami Elementary School, Gotsu, (5th Grade Students), Gotsu Junior Leaders' Club, Gotsu Education Committee, Environmental Protection Div., Gotsu
	8		Inome Beach	Hikari Junior High School, Environment Preservation Div., Hirata
	9		Kawashita Beach	
	10	Tottori	Uratomi Beach	Iwami Group of Love for Naure, Resident Dept., Iwami, Recycling Society Promotion Div. Tottori Pref. Tottori Health Center
	11	Hyogo	Hamasaka People Sun Beach	Hamasaka Livelihood Group, Hanasaka Town Gov't, Tajima Area Environment Div.
	12		Kuntanihama Beach	Satsu Tourist Association, Kazumi Health Promotion Council, Kazumi Municipal Gov't, Tajima Area Environment Div.
	13	Kyoto	Kotobikihama Beach	Amino High School, Mineyama Health Center
C	14	Fukui	Hamachi Bathing Beach	Mikuni Marine Boy Scout, Environmental Policy Planning Div., Fukui Pref., Waste Material Measures Div. Fukui Pref.
	15	Ishikawa	Shioya Bathing Beach	Environment and Safety Div., Kaga City Beautification Center, Waste Management Div. Ishikawa Pref., Minami-Kaga Health Center
	16		Noto Chirihama People's Village Bathing Beach	Environment and Safety Div., Hakui, Construction Div. Hakui, Hakui District County and City Claricfal Association, Ishikawa Prefectural Chubu Health Center, Waste Management Div. Ishikawa Pref.
	17	Toyama	Shimao/Matsudaehama Beach	Kubo Elementary School (6th Grade Students), Environment Div. Himi City Gov't., NPEC
	18		Matsudaehama Beach	Oota Elementary School (5th and 6th Grade Students), Oota Area Federation of Senior Citizens' Clubs, Fushiki Junior High School, Environment Dept., Takaoka City Gov't., Environmental Policy Div., Toyama Pref., NPEC
	19		Iwasehama Beach	Iwase Elementary School (5th Grade Students), Toyama University, Local citizens, Environment Preservation Div. Toyama City Gov't., NPEC
	20		Miyazaki/Sakai Beach	Gokasho Elementary School (4th Grade Students), Resident Dept., Asahi Municipal Gov't, Environmental Conservation Div., Toyama Pref., NPEC
D	21	Niigata	Yotsugouya Beach	Waste Material Measures Dept., Environmental Planning Dept., Environment Planning Dept., Niigata Pref., Environmental Measures Dept., Niigata Pref., Niigata Prefectural Institute of Public Health and Environmental Sciences, Sanjo Health Welfare and Environment Center, Niigata
	22	Yamagata	Hamanaka Bathing Beach	Hamanaka Elementary School (4th Grade Students, PTA), Hamanaka Senior Citizens' Club, Hamanaka Public Hall, Yamagata Prefectural Shonai Branch Office
	23	Akita	Nishime Bathing Beach	Nishime Elementary School (6th Grade Students), Yurihonjo Junior Chamber, Akita Prefectural Yuri Regional Development Dept. Welfare and Environment Div., Civic Affairs, Environment and Culture Dept. Akita Pref.
	24	Aomori	Dekishima Bathing Beach	Environment and Sanitation Dept., Kizukuri Municipal Gov't, Hiroasaki Environmental Management Office, Environmental Policy Planning Dept., Aomori Pref.
	25		Fukigoe Beach	Residents Dept., Yokohama Municipal Gov't., Aomori Environmental Management Office, Environmental Policy Planning Dept. Aomori Pref.
E	26	Hokkaido	Ishikarihama Beach	Environment and Civic Affairs Div., Hokkaido Pref.
F	27	Khabarovsk	Muchke Bay	Junior naturalists club of Botchinsky state wildlife preservation, Stuffs of National park, Administration of Khabarovsk Territory
	28		Toki Bay	Secondary-school students, Administration of Khabarovsk Territory, Khabarovsk Territory Environmental Conservation Department.
	29		Obmannaya Bay	
G	30	Littoral Province	Engelima cove of Ussury bay	All-Russian Child Center "Okean", Primorsky Region, Committee on Natural Resources and Ecology.
	31		Pogranichnaya cove of Popov Island	Ecological club of #29 Secondary school, Museum of Far East National Sea preservation "Nature of the Sea and Conservation", Primorsky Region Committee on Natural Resources and Ecology.
	32	Kangwon-do	Hazode Bathing Beach	Kangwon Environment Institution Co., Kangwon Environment Engineering
	33		Kyongpo Bathing Beach	
	34		Mansan Bathing Beach	
H	35	Chungchong-namdo	Chungjande Bathing Beach	Seochon Federation of Environmental Movement, Volunteer, Welfare & Environment Bureau
	36		Dejong Bathing Beach	Chungcheongnam-do Provincial Government, Environment Conservation Division of Seocheon-gun County
I	37	Liaoning	Haizhiyun Bathing Beach	The Jiefang primary school of ZhongShan district in Dalian, Liaoning Province Environmental Protection Bureau Publish And Education Center
	38		Bayuquan Bathing Beach	The first high school of development district of BaYuQuan in YingKou, Liaoning Province Environmental Conservation Bureau Publish And Education Center
	39		Bijjashan Bathing Beach	Chemical department of special teacher-training school in Jinzhou, Liaoning Province Environmental Conservation Bureau
	40		Xingcheng Bathing Beach	The center primary school of DiaoYuTai in XingCheng, Liaoning Province Environmental Conservation Bureau Publish And Education Center
	41	Pebei	Dongshan Bathing Beach	The pupils of first grade of the 12th junior high school in QinHuangDao, Qinhuangdao Environment Publish And Education Center
	42	Shandong	Yantaidiyi Bathing Beach	The primary school of Yangzheng in Yantai, Yantai Environmental Conservation Bureau
	43		Putabang Bathing Beach	The eighth junior high school in Weihai, Weihai Environmental Conservation Bureau
	44		Shilaoren Bathing Beach	Commercial course of the second junior high school in Qingdao, Qingdao Environmental Conservation Bureau, Qindao Environmental Conservation Bureau Laoshan Branch Office
	45		Zhangjiataixinan Beach	The Zhangjiatai primary school of Donggang district of Rizhao, Rizhao Environmental Conservation Bureau, Rizhao Environmental Conservation Bureau Donggang branch office
	46	Jiangsu	Lianyungang Beach	The center primary school of Liandao in Lianyungang, Lianyungang Environmental Conservation Bureau
	47		Yanchengdafenggang Beach	The first elementary school in Yancheng, The experiment primary school in Dafeng, The Yancheng People's Association for Friendship With Foreign Countries, Dafeng Environmental Conservation Bureau
	48		Nantonglusigang Beach	The Hecheng junior high school in Qidong, The Jiangsu People's Association for Friendship With Foreign Countries, The Nantong People's Association for Friendship With Foreign Countries, Foreign affairs office in Qidong



This map (Upside-down Map) is made as a symbol of "Japan Seaology", that Toyama Prefecture advocates, with the aim at the development in the Northeast Pacific Region.



**Northwest Pacific Region Environmental
Cooperation Center**

NPEC Northwest Pacific Region Environmental Cooperation Center (NPEC)

TEL. 076-445-1571 FAX. 076-445-1581

<http://www.npec.or.jp/>