

# Marine pollution caused by plastic wastes

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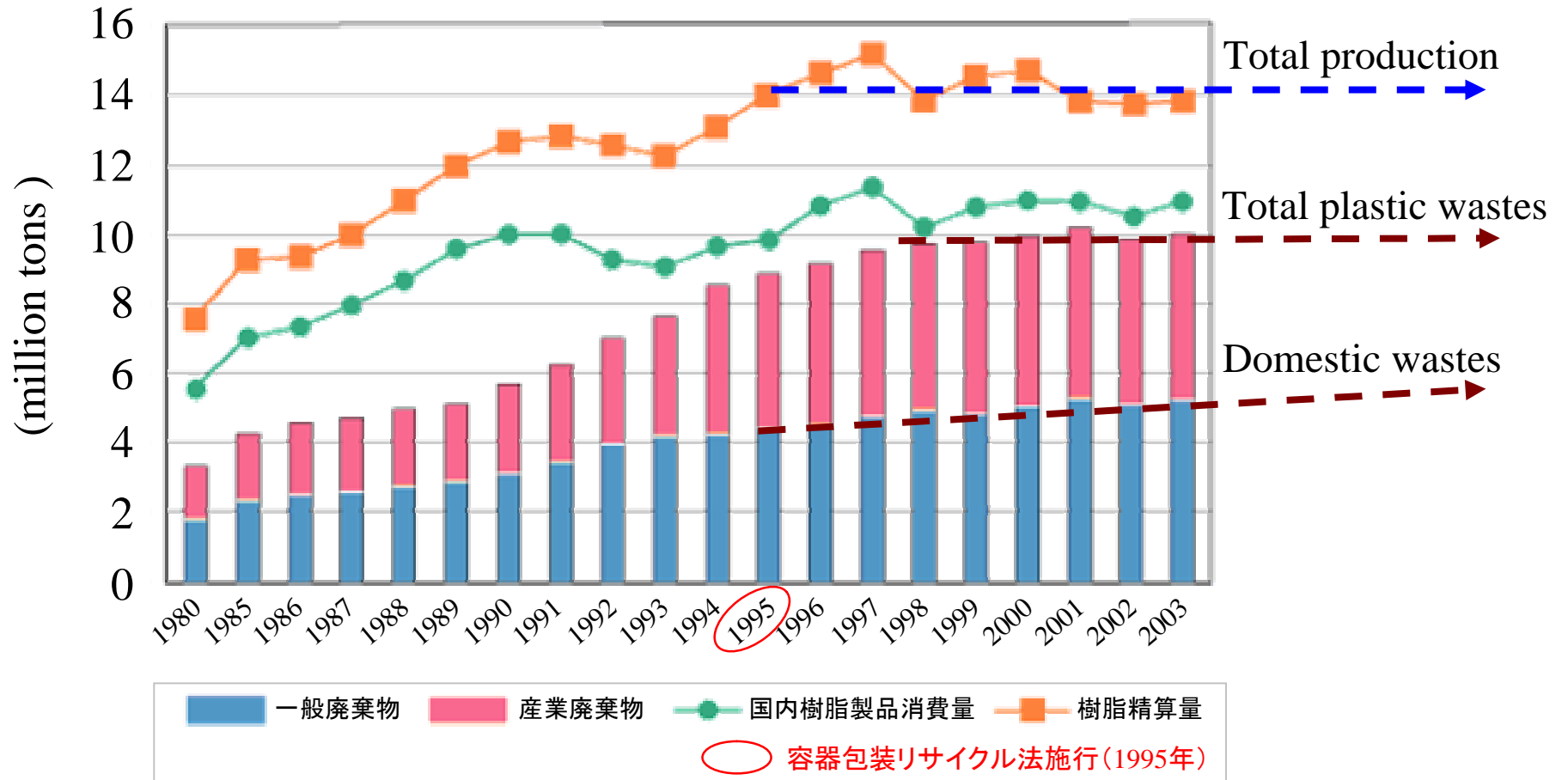


Tobishima



Tsushima

## Japan's plastic production and wastes



Plastic production in 2003 amounts to about 14 million tons and was about the same in the last decade. Total plastic waste discharge amounts to about 10 million tons. Domestic plastic wastes amounts to about 10 million tons and continues to increase slightly.

# Impacts of Marine Litter

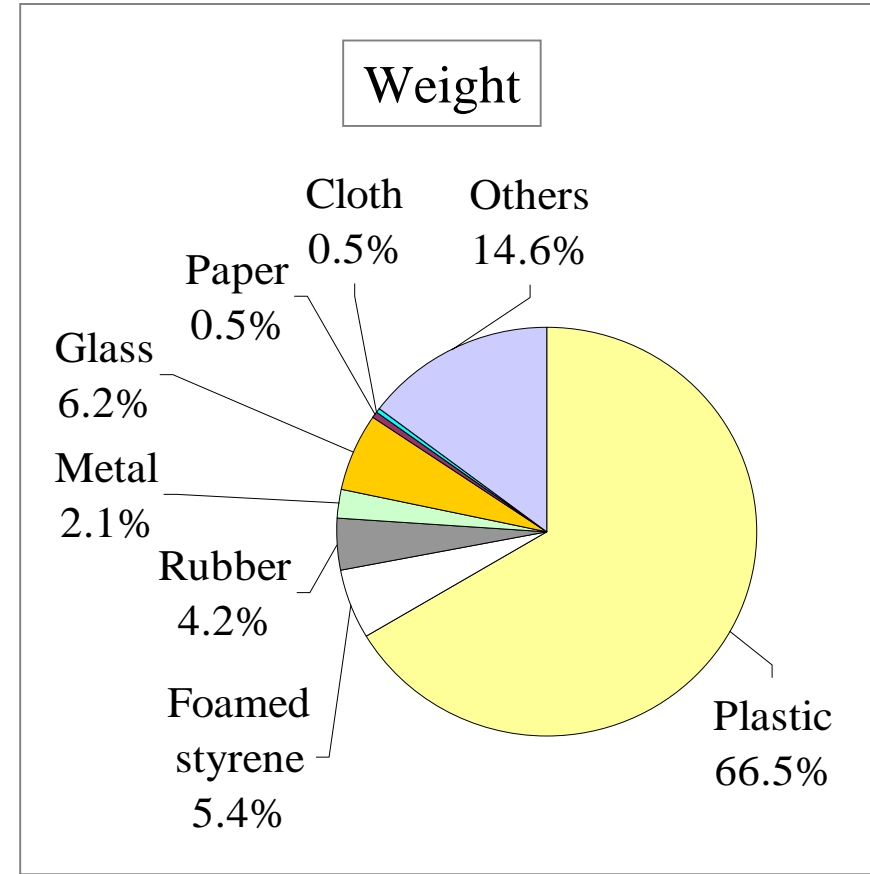
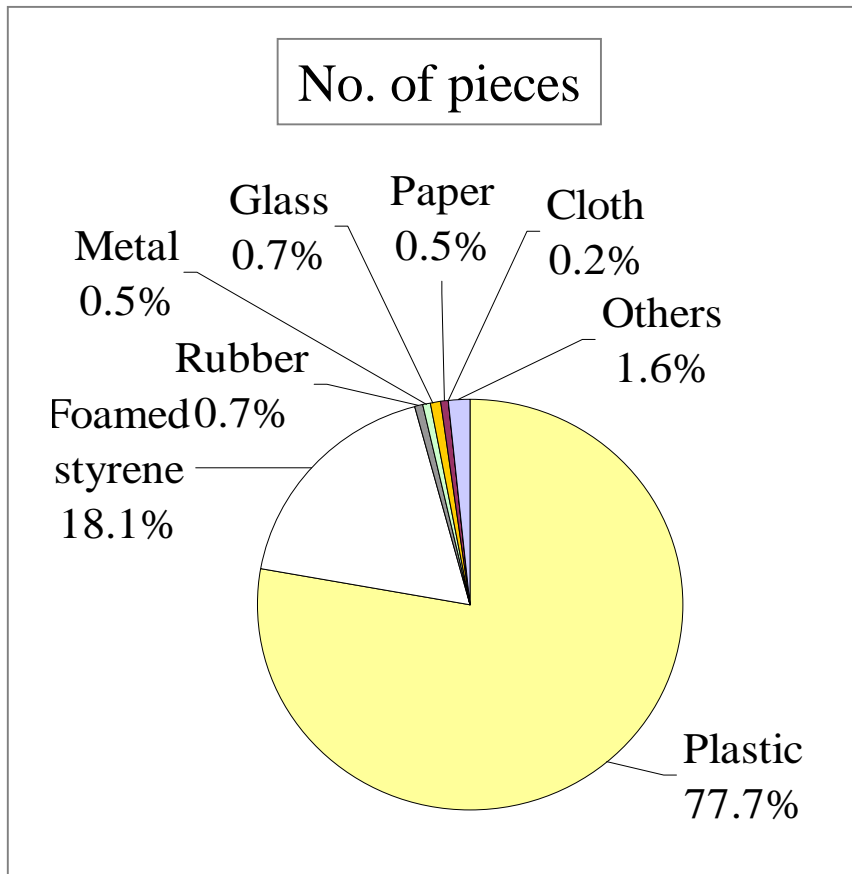
- Spoilage of coastal scenery
- Entanglement and ingestion of marine life
- Pollution of tidal flats and fishing grounds
- Impacts of fishing resources by lost or discarded fishing gear (Ghost Fishing)
- Navigational damage to shipping
- Chemical pollution by resin pellets ingested by seabirds and other marine organisms

# Marine Litter

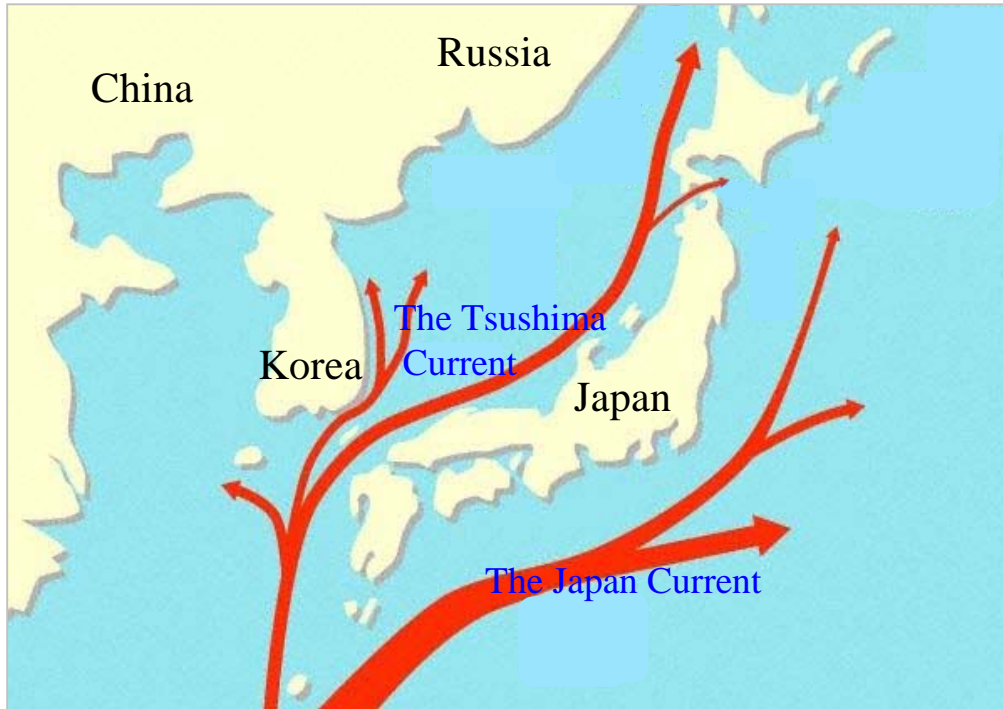
- (1) Washed-up driftage
- (2) Floating litter in the ocean
- (3) Seabed litter

## (1) Washed-up driftage

### Composition of washed-up litters, Artificial litter



# (1) Washed-up driftage from foreign country



Large volumes of plastic litters drift onto coasts and remote islands on the Japan Sea



Life articles



Fishing nets and ropes



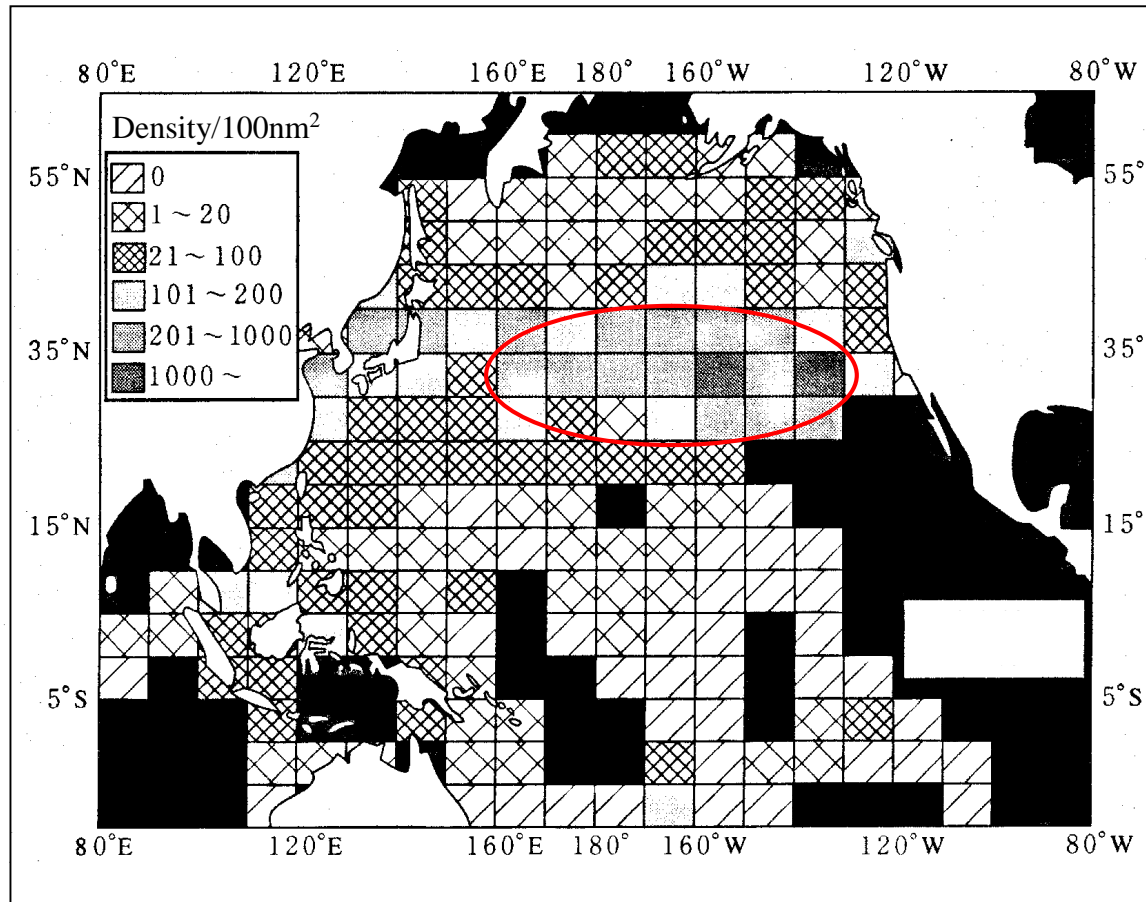
Styrofoam Floats



Plastic container

## (2) Floating litter in the ocean

### Distribution and composition of floating debris in the North Pacific Ocean, Sighting surveys 1986-1991



### Composition of floating debris

Type	(%)
Styrofoam	22.0—26.6 %
Plastic	21.3—23 %
Fishing net	0.5—1 %
Fishing float	9.4—12 %
Wood and Log	10.0—14.5 %
Sea weed	17.3—25 %
Glass	2.1—2.4 %
Metals	1.4—1.7 %
Others	3.3—4.6 %
No. of pieces	25,910—36,849

 : High density areas of floating debris (more than 200 pieces per 100 square nautical miles)

### (3) Seabed litter

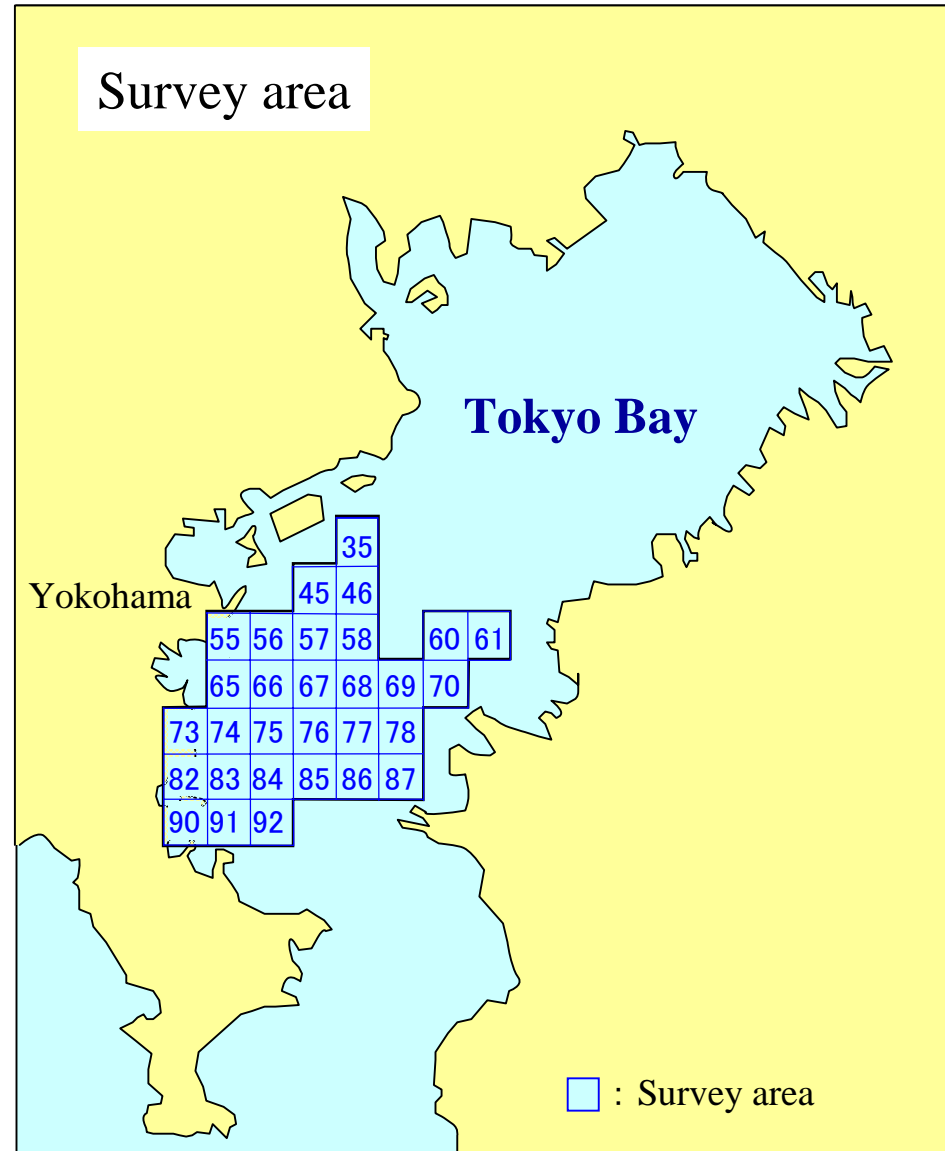
Trawl survey of litters accumulated on the seabed of Tokyo Bay (1989-2004)



Survey ship : Bottom trawl fishing



Fishes and litters caught by trawl net

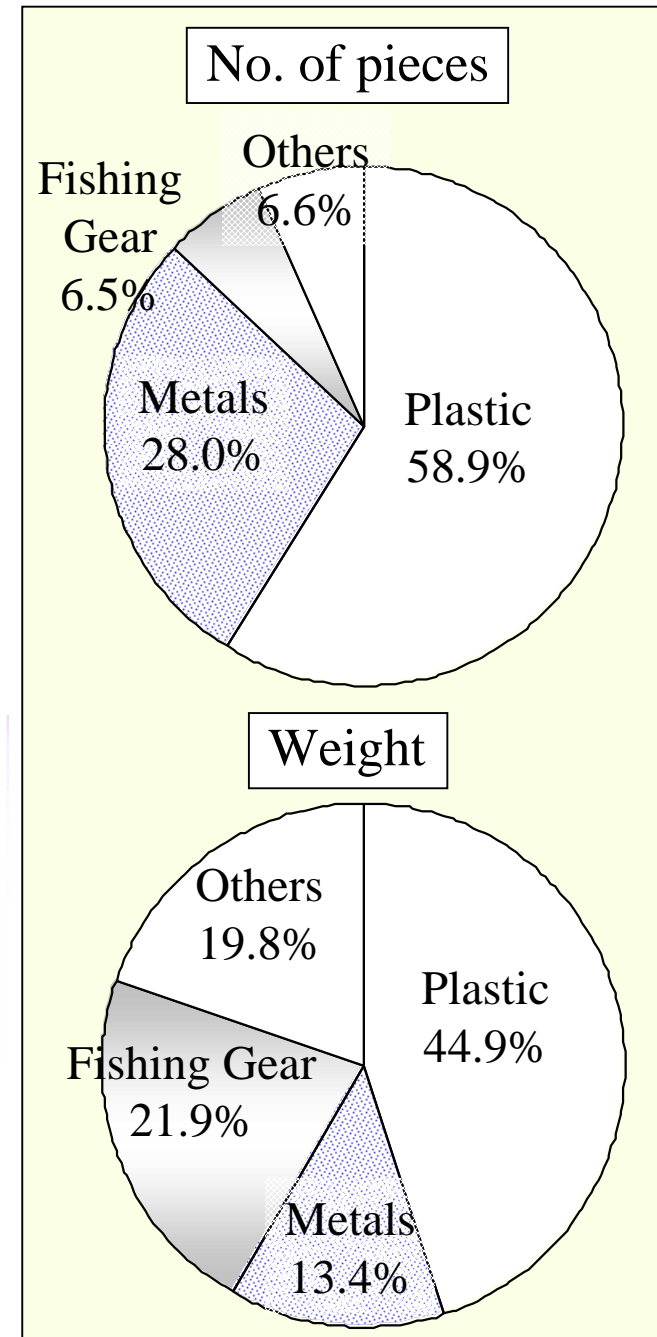


# Litters collected from seabed of Tokyo Bay

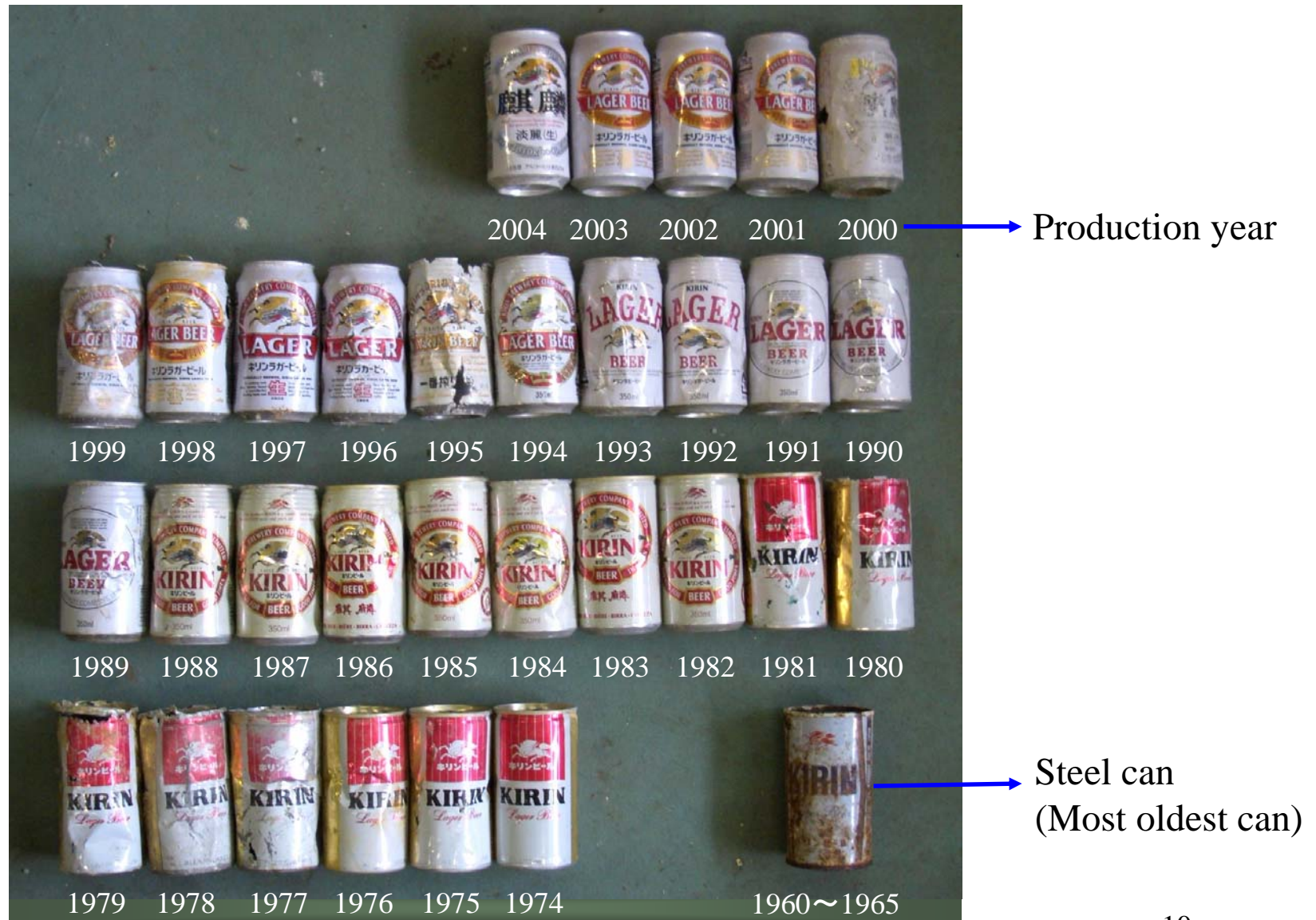


Litters collected per 1 day's trawling

## Composition of seabed litter



# Drink cans accumulated on the seabed of Tokyo Bay (Trawl surveys in 2003-2004)



New cans to older ones manufactured some decades ago

Plastic litters accumulated on the sea bottom (120m) of the East China Sea  
(July, 2000)

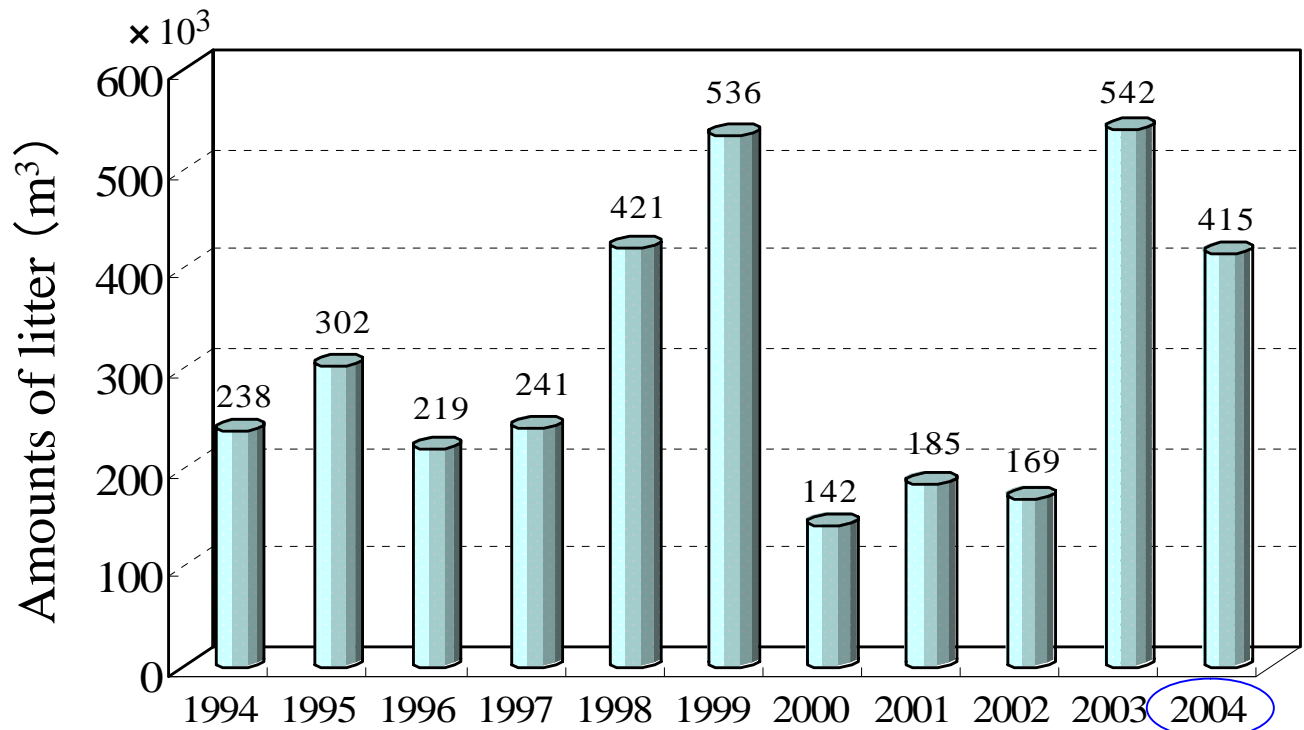


Training and Research Vessel "Umitaka-maru"  
Trawl training  
(Tokyo University of Marine Science and Technology)



Fishing Line, Net, Food packaging film  
(China), shopping bag, can, Wood

# Amounts of washed-up litters on the beaches nationwide, 1994 – 2003



Weight of litter ≒ 50,000 - 150,000tons

Amounts of plastics ≒ 10,000- 20,000tons

No. of Local Government: 38 (85%)  
 No. of Clean-up activity: 16,810  
 No. of Participants: 1,320,000

(Source: The Organization to Promote Conservation of Sea and Seashore, Marine Blue 21)

## Characteristics of washed-up litters drift onto coasts and islands of Japan

- Daily life litters\*<sup>1</sup> : plastic products (shopping bags, bottles, food containers, drink cans etc.) large quantities
- Fisheries related wastes (nets, ropes, floats)\*<sup>2</sup> : massive volume and weight
- Industrial chemical containers : (H<sub>2</sub>O<sub>2</sub>, HCl, NaOH etc.) hazardous chemicals
- Medical wastes : syringe, medical bottle dangerous wastes
- Litters across the sea from other countries

Weight and capacity of fisheries related wastes

Fisheries wastes\*<sup>2</sup> ≫ Daily life wastes\*<sup>1</sup>

\* 1 : several gram (g) to several ten gram (g)

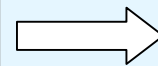
\* 2 : several kg ~ more than 1000kg

# Problems with marine litters

- **Collection and processing of marine litters :**  
local governments take charge of collecting and processing
- **Characteristics of marine litters :**  
contain salt, moisture and sand  
massive volume and weight
- **Recycling of marine litters containing plastics :**  
difficult to separate  
most of litters are processed by landfill without separation
- **Processing facilities :**  
incineration plants and processing ability are limited
- **Processing cost :**  
processing cost becomes big burden to local government  
disposal cost averages some 50,000yen/ton

Total marine litter amount nationwide is estimated at a hundred thousand tons

(Estimation from the survey conducted by MB21)



Processing cost amounted to 5-10 billion yen

# Solution of marine litter problem

## (1) Reducing the generation of marine litter

- **Monitoring surveys of marine litter**

Monitoring surveys of the situation of marine litters

(types, number, volume, weight)

Elucidation of the drift mechanism of marine litters by ocean currents

Identifying the sources of the generation of marine litters

- **Restrain discharge marine litter**

(1) Daily life wastes :

Reduction of the amount of litter discharge

Waterside measure to prevent the discharge of generated litters

(2) Industrial wastes (Fisheries wastes, Medical wastes, Industrial chemical containers)

Rigorous maintenance and management of these wastes

Discharge prevention of these litters --- Legal regulation and penalty

- **Marine litter problems become international problem**

International cooperation (joint surveys and information networks on the marine litter) is necessary

# Solution of marine litter problem

## (2) disposal measures of marine litter

- **Security of adequate litter disposal system**  
burden for processing cost --- administration  
purchase system of marine litter by administration  
(in South Korea)
- **Security of marine litter disposal facilities**
- **Promotion of recycling of plastic litters**

# (3) Development of environmental lower load materials

Non-degradable plastics  
(Conventional plastics)



Eco-friendly plastics  
(Biodegradable plastics)

## Applications of biodegradable plastics



food packaging, agricultural materials,  
miscellaneous, leisure good etc.

## Fishing line and fishery materials



Biodegradable line



Biodegradable  
plastic worm



Biodegradable  
foamed plastic

Foamed polystyrene

Fish box