



2013 NOWPAP International Coastal Cleanup and Workshop on Marine Litter Management

Okinawa, Japan
24-26 October 2013



Organizers

NOWPAP Regional Coordinating Unit (RCU) and
Okinawa Ocean Culture & Environment Action Network (O.C.E.A.N.)

Supporters

Asia-Pacific Network for Global Change Research (APN)
Ministry of Foreign Affairs, Japan
Ministry of Environment, Japan
Ministry of Land, Infrastructure and Transportation, Japan
Okinawa Prefectural Government
Onna Village Government
Okinawa Institute of Science and Technology Graduate University (OIST)
Okinawa Clean Coast Network

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Summary of the 2013 NOWPAP International Coastal Cleanup and Workshop on Marine Litter Management

In order to enhance capacity for the effective management of marine litter (ML) in NOWPAP member states as well as the implementation of the NOWPAP Regional Action Plan on Marine Litter (RAP MALI), 2 day workshop was organized in collaboration with the relevant international organizations, focusing on strengthening regional cooperation by sharing best practices for ML management, including policy measures implemented in the region. Recommendations from the workshop were communicated to governments, environmental NGOs and scientific community for initiating future activities to deal with ML problems. An International Coastal Cleanup (ICC) Campaign (beach cleanup) was organized after the workshop using the new Ocean Conservancy (OC) marine litter data cards. Next NOWPAP ICC campaign and workshop will be held in Korea in September 2014. NOWPAP will co-host (with Northwest Pacific Regional Environment Cooperation Center, NPEC), the regional node of the Global Partnership on Marine Litter (GPML).

Objectives. The main objectives of the 2013 NOWPAP ICC and workshop were:

1. Enhance capacity for the effective prevention and management of ML among NOWPAP member states (China, Japan, Korea and Russia), and for the implementation of the NOWPAP RAP MALI.
2. Promote education and public awareness of ML impacts on coastal and marine ecosystems in the NOWPAP region.
3. Strengthen cooperation among countries in dealing with ML, including data collection and exchange of information.
4. Share best practices for waste management, including policy measures introduced for sustainable production and consumption (e.g., introduction of mandatory recycling, deposits for beverage containers, bans for free plastic bags distribution).

Results:

1. Knowledge and skills on ML management of National NOWPAP ML focal points (representatives of central and local governments and leading research institutions in the field) were enhanced through hearing presentations from Korea, Japan (2 presentations), Philippines and China during the session on central and local government actions addressing marine litter.
2. Knowledge and skills of ICC national coordinators (NGO representatives and individual experts) were enhanced through hearing about best practices and know-how from China, California (USA), Korea, Russia and Japan during the session on NGO efforts to deal with marine litter.

3. Cooperation in the NOWPAP region in dealing with ML, including cooperation between NOWPAP and other international organizations, was further enhanced through the involvement of such organizations as Ocean Conservancy and Blue Ocean Sciences (USA), Hong Kong Cleanup (China), "Let's Do It!" campaign (Estonia), "Green Fins" and "Pirika" projects, representatives from Alaska (USA), Indonesia and UNEP IETC as well as relevant government authorities (central and local) from NOWPAP member states. New research developments related to marine litter were also presented by experts from USA and Japan (2 presentations from each country), Russia and Korea.
4. Awareness on the need to reduce amounts of ML among countries involved was further increased through involvement of including local authorities and NGOs from NOWPAP member states (and an additional 1-day NGO forum organized prior to the APN-funded workshop).

Follow-up. Next NOWPAP ICC campaign and workshop will be held in Korea in September 2014. Supported by the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA), NOWPAP will co-host (with Northwest Pacific Regional Environment Cooperation Center, NPEC), the regional node of the Global Partnership on Marine Litter (GPML).

Workshop Program

24 October (Thursday)

08:30 – 09:00	Registration
09:00 – 09:30 N	Opening Ceremony (Master of ceremony: Mr. Eduardo Heinrich-Sanchez, PO Okinawa OCEAN) <ul style="list-style-type: none"> • Mr. Hirotugu IKEDA, Ministry of Foreign Affairs (MOFA) of Japan • Mr. Hideo TOUMA, Director General, Department of Environment and Community Affairs, Okinawa Prefectural Government • Dr. Jonathan DORFAN, President, Okinawa Institute of Science and Technology (OIST) • Hon. Wakako HIRONAKA, former Minister of Environment of Japan • Dr. Alexander TKALIN, NOWPAP Coordinator
09:30 - 09:45	Coffee break and Photo session
Session 1	NGOs efforts to deal with marine litter (Co-chaired by Ms. Sonya BESTEIRO, Ocean Conservancy and Ms. Mayumi TAKEDA, World Oceans Day, Japan)
9:45 – 10:15 (CR	Dr. Hao CHEN, Chinese Research Academy of Environmental Sciences (CAES), China: <i>China's NGOs activities related to marine litter issues</i>
10:15 – 10:45	Mr. Hiroshi KANEKO, Japan Environmental Action Network (JEAN), Japan: <i>JEAN efforts against marine litter</i>
10:45 – 11:15	Mr. Eduardo HEINRICH-SANCHEZ, NPO Okinawa OCEAN, Japan: <i>Okinawa Asia-Pacific NGO Forum Recommendations</i>
11:15 – 11:45 Center	Dr. Takafumi YOSHIDA, Northwest Pacific Environment Cooperation Center (NPECC): <i>Marine litter monitoring activities in the NOWPAP region</i>
11:45 – 12:15	Mr. Jong-Myeong LEE, Our Sea of East Asia Network (OSEAN), Korea: <i>Addressing Styrofoam buoy marine litter pollution with stakeholders participation</i>

12:15 – 13:30	Lunch break
13:30 – 14:00	Dr. Yana BLINOVSKAYA, Maritime State University, Russia: <i>NGO activities to deal with marine litter in the Russian Far East</i>
14:00 – 15:00	Panel Discussion (moderated by session co-chairs): <ul style="list-style-type: none"> • Mr. Robert STEEL, Sustainability Asia, Thailand • Mr. Shota MIURA, Clean Ocean Guards Association, Japan • Mr. Masahiko KIMURA, Onna Village, Japan • Ms. Natasha SALAMACK, Maui Island Volunteers, Hawaii, USA
15:00 – 15:15	Coffee break
Session 2	Central and local government actions addressing marine litter (Co-chaired by Ms. Sawako TADA, Ministry of Environment of Japan and
Mr.	
	Toshimitsu MAEDA, Yomitan Village Health & Environment Section,
Okinawa	a, Japan)
15:15 - 15:45	Mr. Qingjia MENG, Ministry of Environmental Protection (MEP), China: <i>Marine litter management in China</i>
15:45 - 16:15	Mr. Junichiro NOGUCHI, Ministry of the Environment (MOE), Japan and Mr. Eisaburo HIGA, Okinawa Prefectural Government, Japan: <i>Marine litter management by central and local government actions in Japan</i>
16:15 - 16:45	Mr. Chae-Kyun KIM, Ministry of Oceans and Fisheries (MOF), Korea: <i>Marine litter management in Korea</i>
16:45 – 17:45	Panel Discussion (moderated by session co-chairs): <ul style="list-style-type: none"> • Mr. Jake MIEMBAN, Department of Environment and Natural Resources, Philippines • Mr. Eben Schwartz, California Coastal Commission, USA • Mr. Yasuharu NAGAHAMA, Onna Village Commerce, Industry & Tourism Division, Okinawa, Japan
18:30 – 20:30	Reception

25 October (Friday)

Session 3	Research activities relevant to reducing input of marine litter, modeling marine litter transport, impacts of marine litter, new technologies to deal with marine litter (Co -chaired by Dr. Junichiro TSUTSUMI, University of the Ryukyus and Dr. Kimio UNO, Keio University, Japan)
9:00 – 9:30	Dr. H ideshige T AKADA, L aboratory of Organic Geochemis try, Tokyo University of Agriculture and Technology, Japan: <i>“International Pellet Watch” - transfer of hazardous chemicals from marine plastics to ecosystem</i>
9:30 – 10:00	Mr. Sung-Hoon KANG, Marine Litter Center of Korea Marine Environment Management Corporation (KOEM), Korea: <i>Research on marine litter monitoring in Korea</i>
10:00 – 10:30 Russ	Dr. Sergey MONINETS, Sea Protection and Shelf Development Institute, ia: <i>Marine litter monitoring in coastal areas using sailing boat (Vladivostok – Amur river estuary)</i>
10:30 – 10:45	Coffee break
10:45 – 11:15	Dr. Andrea NEAL, Blue Ocean Sciences, USA: <i>New technology for monitoring marine litter</i>
11:15 – 11:45	Chris WOOLAWAY, Hawaii ICC Coordinator, USA: <i>“Nets to Energy” project</i>
11:45 – 12:45	Panel Discussion (moderated by session co-chairs): <ul style="list-style-type: none">• Prof. Haruyuki KANEHIRO, Otsuma Women’s University, Japan• Dr. Hideshige TAKADA, Laboratory of Organic Geochemistry, Tokyo University of Agriculture and Technology, Japan• Dr. Satoshi MITARAI, Marine Biophysics Unit, Okinawa Institute of Science and Technology (OIST)
12:45 – 13:45	Lunch break

Session 4	International cooperation in addressing marine litter
NOWP	(Co-Chaired by Hon . Wakako HIRONAKA and Mr. Xiaodong ZHONG , AP)
13:45 – 14:15	Ms. Loretta BROWN, Center for Alaskan Coastal Studies, USA: <i>International Coastal Cleanup efforts in Alaska</i>
14:15 – 14:45	Ms. Sonya BESTEIRO, Ocean Conservancy: <i>International Coastal Cleanup (ICC) movement around the world and across-Pacific collaboration among NGOs</i>
14:45 – 15:15 of	Surya CHANDAK, International Environmental Technology Centre (IETC) of UNEP: <i>Integrated solid waste management for coastal cities to address land based sources of marine litter</i>
15:15 – 15:30	Coffee Break
15:30 – 16:00	Ms. Chloe HUNT, Reef World Foundation: <i>Green Fins - A management approach for environmentally responsible diving and snorkeling practices</i>
16:00 – 16:30	Ms. Lisa CHRISTENSEN, Hong Kong ICC Coordinator: <i>International cooperation on marine litter in Hong Kong</i>
16:30 – 17:30	Panel Discussion (moderated by session co-chairs): <ul style="list-style-type: none"> • Ms. Belyn RAFAEL, PEMSEA Resource Facility • Mr. Stefan RAFAEL, ICC Coordinator, Indonesia • Ms. Pille PIRN, Asia Coordinator, “Let’s Do It!” World Cleanup 2013, Estonia

26 October (Saturday)

09:00 – 11:30 **RAP MALI Working Meeting**
(Participants: NOWPAP ML FPs, RAC Directors/representatives, and
NOWPAP RCU)

11:30 - 12:30 Lunch break

Beach cleanup

12:30 – 12:35 Opening Ceremony:
Mr. Taizo ARAKAWA from Friends of the Earth Okinawa Chapter

12:35 – 13:00 Okinawa International Clean Beach Club will brief the participants on how
to conduct beach cleanup and fill the new ICC data cards in Chinese,
Japanese, Korean, Russian, and English

13:00 – 15:00 Beach Cleanup at Kuraha Beach, Onna Village

15:00 – 16:30 Sorting collected marine litter and filling out data cards

16:30 – 16:45 Closure of ICC

16:45 – 16:55 Group Photo

16:55 – 17:00 Walk to Coconut Moon Beach Cafe for refreshments and live performance

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Northwest Pacific Action Plan



China's NGOs activities related to marine litter issues

Hao CHEN, PhD
Chinese Research Academy of Environmental Sciences (CRAES), Beijing 100012, China
email: chenhao@craes.org.cn

Okinawa, October 24, 2013



Outline



- Overview of China's environmental NGOs
- Activities relevant to ML issues
- Impacts
- Communications and Partnerships
- Perspective

Overview



milestone...

1983

Friends of Earth Hong Kong (FOE)

1994

Friend of Nature(FON)

1999

Xiamen Greencross Association (XMGCA)

2001

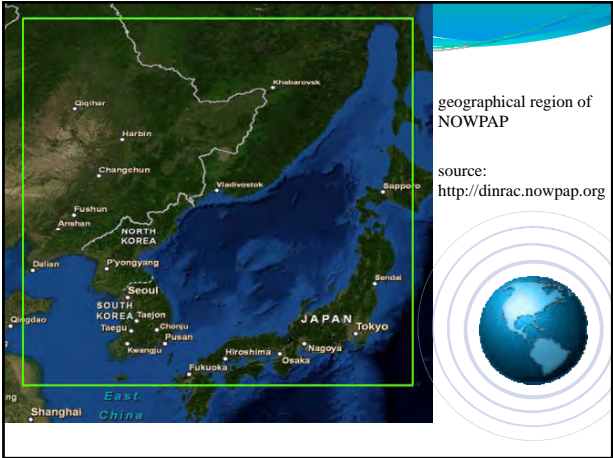
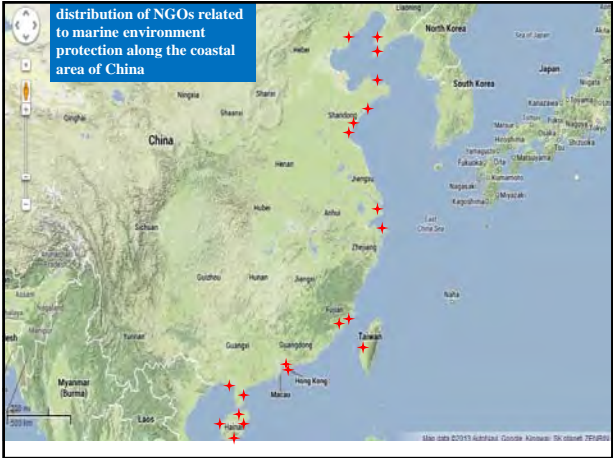
Taiwan Environmental Association (TEA)

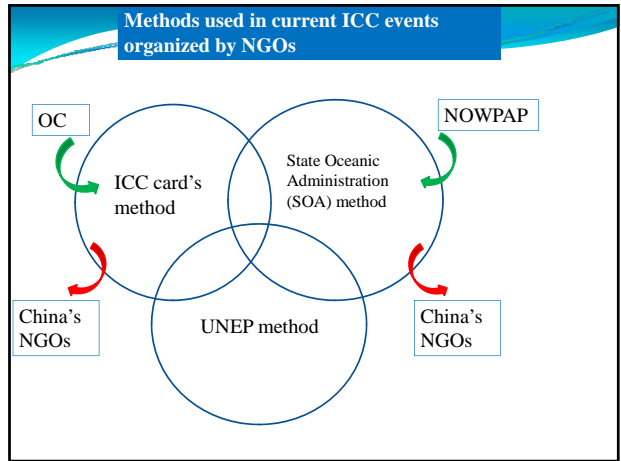
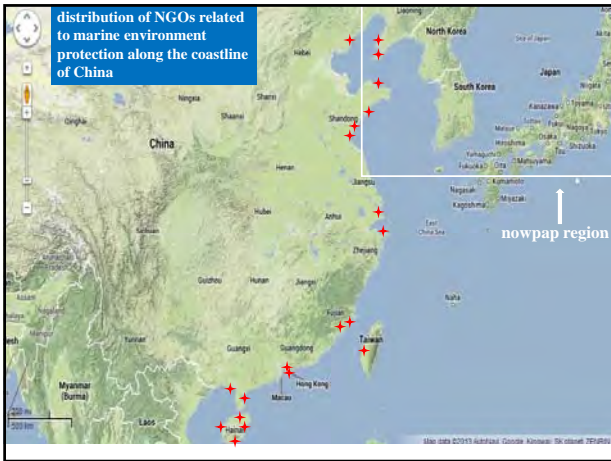
2002

Shenzhen Blue Ocean Conservation Association (SBOCA)

2007

Shanghai Rendu





垃圾收集物

请把你家所发现的垃圾的所有信息，但只记录下回收信息。

如下所示用“云”字记录数据，并画出具体的垃圾在垃圾的空中。

例： 厨 垃圾物 2001/01/01

与海洋环境及活动相关的垃圾

（包括食品物品、包装材料、日常用品、能源、其他本类的垃圾等）

118	1 纸（纸类废物）	14	1 种子/微子/光子/中子/电子
119	2 塑料（塑料废物）	95	食品垃圾物 总
120	3 纺织品（纤维类）		
121	4 橡胶/皮革（橡胶类）		
122	5 玻璃（玻璃类）		
123	6 金属（金属类）		
124	7 陶瓷/搪瓷（陶瓷类）		
125	8 其他（其他类）		

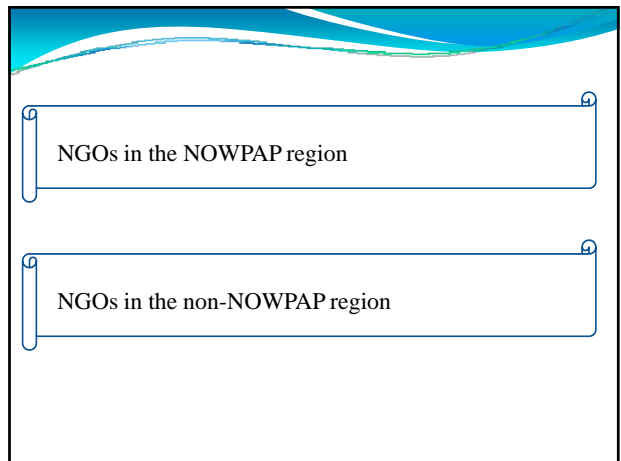
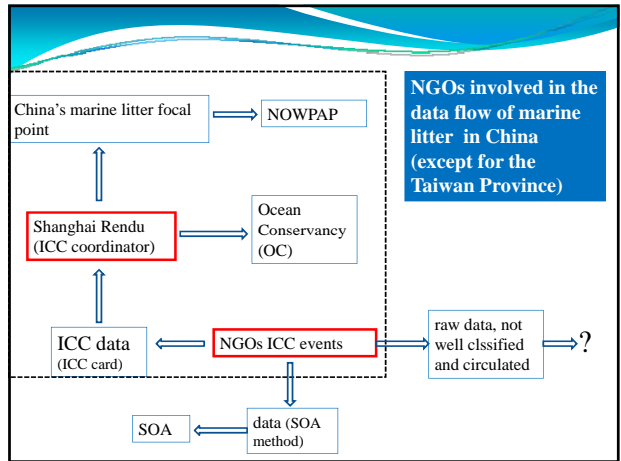
与海洋环境及活动相关的垃圾

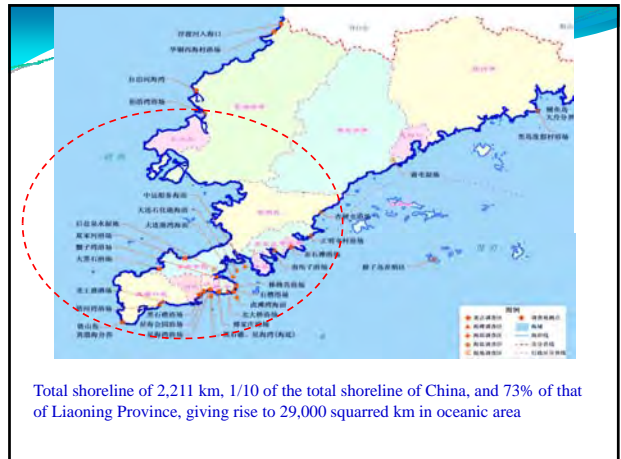
（包括食品物品、包装材料、日常用品、能源、其他本类的垃圾等）

29	1 纸（纸类废物）	1	1 垃圾袋/垃圾
30	2 塑料（塑料废物）	6	6 垃圾袋/垃圾袋/垃圾袋
31	3 纺织品（纤维类）	10	10 垃圾袋/垃圾袋/垃圾袋
32	4 橡胶/皮革（橡胶类）	11	11 垃圾袋/垃圾袋/垃圾袋
33	5 玻璃（玻璃类）	12	12 垃圾袋/垃圾袋/垃圾袋
34	6 金属（金属类）	13	13 垃圾袋/垃圾袋/垃圾袋
35	7 陶瓷/搪瓷（陶瓷类）	14	14 垃圾袋/垃圾袋/垃圾袋
36	8 其他（其他类）	15	15 垃圾袋/垃圾袋/垃圾袋

Chinese version of ICC

data card, translated from English





DEPVA (Dalian Environmental Protection
Volunteers Association)
<http://www.depv.org/>

From 2003....

Outreach + Field work





Shanghai Rendu
<http://renducsr.blog.sohu.com/>

- ◆In 2005, China began to participate in the Marine Litter Activity (MALITA) project of NOWPAP
- ◆Shanghai Rendu was the first NGO in China Mainland to conduct marine litter monitoring and removal (2007), and has helped conduct ICC events in six other cities to date.
- ◆Participating in NOWPAP ICC event and workshop starting from 2011
- ◆Collecting data and reporting to ML focal point of China and OC as well

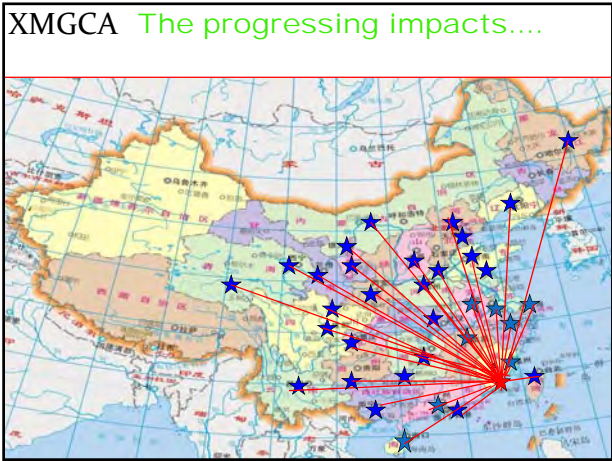




XMGCA(Xiamen Greencross Association)
<http://www.xmgca.org>

The progressing impacts....

A timeline diagram showing the progression of XMGCA's impact. It consists of four stacked, colored blocks representing different periods: 1999-2005 (dark blue), 2005-2008 (light blue), 2008-2009 (yellow), and 2009-2012 (dark blue). A red arrow points upwards from the first block to the last, indicating the progression of time and impact. To the left of the blocks, a vertical list of geographical areas is shown: Xianmen City, Fujian Province, Eastsouthern Coastal area, and China, with arrows pointing to the corresponding blocks.



Actions to reduce trash...

Garbage collection, classification and removal

IT'S OUR WORLD
DON'T TRASH IT
新地球新希望

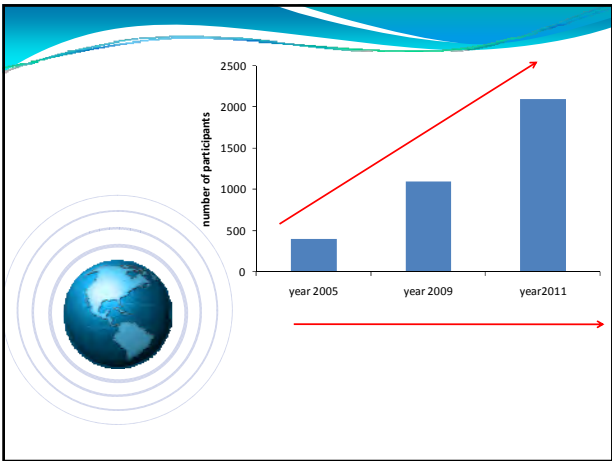
An image showing a group of people participating in a beach cleanup. Next to it is a white drawstring bag with a blue bird illustration and the text "IT'S OUR WORLD DON'T TRASH IT" and "新地球新希望".



SBOCA (Shenzhen Blue Ocean Conservation Association) <http://www.szbo.ca.org/ch/>

The progressing impacts....

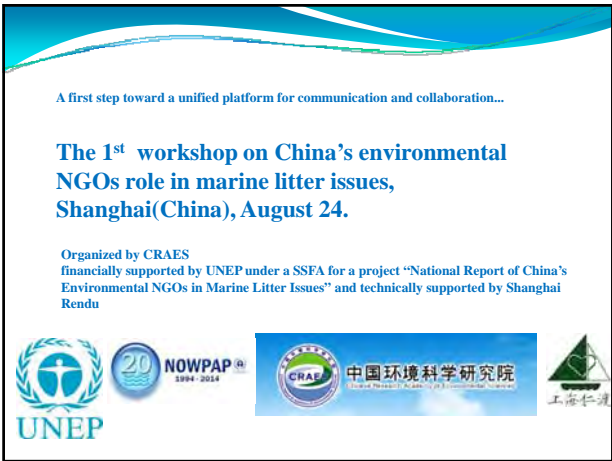
A timeline diagram showing the progression of SBOCA's impact. It consists of four circular nodes connected by a horizontal line, representing different years: 2002, 2005, 2005, and present. Below each node is a description of the event: "kick-off by local aquarium divers", "reigstered by government", "kick-off of the 'ICC Day of Shenzhen City' (3rd Saturday, Sept.)", and "9 times of the ICC Day".



- Public awareness raised
- Decision-making and policy-making supported for governments



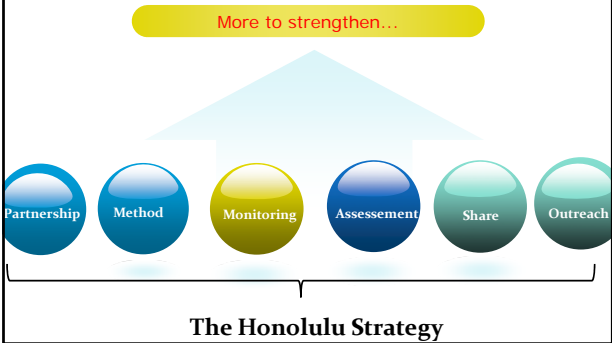
- Blue Ocean Protection Association (BOPA) at Sanya City**
<http://www.ch-blueocean.org/>
- ◆ 2009.12—2010.3
~100 km walk along the coastline for marine litter survey
 - ◆ “Report on environmental conditions of Sanya City coastline”
 - ◆ The local government took the criticism and shared the report online
 - ◆ This event was widely reported and circulated by media
 - ◆ Blue ribbons in hotels in Sanya City



What we did on the workshop...

- ◆ The Honolulu Strategy
- ◆ The Global Partnership on Marine Litter
- ◆ Method standardization in marine litter monitoring and data sharing
- ◆ A framework and platform for unified action

Perspective



Thank You !

Marine Debris in California

NOWPAP Marine Litter Workshop

Eben Schwartz
Marine Debris Program Manager
California Coastal Commission



California Coastal Cleanup Day

Coastal Cleanup Day engages people to **remove trash** and debris from California's beaches and inland waterways, to **identify the sources** of the debris, and to **change the behaviors** that cause pollution.



California Coastal Cleanup Day



- Data indicated that 80% of marine debris came from land-based sources.
- Cleanup expanded to inland counties and areas that have impacts on the coast.
- Cleanup is now the largest volunteer event in the state.
- Practices put in place to improve the overall impact of the Cleanup.

Marine Debris Education in California

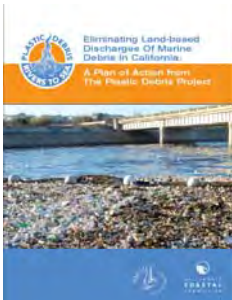
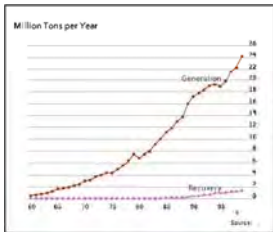
Coastal Cleanup Day Survey
(1,026 responses from 22 counties)

- 58.9% → 83.1% (24.2 increase) on causes of marine debris
- 61.2% → 77.7% (16.5% increase) on problems resulting from marine debris.
- 94.1% say CCD motivated them to do more to protect the environment.

Other programs include formal education curriculum and outreach to the general public.



Increasing Focus on Plastic Debris



Local and Statewide Regulations



Regional Partnerships



- West Coast Governors' Alliance on Ocean Health
- Marine Debris Action Coordination Team active since 2008
- West Coast Marine Debris Strategy approved, database developed, Marine Debris Coalition in process





Photo Credit: 5 Gyres Institute



CALIFORNIA
COASTAL
COMMISSION

Eben Schwartz
Marine Debris Program Manager
Public Education Program
California Coastal Commission
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San Francisco, CA 94105
(415) 904-5210
eben.schwartz@coastal.ca.gov



Pyramid 2030

A global workshop campaign for sustainable development

<http://pyramid2030.org>



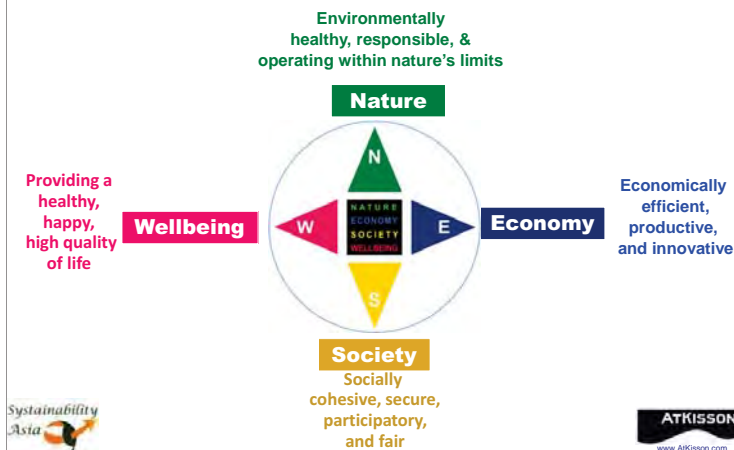
Our Pyramid Challenge

Ensuring the Sustainability of Marine Ocean Ecosystem Health into the 22nd Century



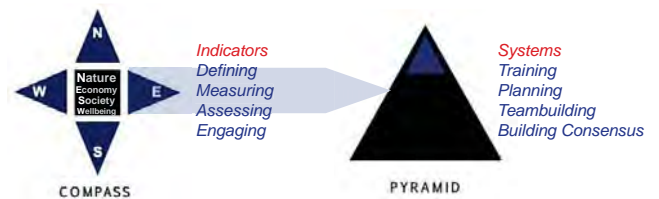
ISIS ACCELERATOR

The Compass Vision of Sustainability



ISIS ACCELERATOR TOOLS

... can be used as stand-alone applications, or in sequence, as part of a comprehensive program for sustainability



The tools can be adapted to virtually any sustainability framework, organization, or cultural context ... as demonstrated in practice in Asia, Australia, Europe and the US.

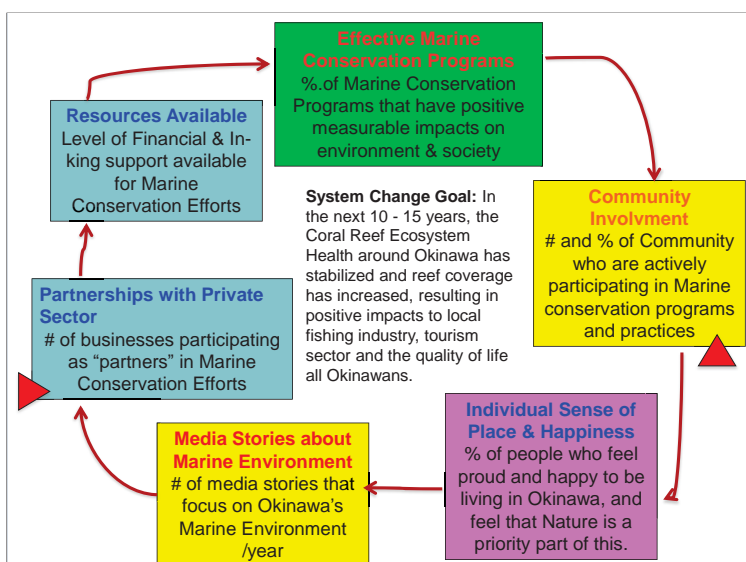
Pyramid

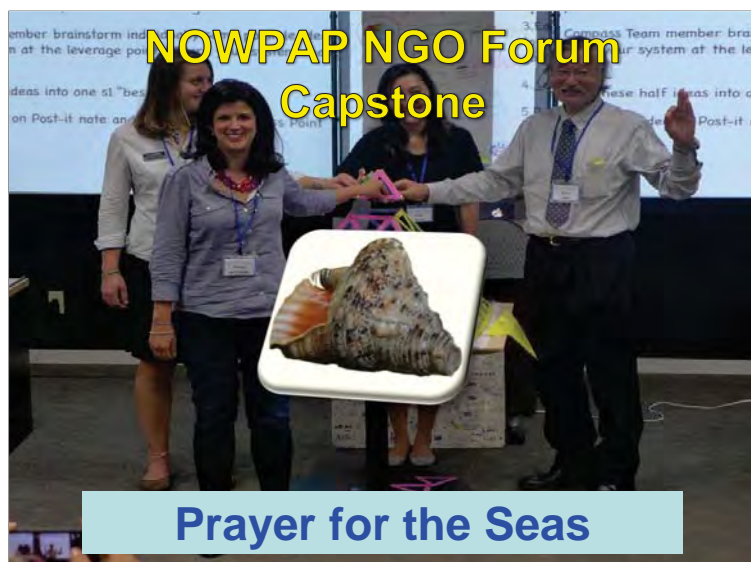
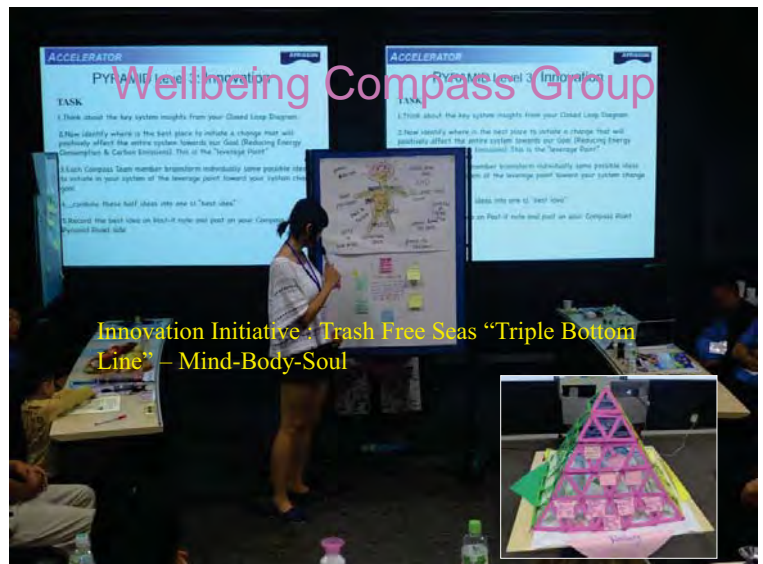
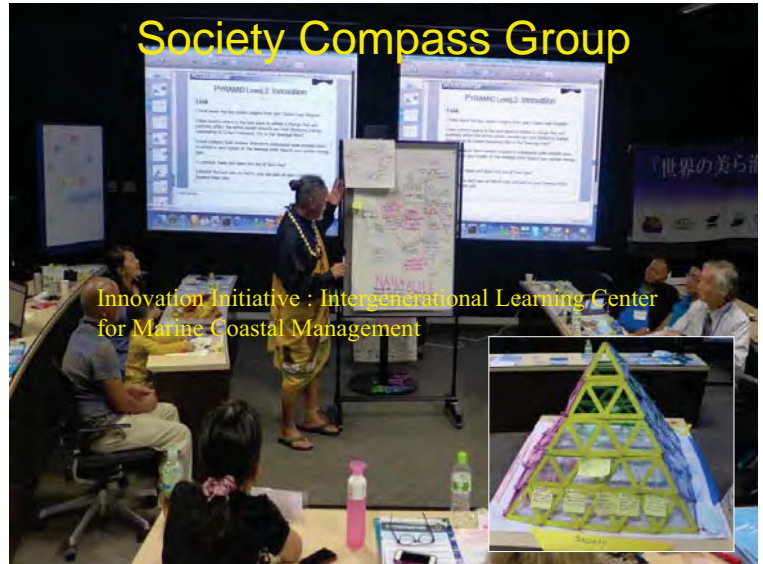
- ❑ Built around the ISIS steps
- ❑ Used for collaborative group learning and planning processes
- ❑ Guides people quickly (takes 1-2 days or 1 years) through the entire learning/ planning/ action cycle
- ❑ Produces a 3-D record of the results ... and strong consensus on action



The Process - 5 Steps, 5 Levels

1. Share **information** about the issue
2. Think about the **causes**
3. Brainstorm **ideas**: ways to address and improve the issue
4. Make a **plan** about how to implement your ideas
5. To cap it off ... make a **commitment to do it!**





NOWPAP ICC in Okinawa

Addressing Styrofoam Buoy Marine Debris Pollution with Stakeholder Participation

J. LEE Y.C. JANG S.HONG W.J. SHIM D. KANG

OSEAN Our Sea of East Asia Network

Contents

- Background
- The 1st Meeting in 2010
- Brainstorming Workshop in 2011
- Participatory Modelling workshop in 2012
- Outcomes and Future Plan


Background

Background

❖ Styrofoam buoy pollution in the coastal areas of South Korea

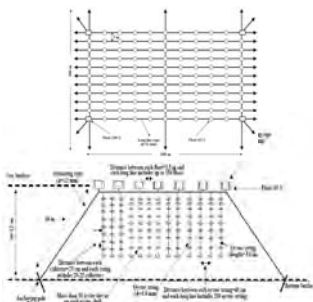
Styrofoam buoys	2008	2009	2010	2011
Rank (by count)	1	1	1	1
Ratio(%)	13.2	12.5	10.8	11.7

Source: Korea National Marine Debris Monitoring Program (MLTM, 2008; 2009; 2010; 2011)



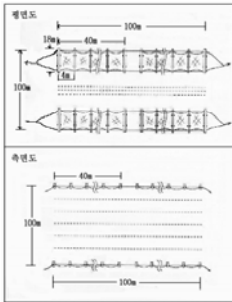
Usage of Styrofoam buoys

❖ Oyster aquaculture



Source: Choi (2008)

❖ Laver aquaculture



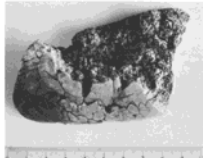
Source: portal.nfndi.re.kr/fbs?id=kindplan02

Ingestion of Styrofoam fragments by wildlife

Northern Fulmar (Provencher et al., 2009)


Location (n)	Female (%)	Total pieces	Industrial	User	Hard plastic	Styrofoam
Overall (25)	52	84%	28%	84%	84%	8%
Incidence		5.6 (6.0)	0.4 (1.0)	5.1 (5.5)	5.1 (5.6)	0.1 (0.3)
Mean (SD)						

Northern Gannet Starvation After Swallowing Styrofoam



(Dickerman and Goelet, 1987)

Laysan Albatross (*Phoebastria immutabilis*)



(Auman et al., 1997)

Styrofoam Microplastics



Styrofoam buoy debris management policies

- ❖ **Subsidy on high density buoys**
(Ministry of Oceans and Fisheries)
- ❖ **Supporting distribution of Styrofoam compactors**
(Ministry of Oceans and Fisheries)
- ❖ **Extended Producer Responsibility**
(Ministry of Environment)



Year	2010	2011
Production(a)	1,281 ton	1,543 ton
Recycle(b)	331 ton	362 ton
Recycle Rate	26%	23%

Source: EPS.or.kr



The 1st Meeting of Stakeholders (2010)

- Organizer: OSEAN
- Participants
 - Korea Foam-Styrene Recycling Association (Producer)
 - Ministry of Land, Transport and Marine affairs (Government)
 - National Fishery Research & Development Institute
 - Korea Zero Waste Movement Network (NGO)
 - Jeon-nam Province government
 - Recycle company
 - Media etc



Brainstorming Workshop in 2011

Workshop for Promotion of Styrofoam buoys recycle (Nov. 2011)

- ❖ **Objective**
 - To understand the state of Styrofoam buoys recycle administration
 - To develop alternative policy measures
- ❖ **Co-organizers**
 - OSEAN
 - Korea Foam-Styrene Recycling Association
 - Gyeong-nam province

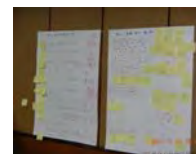
Brainstorming

- ❖ Useful in exploring the policy alternatives (Noh, 2003; Im, 2012)
 - No experiences
 - No examples of similar cases in other countries
 - Lack of theory and knowledge
- ❖ Collective learning of perceptions, knowledge, strategies (Innes and Boher, 2000)
- ❖ Recommendations for effective Brainstorming (Osborn, 1957; Dunn, 1994)
 - Invite relevant experts
 - Generate as many ideas as possible
 - Avoid criticizing
 - Encourage the generation of "wild" ideas
 - Assess the ideas after brainstorming

Participants of Brainstorming Workshop 2011

Sector	Number	Organization
Central Government	3	MLTM, Korea Coast Guard
Local Government	25	Provinces, municipalities
Business	6	Recycle companies
Fishery	2	Fisheries Cooperatives
Research	3	KIOST
NGO	12	KFEM, Agenda 21
Media	4	
Total	55	

Process of the workshop



Result of the Brainstorming workshop

Rank	Reducing the inflow of Styrofoam buoy debris	Efficient recovery	Recycling technique
1	Developing durable buoys	Raising awareness of fishermen	Developing easy-to-recycle buoys
2	User's name on buoys	Designating the mandatory recovery rate with subsidy system	Distribution of portable compactors
3	Amending aquaculture licence system	Buy back program for used buoys	Establishing social enterprise for Styrofoam buoy recycle
4	Buy back program for used Styrofoam buoys	Marine Environmental Beautifier	Regulation on inputting wastes into Styrofoam buoys
5	Education and outreach	Storing warehouse for communities	Distribution of compactors
6	Amending aquaculture method	Promotion for beach cleanup tourism	Extracting oils from Styrofoam buoys
7	Statistics on Styrofoam buoy recycling	Deposit-Refund program for Styrofoam buoys	Developing press compactors
8	Reducing the amount of installation of buoys	Supporting fishing community cleanup	Developing diverse recycled products
9	-	Enhancing Expanded Producer Responsibility	Supplying used buoys for power plants
10	-	Distribution of education materials	Shaping buoys for easy-to-retrieve

Participatory Modelling Workshop in 2012

Styrofoam Marine Debris Policy Workshop in 2012

❖ Objective

- Developing comprehensive policy for Styrofoam buoy debris by stakeholders participation
- Examination of participatory modelling as a policy development tool

❖ Co-organizers

- OSEAN
- Korea Foam-Styrene Recycling Association
- Gyeong-nam province, Yeongnam SeaGrant

Participants of the Workshop in 2012

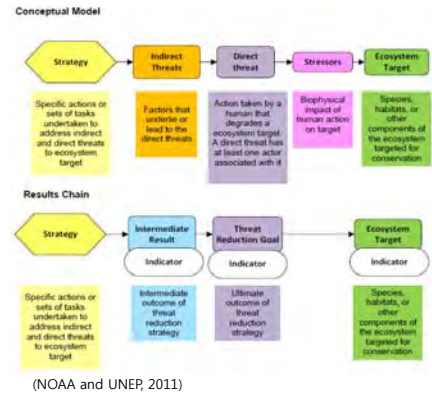
Sector	Number	Organization
Central Government	2	Ministry of Fishery
Local Government	36	Provinces, municipalities
Business	21	Buoy manufacturers, Recycle compaes etc
Fishery	6	Fisheries Cooperatives
Research & NGOs	31	KIOST, KFEM etc
Total	96	

Process of the workshop

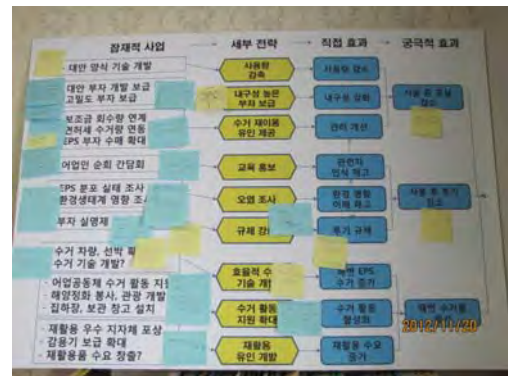
Session	Contents
Introduction	<ul style="list-style-type: none"> Background & Objectives State of Styrofoam buoys recycle
Technology	<ul style="list-style-type: none"> Styrofoam compactors Alternative mariculture buoys
Policy	<ul style="list-style-type: none"> Conceptual model & Result chain AHP questionnaire



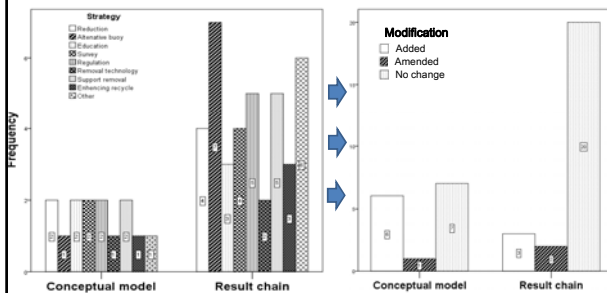
Conceptual Model & Result Chain



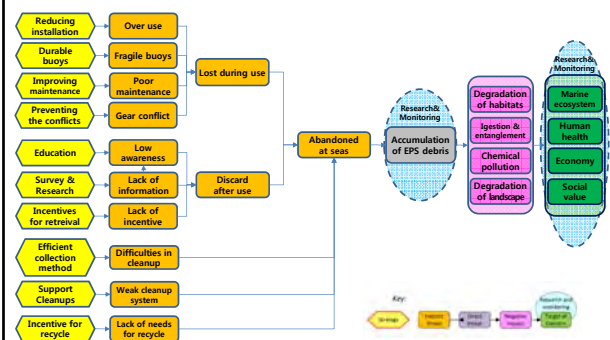
Developemnt of Conceptual model & Result chain for Styrofoam buoy debris

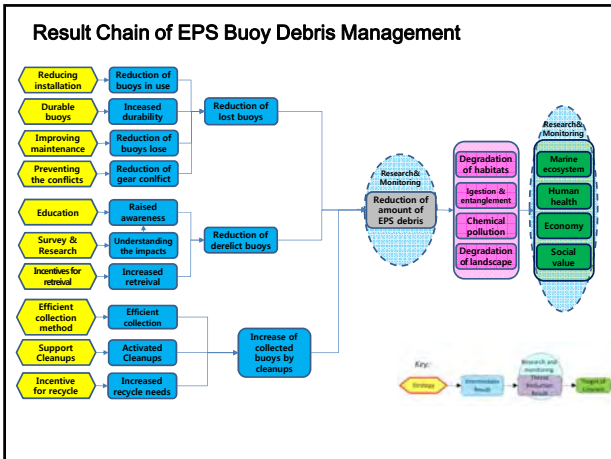


Comments and Modification



Conceptual Model of EPS Buoy Debris Management





Assessment of policy measures by AHP

Rank	Policy measures	Total (n=40)	Government (n=14)	Business (n=9)	Expert (n=17)
1	Beach cleanup by the public works program	3.59±0.71	3.73±0.63	3.30±0.92	3.62±0.65
2	Developing alternative buoy and aquaculture technology	3.54±0.99	3.59±0.83	3.91±0.86	3.32±1.15
3	Research for reducing styrofoam buoy debris	3.51±0.80	3.26±0.70	3.62±0.96	3.66±0.79
4	Awarding best practices of recycling of local governments	3.51±0.66	3.51±0.63	3.43±0.63	3.54±0.74
5	Research on impacts of styrofoam debris on marine ecosystem*	3.50±0.83	3.29±0.86 ^{ab}	3.16±1.16 ^a	3.85±0.62 ^b
6	Outreach for raising fishermen's awareness*	3.47±0.86	3.17±0.77 ^a	3.01±0.76 ^a	3.96±0.74 ^b
7	Optional retrieval of used buoys with subsidy system*	3.47±0.84	3.45±0.64 ^{ab}	2.92±0.73 ^a	3.77±0.91 ^b
8	Survey on distribution of styrofoam debris*	3.44±0.89	3.09±0.71 ^a	3.00±1.13 ^a	3.96±0.63 ^b
9	Supporting fishing community cleanups	3.43±0.84	3.45±0.82	3.13±1.01	3.56±0.76
10	Distribution of Styrofoam compactors	3.37±0.76	3.48±0.71	3.15±0.99	3.41±0.70
11	Statistical surveys on Styrofoam debris stock and generation*	3.33±0.82	2.88±0.62 ^a	3.20±0.82 ^{ab}	3.77±0.77 ^b
12	Assessment performance Styrofoam compactors	3.26±0.78	3.29±0.75	3.20±1.15	3.26±0.60
13	Promotion for beach cleanup voluntarism and tourism	3.22±0.87	3.16±0.95	2.82±1.05	3.48±0.63
14	Extending the buy back program for used buoys	3.08±0.88	3.01±0.76	3.09±1.05	3.14±1.04
15	Subsidy for high density buoy	3.04±0.92	3.17±0.90	2.61±1.07	3.16±0.85
16	Name tags on buoys	3.03±1.05	3.19±0.75	2.59±1.44	3.14±1.04

* means the opinions of groups are significantly different by Kruskal-Wallis test ($p < 0.05$).

Outcomes and Future Plan

Publications and Sharing



Policy

- ❖ Developing Certification System for Environmentally Sound Mariculture Buoys
 - MOF, NFRDI, KCL
- ❖ ‘The 2nd Marine Debris Management Plan (2014~2018)’
 - MOF, KOEM, KMI, OSEAN
 - Draft includes “Enhancing the management of Styrofoam buoys debris”, “Styrofoam buoys Compactors”, “Developing alternative mariculture buoys”...

Future plan

- ❖ Workshop for Retrieval and Recycle of Styrofoam Buoys
 - Chang-won, 1 Dec. 2013.
 - EPR-“Enhanced Consumer Responsibility”-EGR
- ❖ Quantitative model of Styrofoam buoys management system



Acknowledgement

❖ Special thanks to

- Korea Foam Styrene Recycling Association
- Korea Institute of Ocean Science and Technology
- Gyeong-nam Province
- Yeong-nam SeaGrant
- Tong-yeong City
- Geoje City

NOWPAP International Coastal Cleanup and Workshop on Marine Litter Management in Okinawa, Japan, October, 24-27

NGO ACTIVITIES TO DEAL WITH MARINE LITTER IN THE RUSSIAN FOREAST



Blinovskaya Yana, Vysotskaya Maria
Maritime State University named after Admiral G.I. Nevelskoy
Vladivostok, Russia

Human activity



↓ Environmental problems ↓



Ecological education



3

The marine litter impact



4

Marine litter in NOWPAP region



5

Coastal area cleanup actions



6





Marine Litter Monitoring Activities in the NOWPAP Region

Northwest Pacific Region Environmental Cooperation Center (NPEC)

Takafumi YOSHIDA

2013 NOWPAP International Coastal Cleanup and Workshop on Marine Litter Management
Okinawa, Japan
24-26 October, 2013

Northwest Pacific Region Environmental Cooperation Center (NPEC)

Established in 1998
To conserve marine environment in the Northwest Pacific region under the cooperation with neighboring countries and local governments

1. International cooperation

The Association of North East Asia Regional Governments

2. CEARAC activities

Reports
Training course
Assessment of marine environment

3. Researches for preserving the marine

Monitoring survey in Toyama Bay
Marine litter monitoring

Marine Litter Monitoring

【1996】
Country : Japan
Local governments :10
Survey sites :16 sites

【2012】
Country :China, Japan, Korea and Russia
Local governments :15
Survey sites :33 sites

Survey methods

①Compartment of survey area

(10m×10m)

②Collection of marine litter

③Classification of marine litter

プラスチック類 (Plastic), ガラス (Glass), 金属類 (Metal), 発泡スチロール類 (Foam), 布類 (Cloth), 紙類 (Paper), その他 (Others)

④Counting number and weight

Result of Marine Litter Monitoring (2003~2012)

Number of marine litter/ 100m²

凡例 (Legend): プラスチック類 (Plastic), ガラス (Glass), 金属類 (Metal), 発泡スチロール類 (Foam), 布類 (Cloth), 紙類 (Paper), その他 (Others)

東京湾 (Tokyo Bay), 対馬海峡 (Tsushima Strait), 黒潮 (Kuroshio Current)

Number of marine litter/ 100m² (Number of marine litter per 100m²)

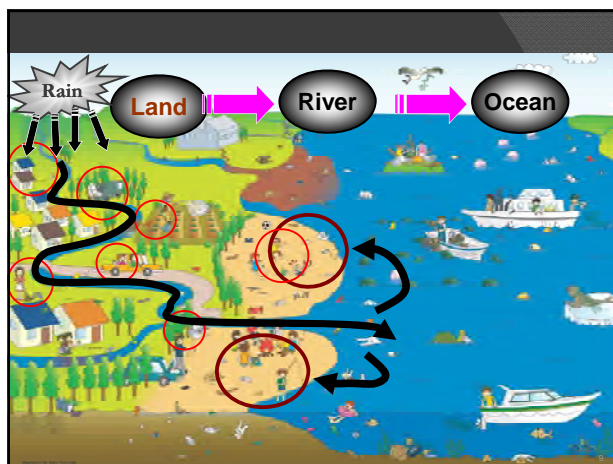
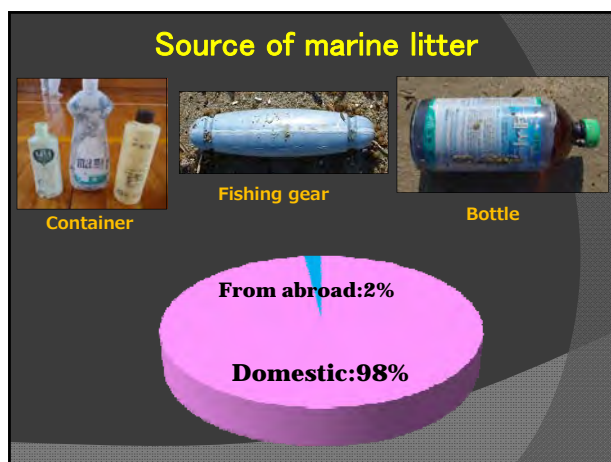
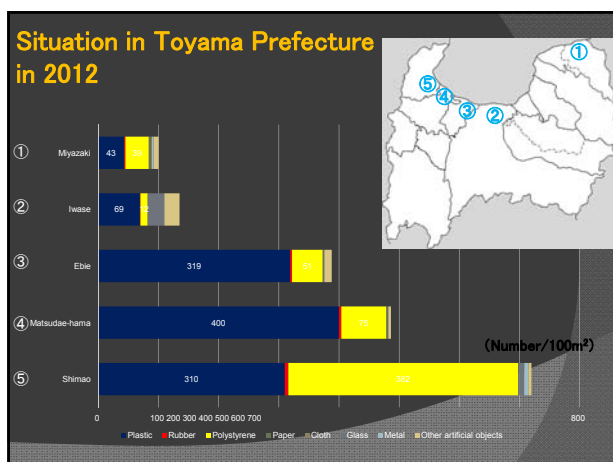
2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012

Composition of marine litter

2011
Number per 100m²: 213

2012
Number per 100m²: 321

Composition: Plastic (75.1%), Rubber (14.5%), Polystyrene (2.5%), Paper (1.0%), Cloth (1.3%), Glass/Ceramic (0.6%), Metal (0.6%), Other artificial objects (3.7%)



To prevent marine litter input from land-based sources

- ① **Collect marine litter in coasts**
 - Much money and work
 - Difficulty of treatment of marine litter
- ② **Reduce generation of garbage**
 - Enhancing public awareness

Marine Litter Art

- Started from 2007
- Objectives
 - ① Public awareness on marine environment
 - ② Understanding on marine litter problem
 - ③ To provide opportunity in order to learn about marine litter

Effective public awareness

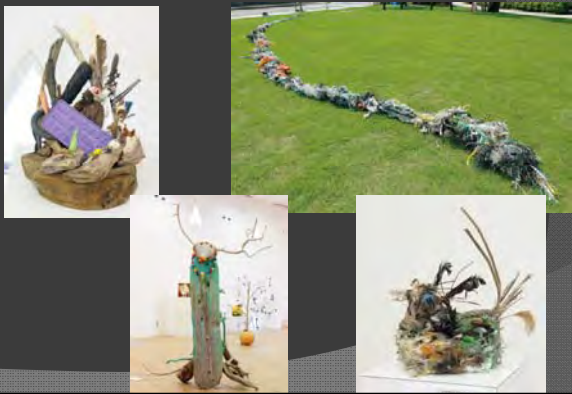
Marine Litter Art Exhibition

Art work + Marine litter monitoring

↓

Promote better understanding of marine litter problem through enjoyable experiences

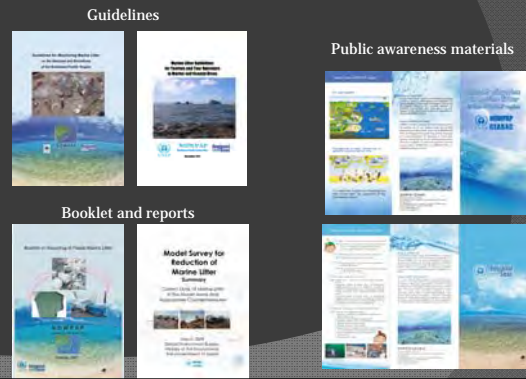
Marine Litter Art Exhibition (2013)



From Toyama to other region



CEARAC Marine litter activities



Measures and best practices for prevention of marine litter input from land-based sources in the NOWPAP region



Thank you very much for your attention



MARINE LITTER MANAGEMENT IN RO KOREA: PROGRESS AND PERSPECTIVES



Mr. Chae-Kyun KIM
Deputy Director
Marine Conservation Division
Ministry of Oceans and Fisheries

- TABLE OF CONTENTS -

- I Current Status of ML Management in RO Korea
- II The 1st Comprehensive ML Management Plan: implementation and assessment
- III 2nd Comprehensive ML Management Plan: overview and main direction
- IV Way Forward

Note: ML denotes Marine Litter in this presentation

Current Status of Marine Litter Management in RO Korea

Marine Litter Policy Environment

Milestone changes in 2008

- Promulgation of the Marine Environment Management Act
- Establishment of KOEM



1st Comprehensive Marine Litter Management Plan (2008)

Before 2008	1 st Comprehensive Plan
Collection & Disposal focused - Marine litter collection	Prevention focused - Watershed management - ALFG management
National Funding dependent - Seabed deposited litter - ALFG collection	Polluter pay principle - Fisheries sector - 4 River management
Sectoral & local centered - Varied local policies - Divorced from land waste	Integrated management - Metro-wide management - Land-marine integration

1st Comprehensive ML Management Plan (2008-2013)

: Assessment

1st Comprehensive ML Management Plan

- Duration**
 - 2009 ~ 2013 (5 year plan)
- Ministries**
 - Ministry of Oceans and Fisheries
 - Ministry of Environment
 - Ministry of Agriculture, Forestry and Food
 - Korea Coast Guard
 - Local governments
- Legal basis**
 - Marine Environment Management Act, Article 5 and 24
 - Underplan of the Comprehensive Marine Environment Management Plan

4 Strategies and 28 Programmes/projects

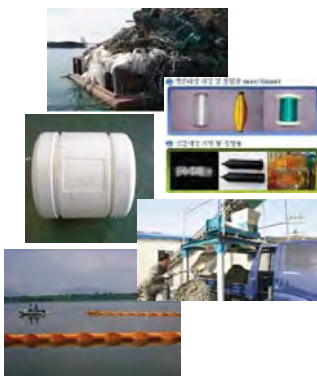
- Strategy 1. Minimizing litter inflow to marine environment
- Strategy 2. Increasing ML collection and disposal capacity
- Strategy 3. Enhancing ML management capacity
- Strategy 4. Involving public and international collaboration

Assessment of the 1st CML Plan



Strategy 1. Minimizing litter inflow to marine environment (8 programmes and projects)

Programme/Project
Set-up and operation of ML collecting barges
Establishing fishing gear management system
Promotion of eco-friendly fishing gear use
Provision of high-density Styrofoam buoy
Developing oyster shell recycling technology
Promotion of fishing boat waste collection
Introducing upstream-downstream ML management cost-sharing schemes
Set-up of ML boom



Set-up and operation of ML barges



Objectives

- Set-up a barge-type marine litter collection boat in ports or fishing ports to collect litter during fishing activities. It helps prevent the occurrence of abandoned, derelict and discarded fishing gear.

Progress

Year	2010~2012	2013
Number of Barges	128	51
ML collection (ton)	2,951	1,298

1 barge: Approx. US\$170,000 (2010)



Promotion of Fishing Boat Waste/Bilge Collection



Objectives

- ✓ Preventing the littering of waste and bilge of small fishing boats
- ✓ Campaigning and educating fishers on littering of boat waste/bilge
- ✓ Establishing waste collecting system at fishing ports

Roles

- ✓ KCG: set up of waste collection bins at ports; promotion and campaign
- ✓ Fisheries cooperatives: Collection bin maintenance and volunteer management

Year	Fishing Boat Waste Collection		Bilge Collection	
	Site	Amount (Ton)	Site	Amount (Ton)
2012	128	1,372	77	128
2011	100	1,470	53	111
2010	100	1,063	32	10
2009	85	825	-	-



Upstream-Downstream ML Cost-sharing Schemes



Objectives

- ✓ 70% of marine litter are land-based. In order to prevent the entering of litter to marine environment, it is necessary to establish upstream-downstream collaboration mechanism

Progress

- ✓ Han river basin: a cost-sharing scheme operational since 2001
- ✓ Nagdong river basin: established a cost-sharing scheme in 2007
- ✓ Youngsan river basin: established a cost-sharing scheme in 2009

River Basin	Responsibility
Nagdong River	Ministry of Oceans and Fisheries/Ministry of Environment
Han, Keum, Youngsan	Ministry of Environment



Assessment of the 1st CML Plan



Strategy 2. Increasing ML collection and disposal capacity (10 programmes and projects)

Programme/Project
Fishing port deposited waste removal
Buying of the recovered waste during fishing
Deposited fishing gear removal
Distribution of Styrofoam volume reducer
Aquaculture ground clean-up
River and estuarine waste clean-up
Coastal clean up event
Waste FRP boat disposal system
High-tech coastal waste removal system
Conversion of ML into RPF



Buying of the recovered waste during fishing



Objectives

- ✓ To prevent re-entering of the recovered waste during fishing into marine environment by buying the recovered waste
- ✓ This is ultimately cost-effective
- ✓ Enhancing fishers' awareness on marine environment

Progress (Total volume of waste bought)

Total (Ton)	2009	2010	2011	2012
30,959	9,692	6,563	8,054	6,650

Cost sharing: National 60%, Local 40%

- ✓ Total cost is approx. US\$ 26M up to 2012
- ✓ Approx. 118% achievement (compared to planning)



Aquaculture ground clean-up



Objectives

- ✓ Maintaining the health of aquaculture ground by removing land-based or sea-based litters, if deemed necessary
- ✓ Increasing the productivity and safety of the aquaculture products

Cost sharing

- ✓ National 80%, Local 10%, Aquaculturist 10%

Progress

- ✓ Established a standardized process and implementation mechanism
- ✓ Recovered wastes are sent to recycle and/or recover into RPF



River and Estuarine Waste Clean-up



Objectives

- ✓ To prevent the litter entering into marine environment by removing the wastes in the river basin
- ✓ To promote public participation in waste removal and environmental campaign

Progress

- ✓ Regular clean-up activities in 5 River basins
- ✓ Ministry of Environment provides partial cost of clean-ups (40~70%)

Basin	2009	2010	2011	2012
Total (Ton)	43,234	36,820	50,607	46,089
Han	16,507	11,683	6,954	11,089
Nagdong	6,975	6,543	26,067	16,721
Keum	4,814	4,543	7,725	8,003
Youngsan	11,288	7,638	2,288	8,820
Sumjin	3,650	6,513	7,573	1,456



Assessment of the 1st CML Plan



Strategy 3. Enhancing ML management capacity (4 programmes and projects)

Programme/Project
Development of ML Statistics and Analysis Methods
Conducting the ML Distribution Survey
Establishment of ML Information System
Establishment of Marine Litter Management Center



Marine Litter Distribution Survey



Objectives

- ✓ To implement an effective marine litter management projects and programmes, it is necessary to gather precise data on litter distribution
- ✓ Regular and scientific survey of marine litter is conducted

Implementation

- ✓ Approx. US\$ 6M spent (152% than planning)
- ✓ In 2012, 46 sites were surveyed
- ✓ In 2013, 5 Environmental Management Seas were surveyed

Survey

- ✓ Divide into 5 region
- ✓ Once in every 5 year



Establishment of MALI Center and Marine Litter Information System



- ✓ MALI Center established in 2011
- ✓ Marine Litter Information System designed to provide information to public which was established in 2011 within MALI Center in KOEM

Four major functions of MALI Center

Information System

Monitoring



Information Management



Policy Support



International Collaboration



Assessment of the 1st CML Plan



Strategy 4: Public participation and International Collaboration (6 programmes and projects)

Programme/Project
Supporting NGOs' Marine Environment Conservation activities
Development of Marine Environment Education Programmes
Public outreach on Marine Litter
Youth Marine Environment Programme
National Marine Litter Monitoring programme
Regional and global cooperative projects



Youth Marine Environment Programme



Objectives

- ✓ Educating marine environment protection to Elementary, Middle and High School students
- ✓ Including programmes such as Lectures, Summer Camps, Events, Competition

Implementation

- ✓ Korea Coast Guard
- ✓ Nation-wide 16 local branches
- ✓ About 10,000/year youth participation



National Marine Litter Monitoring Programme



Objectives

- ✓ Collecting nation-wide ML data
- ✓ 20 sites
- ✓ 6 times/year

Implementation

- ✓ KOEM with 19 NGOs
- ✓ Include Foreign-origin litter study



2nd Comprehensive ML Management Plan



Overview



Duration: 2014 ~ 2018 (5 year)

Ministries MOF, MOE, MAFF, KCG

Direction

- Reducing ML volume to reducing ML impacts
 - Measures for reducing impacts of marine litter
 - Evaluation: education, awareness etc. rather than amount
- National support dependent to stricter application of polluter pay principle
- Recycling and Regeneration of recovered wastes
 - Fishing gears (total lifecycle management)

VISION

Making clean and safe sea for public use
(No harms from marine litter)

Objectives and Strategies



Objectives

1. Integrated management of ML occurrence and impact
2. Prevention-centered management
3. Management based on collaboration



4 Strategies

1. Polluter pay principle-based source management
2. Self- and collaborative collection and disposal system
3. Circulation-oriented management
4. Needs-centered education and public awareness

Way Forward



- Finalizing the 2nd CMLM Plan (Dec. 2013)
- Inter-ministerial consultation (Mar. 2014)
- Securing fund and implementation (2014 ~ 2018)

Thank you!

What We Do against Marine Debris

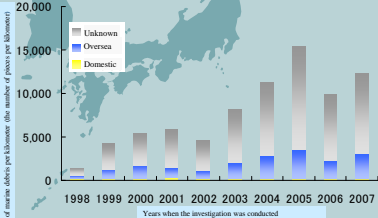
Environmental Waste Management Division,
Department of Environmental and Community Affairs of Okinawa

Marine debris (beaches In Okinawa)



Changes over the years

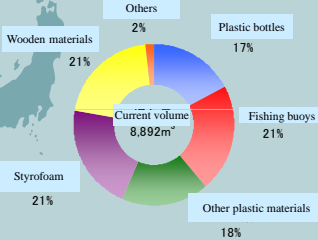
- Marine debris, especially from overseas, has been increase tendency in Okinawa.



Source:marine debris problem that is getting serious in Okinawa (Hareyuki YAMAGUCHI, 2008)

Characteristics (seasonal ,material)


- With the impact of monsoon, a lot of marine debris arrives at north and north east coast in winter.
- plastic bottles, buoys, Styrofoam are the major types of marine debris.



Marine debris (beaches at Miyako island, Okinawa)

Before Clean up

November 2010



After Clean up

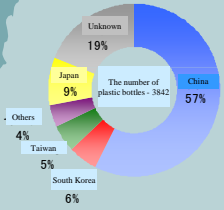
January 2011

2 months later



Characteristics (percentages by country/region of origin)

- After analyzing label of plastic bottles, we found out that they are mostly from overseas countries such as China, South Korea; regions such as Taiwan etc.



Issues

- A lot of effort and money will take to collect and treat them. Marine debris keeps coming and it is difficult to stop it.
- This isolated island does not have enough waste treatment facilities and they sometimes have to pay to transport marine debris by sea in the distance.
- It is not easy for the prefectural government to control the source because it is from oversea.

Legislation

- In order to promote measures against marine debris, act for the promotion of marine litter processing was enacted in 2009.
- In order to smoothly treat marine debris and to control the source, these measure are carried out:
 - Clarifying who is responsible for the treatment
 - Diplomatically proper treatment for oversea marine debris
 - Financial measure

What we do (Okinawa prefectural government)

- Investigation on marine debris
- Outsourcing collection and treatment as public works
- Creating promotional materials



Working with the local community

- Supporting volunteer groups for beach cleaning (providing tools, treating collected litter)
- Sharing information with the administration and volunteer groups
- Promoting beach cleaning event throughout the prefecture

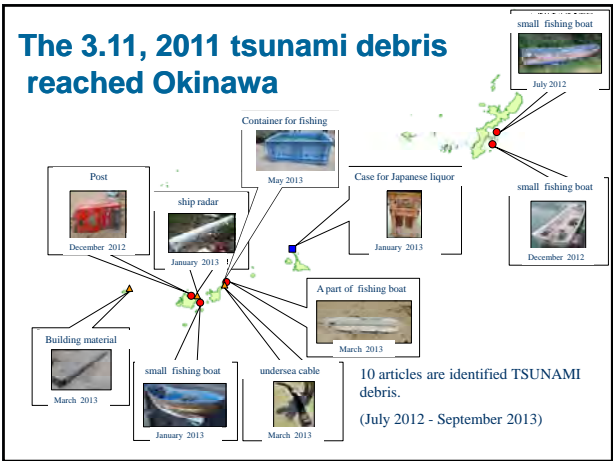
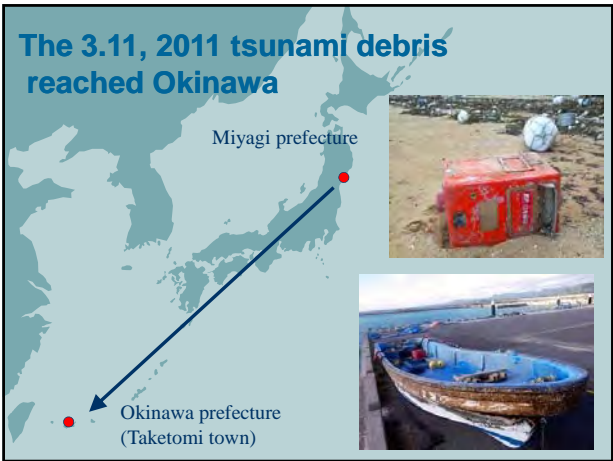


Beach cleanup Event by OCCN (Okinawa clean coast network)



Dangerous objects







Philippines

2012-2013

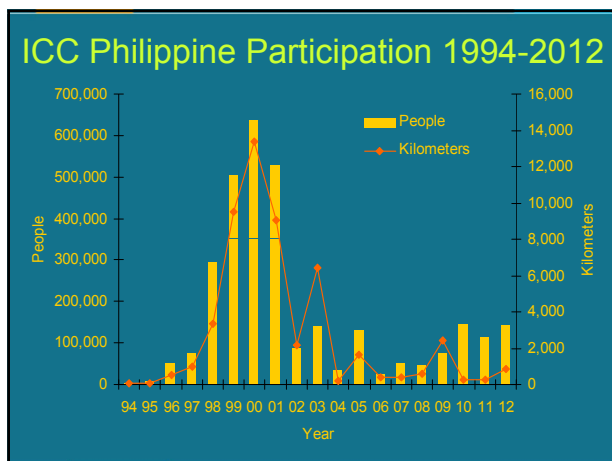
ICC

International Coastal Cleanup

Jacob F. Meimban, Jr.
Executive Director
DENR-PAWB Coastal and Marine Management Office

ICC in the Philippines

- The Philippines joined the ICC in 1994 with the International Maritime Alliance (IMA) as the country coordinator and since then, the country consistently topped in the ICC, in terms of volunteer turnout, and has been recognized as "the cleanup capital of the world".
- In 2003, the third Saturday of September of each year was declared as the International Coastal Clean-up Day in the Philippines through Presidential Proclamation No. 470



Objectives

- To remove trash/debris from beaches and waterways
- To increase awareness on the extent of the marine debris problem
- To popularize the concept of waste management
- To promote a clean, healthy and sustainable coastal environment
- To change behaviors that cause pollution

2012 Top Ten Participating Countries/Region

RANK	COUNTRY/REGION	NO. OF VOLUNTEERS
1	United States	166,325
2	Philippines	143,946
3	Canada	30,723
4	Hong Kong	23,802
5	Dominican Republic	18,997
6	Mexico	16,945
7	India	16,756
8	Peru	12,913
9	Ecuador	12,459
10	Puerto Rico	8,945
98 COUNTRIES & LOCATIONS		561,633

2012 ICC Philippine Results Summary



2012 Top Ten Debris Items

DEBRIS ITEM	QUANTITY	PERCENT FROM TOTAL
food wrappers/containers	263472	13
straws, stirrers	253352	12
cigarettes / cigarette filters	160350	8
bags (plastic)	140811	7
plastic sheeting / tarps	129609	6
cups, plates, forks, knives, spoons	124058	6
diapers	114854	6
caps, lids	113313	5
beverage bottles (glass)	106596	5
cloth/shoes/slippers	104229	5
Top ten total debris items	1510644	73.21%
Total debris items	2063415	100%

2013 ICC Philippines Details and Initial Results (National Level only)

Locations

1. Las Piñas-Parañaque Critical Habitat and Ecotourism Area

The first photograph shows a large group of volunteers gathered on a sandy beach. The second photograph shows a person in a blue shirt and yellow gloves collecting debris into a pink bag. The third photograph shows a person in a red shirt and blue pants collecting debris. The fourth photograph shows a person in a blue shirt and yellow gloves collecting debris into a pink bag.

Locations

2. Shores of the Manila Bay along the Roxas Boulevard stretch in Manila

The first photograph shows a large group of volunteers gathered on a sandy beach. The second photograph shows a person in a blue shirt and yellow gloves collecting debris into a pink bag. The third photograph shows a person in a red shirt and blue pants collecting debris. The fourth photograph shows a person in a blue shirt and yellow gloves collecting debris into a pink bag. A map of the Philippines is shown with a red line indicating the location of the cleanup area along the shores of Manila Bay.

Participants

- Around **7,500** volunteers participated in the 2 national Cleanup sites in the Philippines on **21 September 2013** amidst the landfall of Typhoon Usagi



Garbage Collected

- From a total of **5-kilometer** coastline, around 25 trucks of trash were collected, equivalent to **625 tons** or **1,250,000 lbs.**



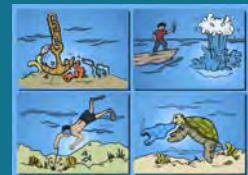
Other Details

- Summary of Data Collected from all over the Philippines is still being processed
- Due for submission before the end of 2013 to the Ocean Conservancy

Philippine Initiative to Prevent/Manage Marine Litter



- The **Sustainable Coral Reef Ecosystem Management Program (SCREMP)** is a national program that conducts a strategic, sustainable and ecosystem-based approach in protecting and rehabilitating the coral reefs of the Philippines and addressing continuing threats, such as, coastal development, marine-based pollution, sedimentation, over- and destructive fishing.



Philippine Initiative to Prevent/Manage Marine Litter



- The **National Integrated Coastal Management Program (NICMP)** adopts ICM as a national strategy following the framework for Sustainable Development of Coastal Areas and covers five main aspects of sustainable development, one of which is, pollution reduction and waste management.

ICM Scaling-up Target #3

Advance water supply conservation & management and pollution reduction & waste management through ICM programs in priority coastal and watershed areas

Philippine Initiative to Prevent/Manage Marine Litter

- Adopted during the IGR-3 Meeting on January 25-27, 2013 in Manila, Philippines, the **Manila Declaration on Furthering the Implementation of the Global Programme of Action (GPA) for the Protection of the Marine Environment from Land-based Activities** focuses on finding



"innovative solutions and initiatives to the problem of marine litter, including by sharing best practices, technical information about capacity-building and legal, policy, community-based, economic and market-based means of preventing, reducing and managing marine litter, and working to establish a global partnership on marine litter."

Thank you!

Marine litter management by central government actions in Japan

Junichiro NOGUCHI
Ministry of the Environment

Issue and domestic strategy of Marine Debris in Japan

Nagasaki Pref.
(Tsushima-city)



Yamagata Pref.
(Yuza-town)



[damage caused by marine debris]

- nowadays, enormous quantities of marine debris from home and abroad have been washed ashore to our coast

→ ill effects on marine environment, beautiful beach, ecosystems and fishing operation, e.t.c.

Nationwide Distribution trend of marine debris on the beach

(Survey overview)

- A survey implemented by MAFF and MLIT in 2006

- A survey was conducted from mid-Nov to mid-Dec on 2006 simultaneously nationwide

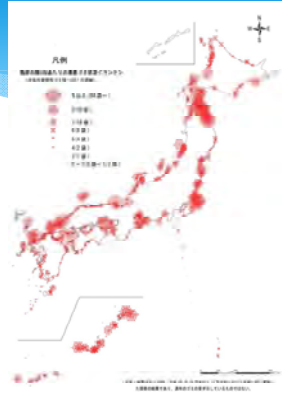
- A survey was conducted at 606 out of 664 municipalities nationwide that have seacoasts

- select the average coastal area of each municipalities, then estimate the amount of scattered marine debris on the beach except driftwood and seaplant by sight

(Result)

- The amount of artificial marine debris on the beach is estimated to 148,000m³ (26,000t)

- Its distribution differs from place to place, vast quantities of debris drifted especially to north of Kyushu District and north of Tohoku district etc



Ranking list of marine debris on the beach by category

(Source : MOE model investigation to reduce domestic marine debris in year of 2009 and 2010)

<個数によるランキング>

順位	品名	個数	割合 (%)	重量割合 (%)
1	ペットボトル	324	30.1	30.1
2	プラスチック容器	292	27.6	4.6
3	プラスチック容器	48	4.5	7.9
4	プラスチック容器	47	4.4	7.9
5	プラスチック容器	35	3.3	3.0
6	プラスチック容器	23	2.2	0.5
7	プラスチック容器	20	1.9	0.4
8	プラスチック容器	19	1.8	0.4
9	プラスチック容器	18	1.7	0.4
10	プラスチック容器	17	1.6	0.4
11	プラスチック容器	16	1.5	0.4
12	プラスチック容器	15	1.4	0.4
13	プラスチック容器	14	1.3	0.4
14	プラスチック容器	13	1.2	0.4
15	プラスチック容器	12	1.1	0.4
16	プラスチック容器	11	1.0	0.4
17	プラスチック容器	10	0.9	0.4
18	プラスチック容器	9	0.8	0.4
19	プラスチック容器	8	0.7	0.4
20	プラスチック容器	7	0.6	0.4

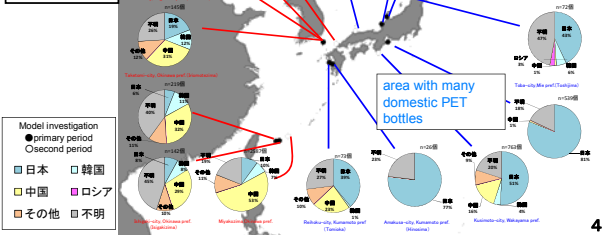
<重量によるランキング>

順位	品名	重量	割合 (%)	重量割合 (%)
1	ペットボトル	28.48	37.6	37.6
2	プラスチック容器	21.71	21.6	4.6
3	プラスチック容器	4.22	1.9	7.9
4	プラスチック容器	4.19	1.8	0.4
5	プラスチック容器	3.42	0.8	0.4
6	プラスチック容器	3.35	0.8	0.4
7	プラスチック容器	1.72	1.4	0.4
8	プラスチック容器	1.61	1.4	0.4
9	プラスチック容器	0.75	1.4	0.4
10	プラスチック容器	0.61	1.4	0.4
11	プラスチック容器	0.60	1.4	0.4
12	プラスチック容器	0.52	1.4	0.4
13	プラスチック容器	0.29	0.9	0.4
14	プラスチック容器	0.25	0.9	0.4
15	プラスチック容器	0.25	0.9	0.4
16	プラスチック容器	0.25	0.9	0.4
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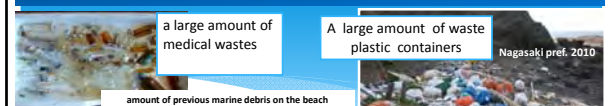


Proportion of PET bottle by country (example of model investigation by MOE: first period, second period)

- ・In Southwest Japan including Yamaguchi pref., Nagasaki pref., Okinawa pref. PET bottle of foreign origin account for majority of all.
- ・Except the above, Japanese origin occupy the most part, account for half of the share.

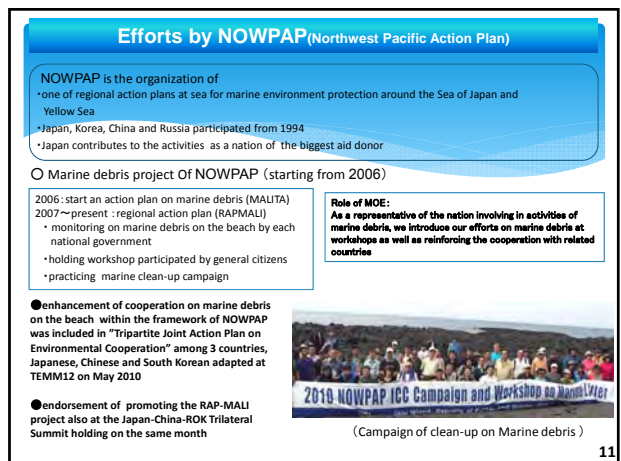
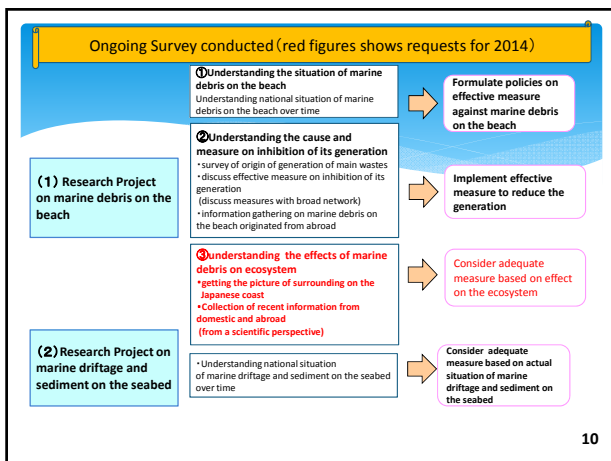
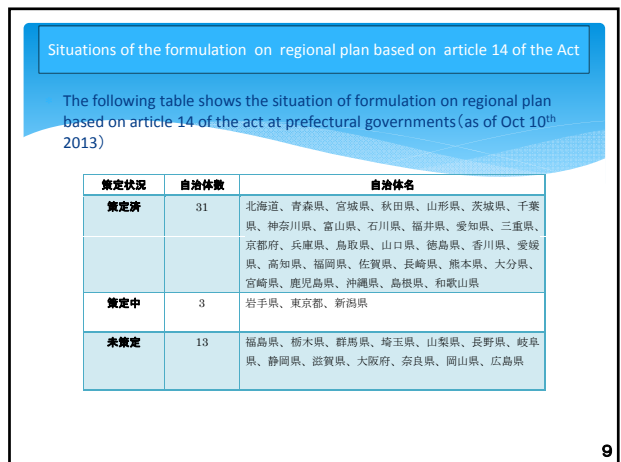
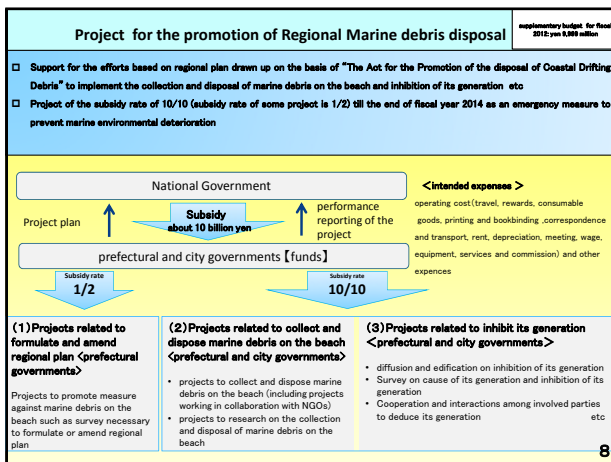
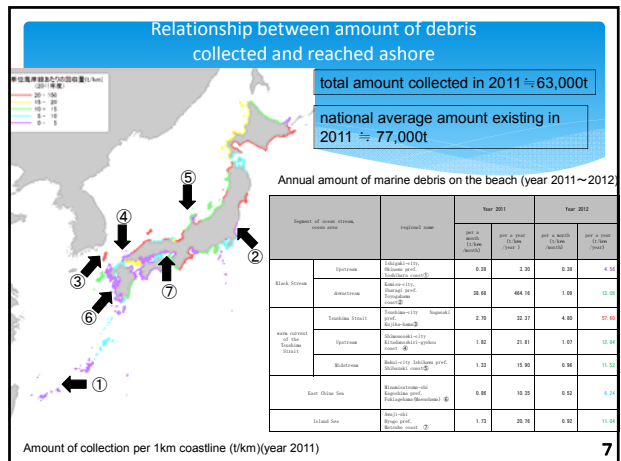
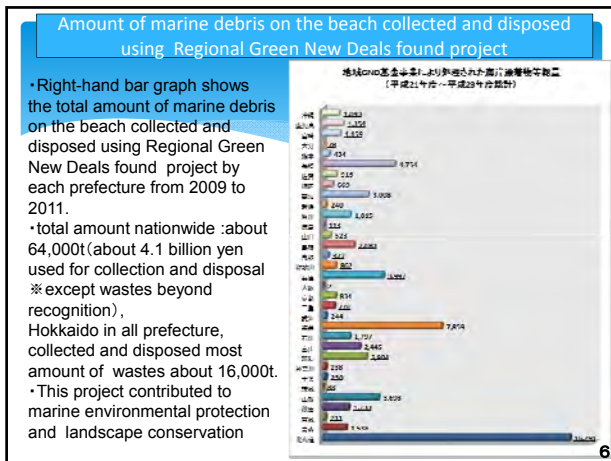


Circumstance of waste plastic container e.t.c washed ashore to our coast

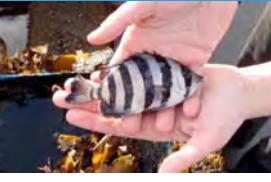
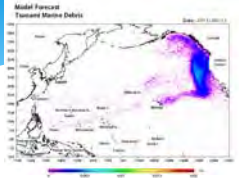


year	number of wastes
2006	≈27,000
2008	≈2,000
2009	≈200
2010	≈27,000
2012	≈2,000
2013	≈7,000





Efforts on tsunami driftage (Requests for 2014)



The tsunami driftage was caused by natural disaster and Japan has no responsibility of tsunami debris in the eye of the international law. But we are planning to have an investigation of the effects of Tsunami driftage on the Western Coast of North America and Hawaii about the following points:

- Marine environment
- coastal region
- regional community
- ecosystem

and assessing the effect of tsunami driftage on marine environment at present and in the future

12

Marine Litter Management in China

Qingjia MENG, Hao CHEN

Chinese Research Academy of Environmental Sciences

NOWPAP ICC, October 24, 2013
Okinawa, Japan

Outline

1

Overview of current China's marine litter status

2

Actions against marine litter

3

National plans to marine pollution control

4

Other activities for marine litter management

1

Overview of current China's marine litter status



- nationwide monitoring by central government.
- since 2007, it has been carried out by the State Oceanic Administration (SOA).
- 50 survey locations have been set along coastal area.
- publishes the marine environment report every year.

Monitoring items & survey methods


Monitoring items	Survey methods
Beach debris	Sighting survey/Weight survey
Floating debris	Sighting survey /Trawling survey
Seafloor debris	Diving survey/Trawling survey

The monitoring areas are mainly focused on:

- coastal recreational waters
- harbors and ports
- mariculture zones
- Marine protection areas

Monitoring time:

September to October.

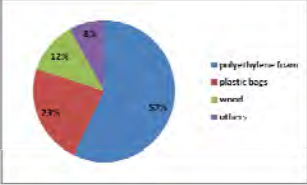


Distribution of ML (number/ km²) in coastal and nearshore regions of China in 2012

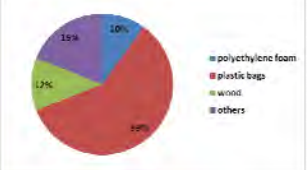
data source:
Bulletin of China's Marine Environmental Status of China for the year of 2012

Big drifting ML on seawater surface
Small ML on seawater surface
Beach ML
Seafloor

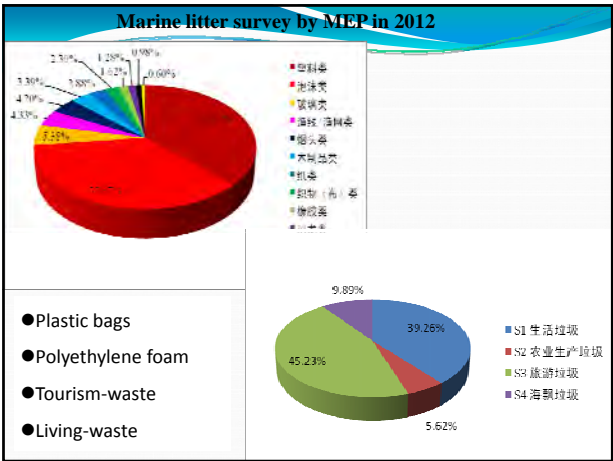
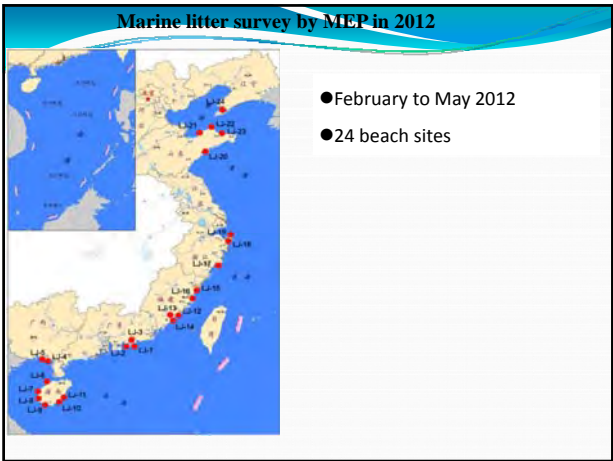
Material composition of drifting Marine Litter



on seawater in 2012
87% from land-based



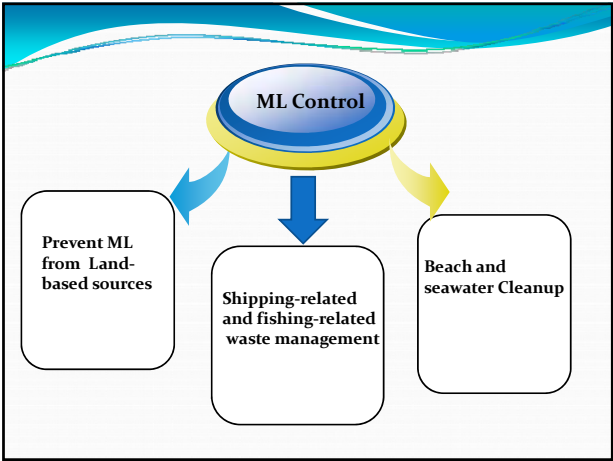
on beach in 2012
94% from land-based



2 Actions against marine litter

- Marine Litter Control consultation meeting
- September, 2008, Director-general level
- 5 relevant Ministries and Agencies: Ministry of Environmental Protection, Maritime Safety Administration, Fishery Bureau, State Oceanic Administration and PLA (Navy)
- Exchanged the info. on what have been done
- To build inter-department cooperation mechanism

全国海洋垃圾防治经验交流会



Land-based Waste Management

- MEP has established a garbage collection and disposal system, a medical waste disposal system, and a port solid waste recycling and treatment system.
- An environmental supervision and management system was built for the whole process of hazardous waste and medical waste collection, transportation and disposal.
- Reduce the solid wastes that may flow to the rivers and seas.

Waste transfer station, Garbage truck, Recycling facility

Restrictions to the free use of plastic bags in markets (June 2008-)

- No free use of plastic bags
- It is estimated that 40 billion plastic bags are reduced per year

Supermarket, People with reusable bags

Shipping and fishery-related waste management



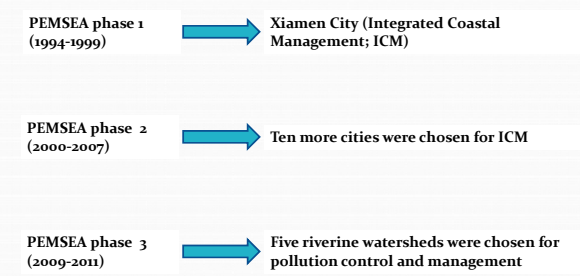
Beach and seawater Cleanup



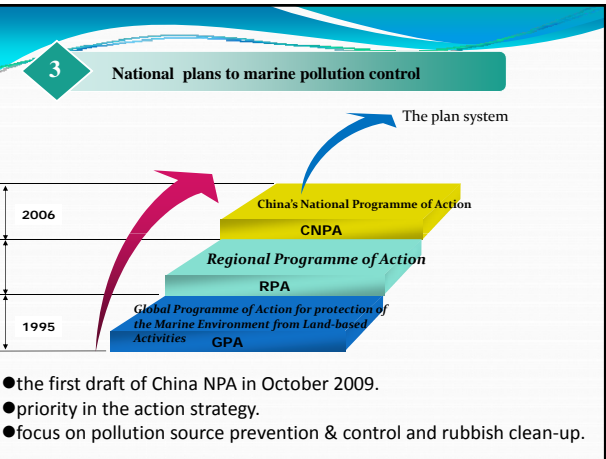
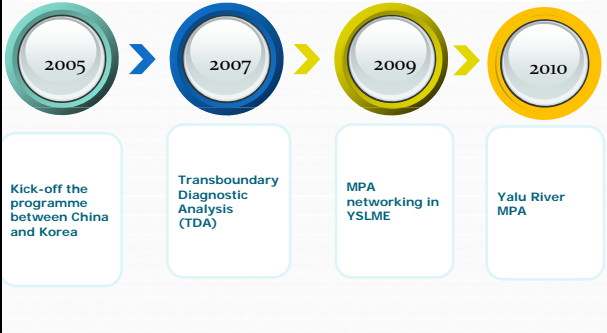
NOWPAP MALITA and ICC events

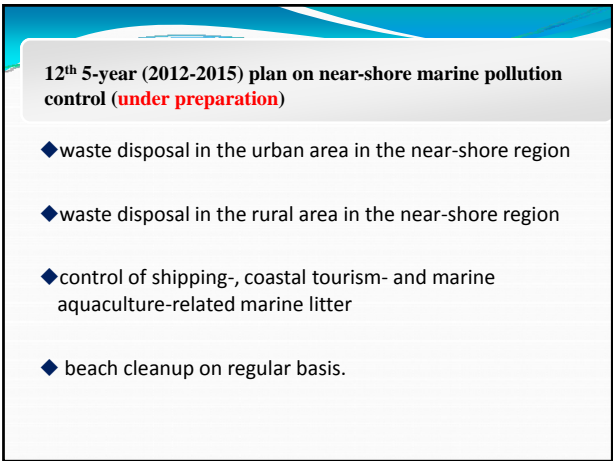
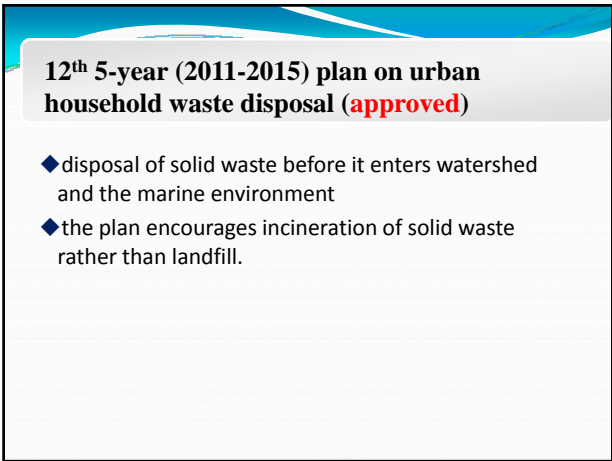
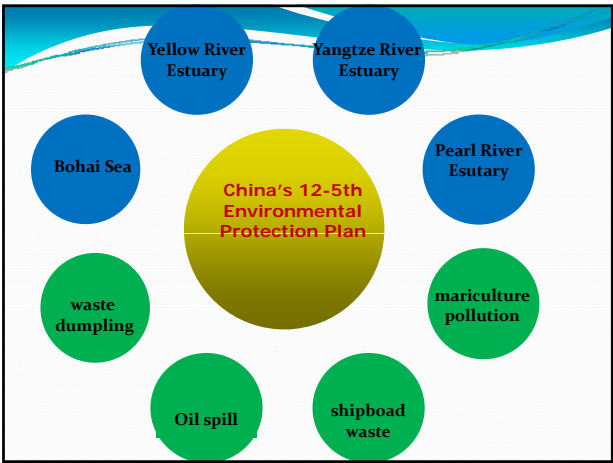
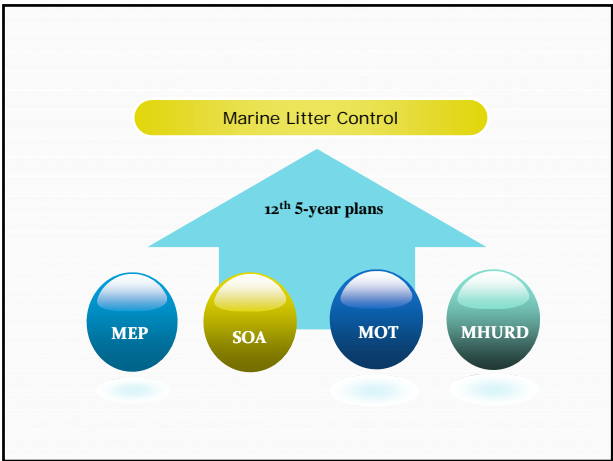
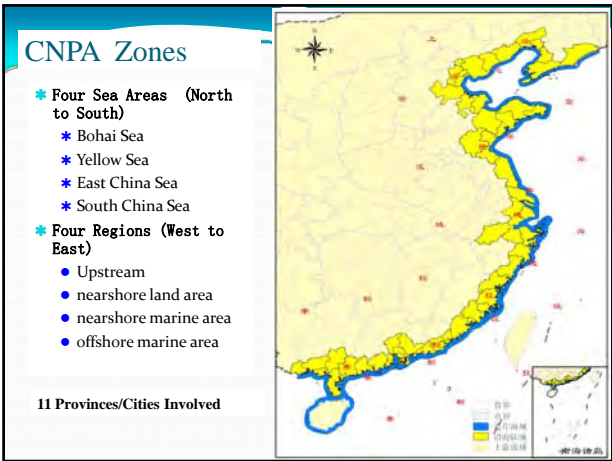


Participation in PEMSEA



Participation in Yellow Sea LME (YSLME)





Other activities for marine litter management

- ◆ Communication with NGOs
- ◆ Examples in marine litter control
- ◆ Public awareness

Communication with NGOs

- We have built a regular communication with NGOs in several cities.

[illegible]

Communication with NGOs

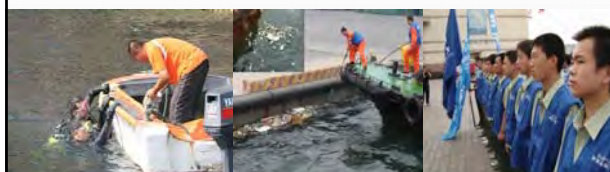
- Workshop about NGOs' role in Marine environmental protection
- Organized by ML FP and Shanghai Rendu Ocean NPO Development Centre on August 24th, 2013



Examples – Dalian

Marine Litter Control from land-based sources:

- Strengthening the waste discharge outlet management. The Environmental Protection Bureau controls the total quantity of pollutants with target management.
- Recycling waste at Port. There are almost 7,800 ships discharging waste at Dalian Port every year, and more than 6,000 tons of garbage is recycled.
- Implementing environmental protection and coastal clean-up activities



Examples – Yantai

- Organizer: Yantai MSA, youth league committee
- More than 90 volunteers collected garbage on the First Bathing Beach (3.2km total length)
- More than 20 volunteers collected near-shore drifting ML through 2 maritime inspection ships
- 730 pieces of marine litter, including plastic bags and mineral water bottles were collected



Information provided by Yantai MSA & from http://kab.yantai.gov.cn/content/news/index_dis.jsp?id=123957

Examples – Qingdao

- Shandong foreign trade education station of online college of Renmin University of China
- More than 100 university students on a voluntary basis carried out the cleanup work on several bathing beaches
- Amount: 2 handcarts
- Banner on the bus for awareness
- Reported by the local newspaper



From <http://www.cmr.com.cn/diary/0430.htm>

Examples – Weihai



- Once per several weeks
- Harbin Institute of Technology, Weihai
- Gold Beach cleanup

From http://www.whhit.com/stglzx/Article_Show.asp?ArticleID=187

Public Awareness-poster and exhibition



Thank You

New Technologies for Monitoring Marine Litter

Advanced and Fresh non-traditional multi-disciplinary approaches

Andrea Neal, Ph.D.
CEO and Founder
Blue Ocean Sciences LLC
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Disruptive Innovators!



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Why Do We Need Disruptive Innovators?

Many of society's most urgent problems cannot be solved by improving technologies we have today. We need bolder solutions and radically new ideas. These won't be found in crowded ponds but in unexplored blue oceans. We need a new generation of disruptive scientists, the kind of really creative people who can imagine such new places and transport themselves and us.

— Javier Garcia-Martinez, Ph.D.



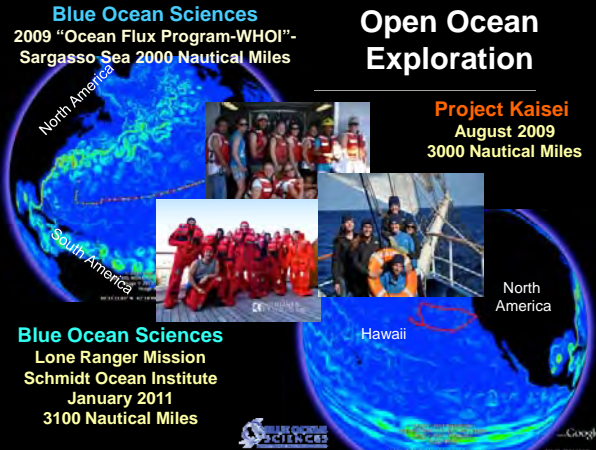
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Blue Ocean Sciences

2009 "Ocean Flux Program-WHOI"-
Sargasso Sea 2000 Nautical Miles

Open Ocean Exploration

Project Kaisei
August 2009
3000 Nautical Miles



Blue Ocean Sciences
Lone Ranger Mission
Schmidt Ocean Institute
January 2011
3100 Nautical Miles

Blue Ocean Sciences (BOS)
Lone Ranger Mission Atlantic Ocean 2011



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Michael Gonsior, Ph.D. (University of Munich)

Heather Coleman, Ph.D. (PACMARA)

Randall Mrelke (NASA, UCSB, BOS)

Greg Wanger, Ph.D. (JCVI)

Shaneen Braswell (McGill)

Christina Stam (NASA)

Andrea Neal, Ph.D. (BOS)

Prof. Greg Ferry, Ph.D. (PENN State, Synthetic Genomics)

Prof. Robert Schlegel, Ph.D. (PENN State)

Scott Walker (Highliner Studios)

Erika Raymond, Ph.D. (MBARI)



HIGHLINER STUDIOS®

BOS Lone Ranger Team 2011

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Critical Thinking Meets Ocean Love

You Protect What You Love
 –Jacques-Yves Cousteau

You Can't Protect What You
 Don't Understand
 - Jean-Michel Cousteau

Protect the ocean and you protect yourself
 - Jean-Michel Cousteau

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What Does the BOS_{LLC} Research Tell Us?

Environmental Synthetic Polymers Are Covered In Microbes
ESEM: Imaging was performed at a 4.0 torr with an accelerating voltage of 20 kV

The figure displays 12 SEM images of synthetic polymers covered in microbes, arranged in three rows (A, B, C) and four columns. Each image includes a scale bar indicating magnification.

- Row A:** Four images showing polymers at 10, 20, 50, and 100 μm scales.
- Row B:** Four images showing polymers at 10, 20, 50, and 100 μm scales.
- Row C:** Four images showing polymers at 5, 10, 20, and 20 μm scales.

Each image shows a different polymer structure, with varying degrees of microbial coverage and morphology. The scale bars are located at the bottom of each image.

Environmental PRP's (Pre-Production Resin Pellets)
Degrade In Open Ocean

From a combination of

Physical Weathering

Biofilm
 Weathered PRP
 200 µm

UV Irradiation

Wave Action

Bacteria
 2000 nm

Animal Foraging

Microbial Processes
www.blueoceansciences.com

Bacterial Footprint With EPS
 200 µm

Synthetic Chemicals and Heavy Metals Associate With Biofilms on Surfaces of Open Ocean Synthetic Polymers

Deep-UV

Micro-Tomography

Virgin PP Homo

Environmental PP Homo

Biofilm And Organic Chemicals

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How Can We Get Real Time Data on Microbe Interactions with Synthetic Polymers and Persistent Pollutants In Open Ocean?

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Rapid Assessment of Organics and Heavy Metals

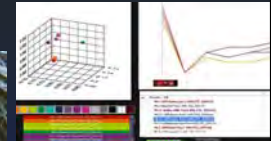
- Near real-time analysis of contaminants
- Persistent organic pollutants (POP's), Polycyclic aromatic hydrocarbons (PAHs), Poisons, Heavy metals, Radiation, Explosives, and Narcotics.
- Real Time analysis of any liquid and air in PPT and PPB ranges
- Monitoring Services for Decision Makers
- Quality Control
- Continuous 24-7 monitoring
- Portable environmental detection system - LAB and FIELD!



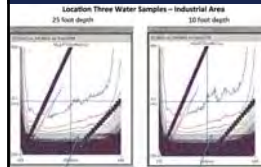
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The Underwater Dart: Chemical Mapping

Near-instantaneous in field detection of water-soluble metal ions and organics down to low ppb levels



Can go down to 4000 meters!



Detects subtle differences within mixtures of trace chemicals and other complex compounds present in water (fresh or salt)

INFORM EVALUATE REMEDIATE

Integrated Strategic Executive Planning Map

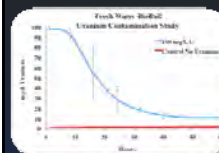
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CREATING SOLUTIONS EVERYDAY

Slingshot Technologies
the system is the solution

Secured Environment
Protecting the Standard for Water Distribution

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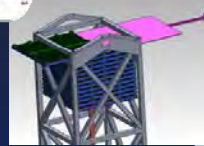
Bio-Optimized Bioremediation (BOB)



uranium, cesium and other radioactive heavy metals, heavy metals, persistent organic pollutants (POP's), Polycyclic hydrocarbons (PAHs), nitrates, phosphate, carbon, arsenic, fecal matter, and metal-oxide nanoparticles

BOB uses microbial bio-film formation on surfaces to naturally clean both salt and fresh water aquatic environments of different kinds of contaminants

BOB can clean 67,000 gallons of water contaminated with **100 mg/L** of the heavy metal Uranium with seven 3'X'3'x8' Pods.



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CREATING SOLUTIONS EVERYDAY

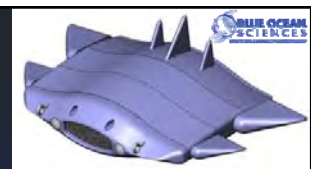
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Informal Science Education

INFORM EVALUATE REMEDIATE

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MOM (Mega Ocean Manta)



What is MOM?

— An integrated system for Detection, Location, Assessment, and Monitoring, of Ocean Contaminants

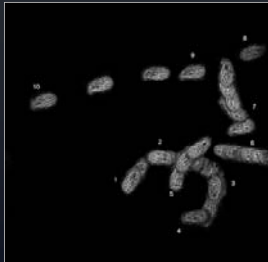


- Non-Invasive Sensitive Sampler
- Sniffer for Point Source Pollution
- Champion to Recovery Divers
- Money and Time Saver!


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Digital In-Line Holographic Microscopy (DIHM)


Dr. Jay Nadeau
Biomedical Engineering Department, McGill University



A rotifer swimming through the observation window of the underwater DIHM at a depth of 12m in the Atlantic Ocean off Nova Scotia.

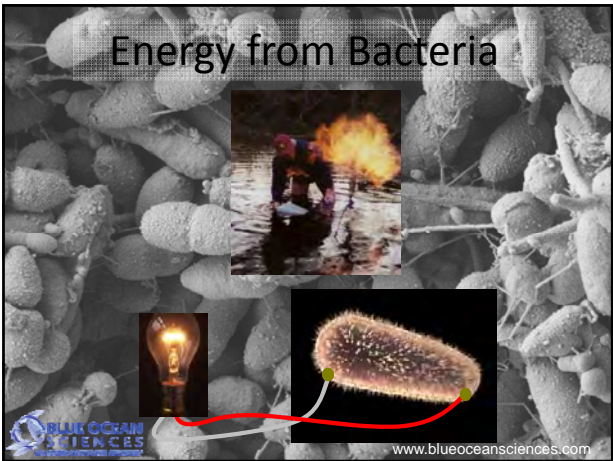



A collage of reconstructed images of freshwater proto- and phytozoa taken with the underwater DIHM at a depth of 15m. (A) Paramecium, (B) Diatom, (C) Rotifer, (D) Didinium, E-Rotifer, (F) Ciliate, (G) Ciliate, (H) Bacteria, (I) Flagellate, (J) Swimming Ciliate, (K) Rotifer Tail.



<http://fizz.phys.dal.ca/~kreuzer/DIH.html>

Energy from Bacteria





www.blueoceansciences.com

Radiationwatch.org

INTRODUCTION

ポットガイガーは、スマートフォン接続型の放射線センサーです。日本原子力研究開発機構、インターネット社会連携イニシアチブによって、世界中の研究者・エンジニアの協力により開発されました。生体・環境は放射線の影響を受けるため、世界初のスマートフォン接続型放射線センサー・ネットワークを中心に注目を集め、これまでおこなわれてきた放射線計測が大幅に向上しました。現在、米国と欧州にも販売計画が立てられています。

Pocket Geiger is a smartphone-connected, radiation detector which has been developed by social project named Radiation-Watch.org. The project has been funded via Kickstarter.com, soon after the Nuclear accident in Japan. The detectors have been fabricated in a factory which is located in official area. The project contributes ensuring job security in such area. Totally 30,000+ units were shipped in the global market.





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BOB Ag REFORM



BOB REMEDIATE Bio-Remediation



BOB IN REFORM



EVALUATE ope 20 GO



Executive Management Services



Medical Testing Equipment and Services



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Management Team



CEO Andrea Neal, Ph.D -
Over 15 years of experience in the management of large-scale national and international projects.

COO Gordon Neal, Ph.D., EE
Over 45 years experience in Avionics management and engineering has grown two companies from a \$5 million USD per year programs to a to a high quality \$125 million \$250 million USD per year respectively.

CTO Randall Mielke, M.S., Ph.D.
Over 15 years of experience managing many high-profile projects -NASA and UCSB.

CFO Jerry Knotts BSEE,MBA
Over than 30 years of successful experience in defense and aerospace companies. Serial Entrepreneur.



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Senior Scientific Staff

Senior Biological Analysts, Robert A. Schlegel, Ph.D.: Dr. Schlegel is a Professor and former Chair (1991-2007) of the Biochemistry and Molecular Biology at Penn State University. He received his PhD from Harvard University.

Senior Sensor Systems Engineer, Arthur Lonne Lane, Ph.D.: Dr. Lane was a principal investigator at NASA's Jet Propulsion Laboratories. He specializes in Planetary in-situ micro-instrument development, Remote, proximity, and in-situ sensing pollution problems.

Senior Web Data Management Engineer, Ziggy Peake.: Ziggy is the President and Founder of Sling Technologies. Sling Technologies was developed out of the development of iParq, I.L.C.

Senior Risk Management Specialist, Edward Leung: Mr. Leung is the founder and CEO of Secured Environment. He is one of the foremost experts on emerging and hidden risks including; environmental and energy risks, climate change, natural disaster risks, financial impact, and chemical and radioactive contamination

Senior Operations Management, George Orbelian: George Orbelian is the owner of Orbelian Holdings, L.P., and co-founder of Ojingo Labs, Inc. which specializes in adapting technology to smart phones. George Orbelian is the Co-Founder of Project Kaisei.

Senior Environmental Physicist, James G. Ferry, Ph.D.: Dr. Ferry is an endowed chair and Stanley Person Professor in the Department of Biochemistry and Molecular Biology at Penn State University. Dr. Ferry discovered how microbes make methane gas.

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With Special Thanks To

Jean-Michel Cousteau's Ocean Futures Society

Jet Propulsion Laboratory Caltech/NASA

The California Environmental Protection Agency

Opus Novum

Schmidt Ocean Institute

Project Kaisei

Marine Affairs Research and Education

The American Chemistry Council

Odwalla Foundation

Whole Systems Foundation

UNEP-CEP Program

NOWPAP

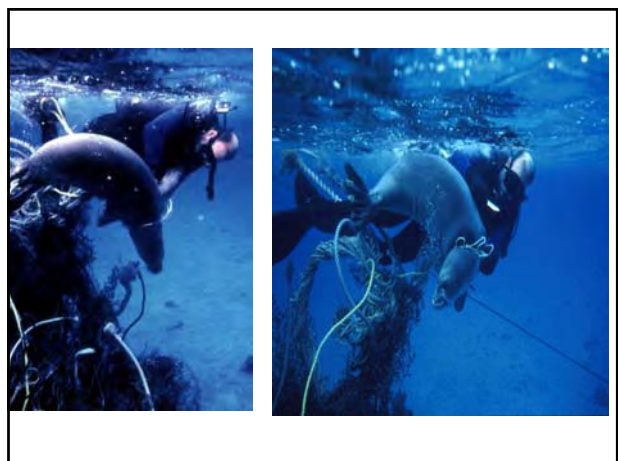
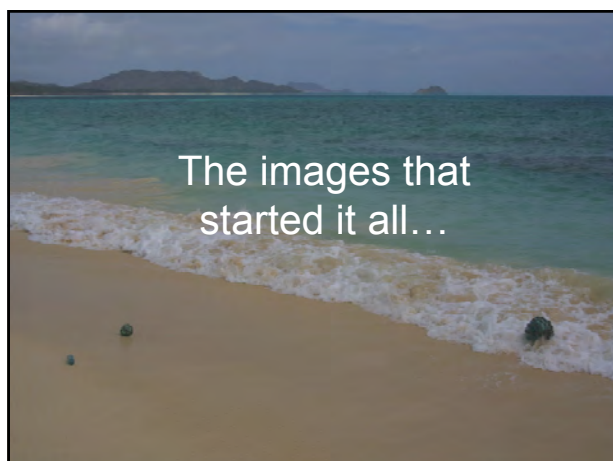
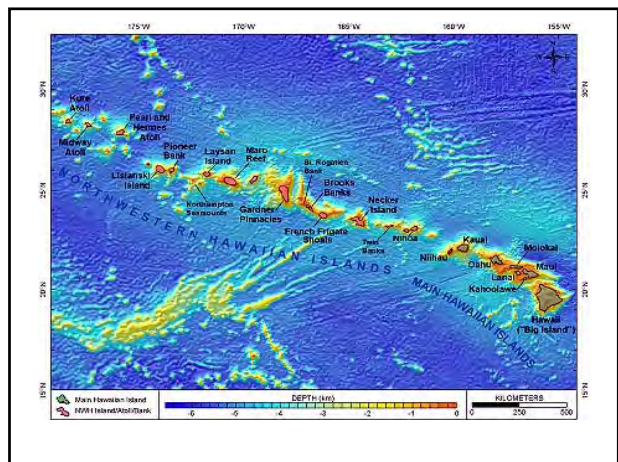
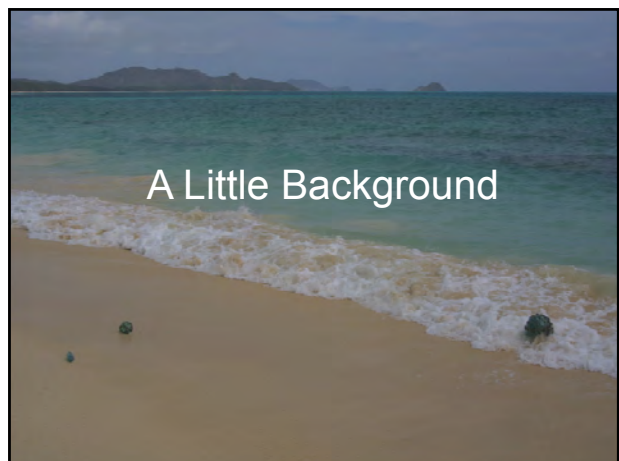
"Time is of the essence. We didn't know before, but now we do and it's not an issue of pointing fingers or accusing anybody. Now that we know the consequences, we need to immediately change"

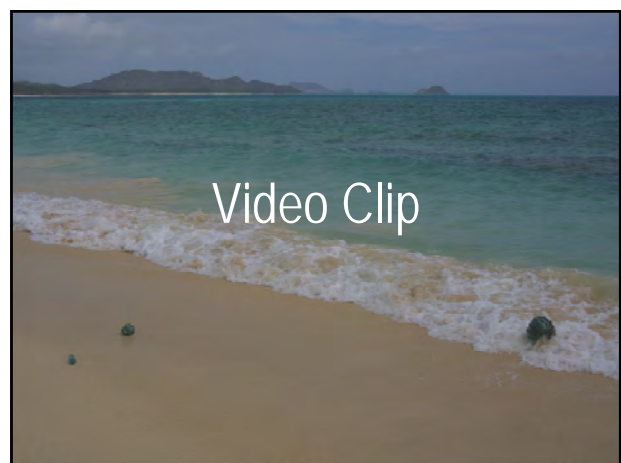
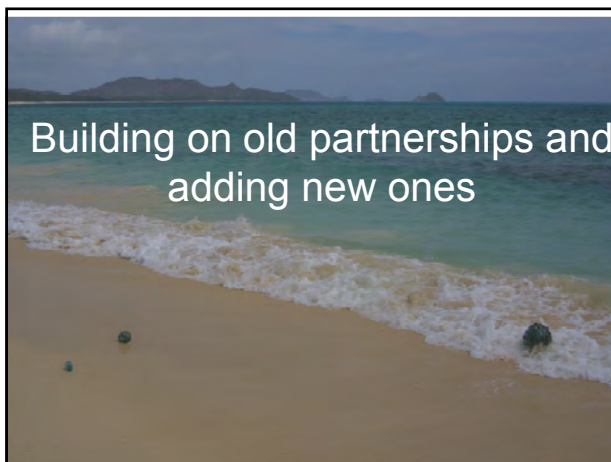
– Jean-Michel Cousteau

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Hope

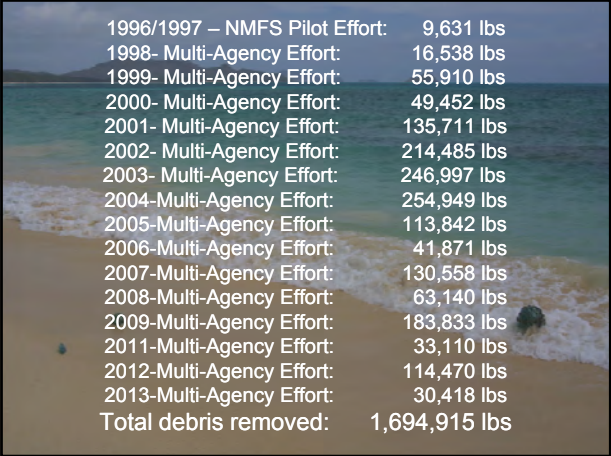
Andrea Neal, Ph.D.
CEO and Founder
Blue Ocean Sciences LLC
www.blueoceansciences.com
andrea@blueoceansciences.org









Ongoing NWHI Multi-Agency & Partner Cleanup Project Debris Results



1996/1997 – NMFS Pilot Effort:	9,631 lbs
1998- Multi-Agency Effort:	16,538 lbs
1999- Multi-Agency Effort:	55,910 lbs
2000- Multi-Agency Effort:	49,452 lbs
2001- Multi-Agency Effort:	135,711 lbs
2002- Multi-Agency Effort:	214,485 lbs
2003- Multi-Agency Effort:	246,997 lbs
2004- Multi-Agency Effort:	254,949 lbs
2005- Multi-Agency Effort:	113,842 lbs
2006- Multi-Agency Effort:	41,871 lbs
2007- Multi-Agency Effort:	130,558 lbs
2008- Multi-Agency Effort:	63,140 lbs
2009- Multi-Agency Effort:	183,833 lbs
2011- Multi-Agency Effort:	33,110 lbs
2012- Multi-Agency Effort:	114,470 lbs
2013- Multi-Agency Effort:	30,418 lbs
Total debris removed:	1,694,915 lbs



Ongoing Main Hawaiian Islands Cleanup Project Debris Results



In 2005, NOAA and Western Pacific Regional Fishery Management met with Schnitzer requesting our partnership with a roll-off bin to service fishermen in Honolulu Harbor. Thus, the Pier 38 Port Reception program was born in 2006.



Video Clip



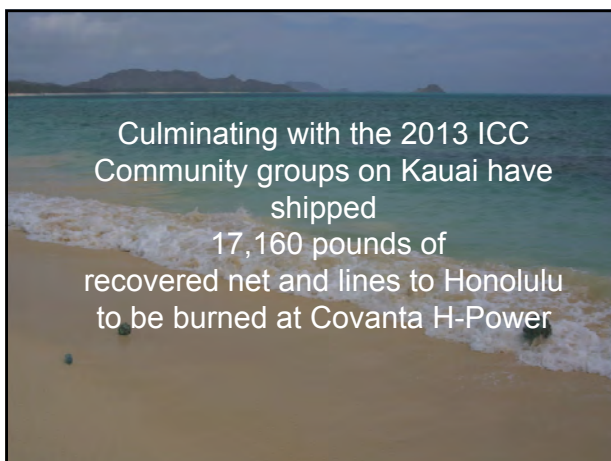
Thus far over 50 tons of derelict net and monofilament line have been used to create electricity.

Approximately 100 tons of derelict fishing net will produce enough electricity to power an estimated 43 Oahu homes for a year. Time, labor, and equipment are being donated by all partners.

-- Hawaii State Dept. of Business, Economic Development, and



Ongoing Main Hawaiian Islands Cleanup Project Debris Results



Culminating with the 2013 ICC Community groups on Kauai have shipped 17,160 pounds of recovered net and lines to Honolulu to be burned at Covanta H-Power



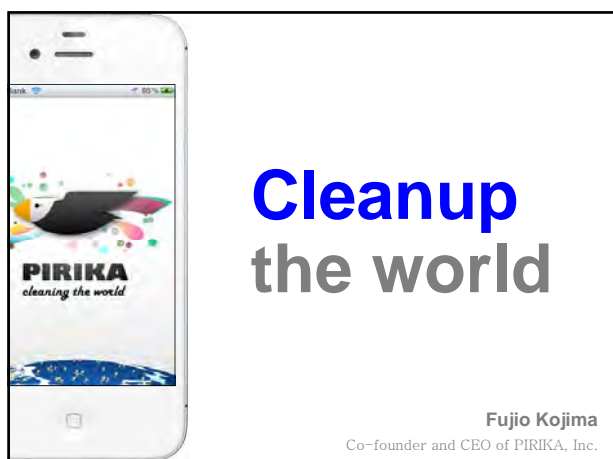
The Nets to Energy Program Grows to



US Mainland Ports

- New Bedford, MA
- Gloucester, MA
- Brookhaven, NY
- Hyannis, MA
- Scituate, MA
- Newport, RI
- Cape May, NJ
- Provincetown, MA
- Moss Landing, CA
- Astoria, OR
- Wellfleet, MA
- Point Judith, RI
- Chatham, MA
- Sandwich, MA
- Portland, ME
- Garibaldi, OR
- Boston, MA
- Southampton, NY
- New Port News, VA
- Everglades City, FL
- Miami-Dade, FL



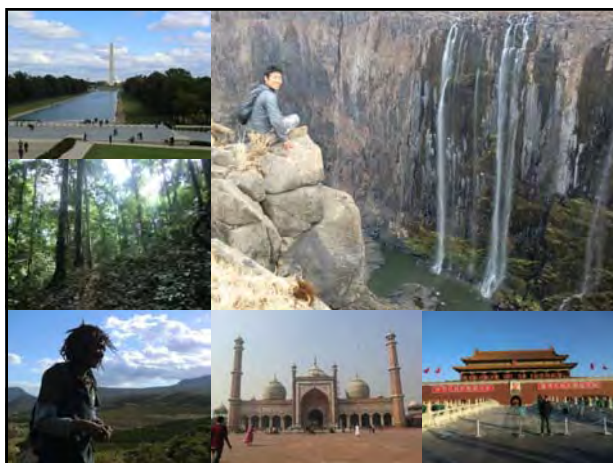


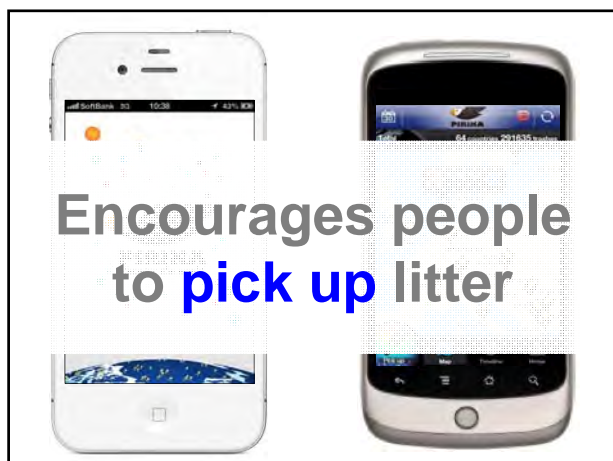
Tackle the global
problem of **littering**

(including on the ground)

PIRIKA means **Clean**

Why we developed?





Pick up



Take a picture



Share



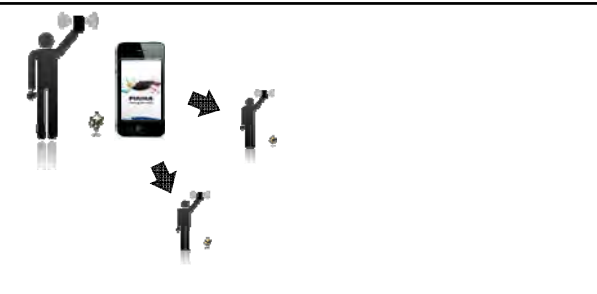
Throw away



Your good deed is
rewarded by



Your good deed is
rewarded by **“likes”** and
“comments”



Other people will be encouraged



Other people will be encouraged to do the same



Other people will be encouraged to do the same



1,200,000
pieces of litter
were picked up



in 67
countries/regions




Visualize the clean up activity

Not only for individuals,
we are also making
PIRIKA for Group!

Visualize the clean up activity

in 30 seconds

Fill out the easy forms and to post pictures of the activities.

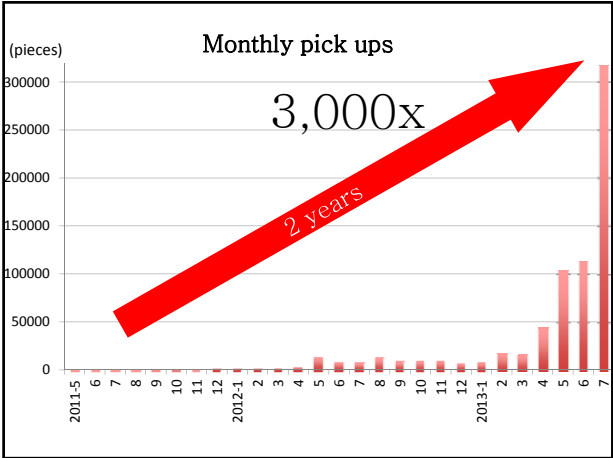
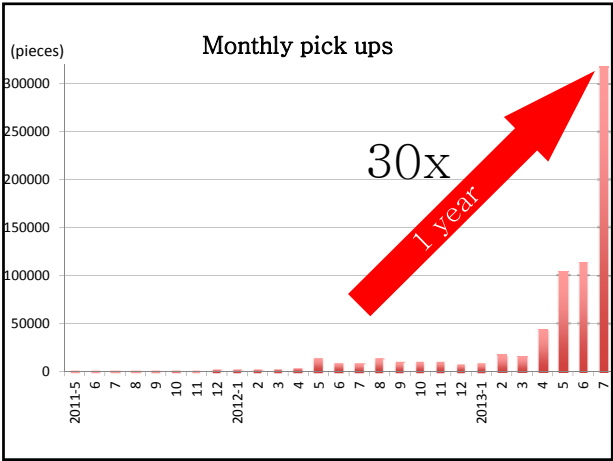


Visualize the clean up activity



Visualize the clean up activity

Already 50 groups started using in 5 month.



Our aim by 2016

To reach 100 million pieces of litter

PIRIKA's Data

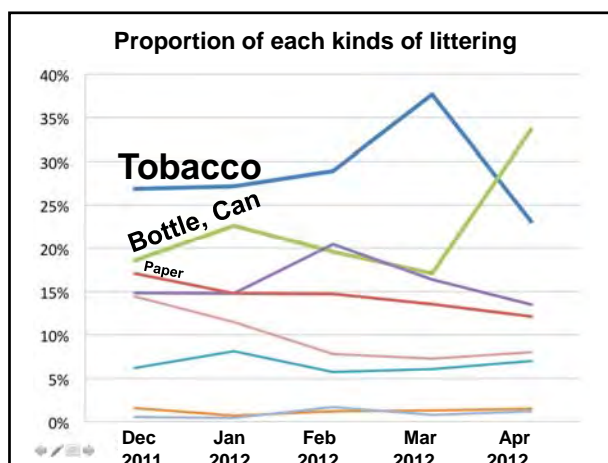
The map of littering (Tokyo, Japan)



The map of littering (Tokyo, Japan)

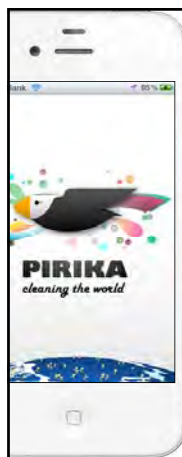


Proportion of each kinds of littering



We need your support!

We are looking for **test users and groups.**



Join us!
kojima@pirika.org

Fujio Kojima
Co-founder and CEO of PIRIKA, Inc.

International Pellet Watch

<http://www.pelletwatch.org/>

International Pellet Watch
*Transfer of hazardous chemicals
from marine plastics to ecosystem*

Hideshige TAKADA

Laboratory of Organic Geochemistry (LOG)
Tokyo University of Agriculture and Technology (TUAT)
Japan

Topics

1. Introduction of International Pellet Watch
2. Transfer of hazardous chemicals from ingested plastics to biological tissue of oceanic seabirds.

International Pellet Watch

To globally monitor persistent organic pollutants (POPs) by using beached plastic resin pellets

To understand magnitude and spatial distribution of chemical risk associated with marine plastics.

Under cooperation with world NGO

established in 2005

Plastic Resin Pellets

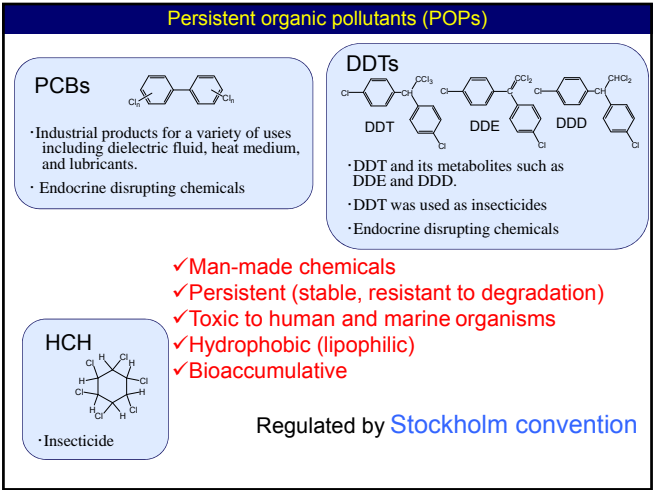
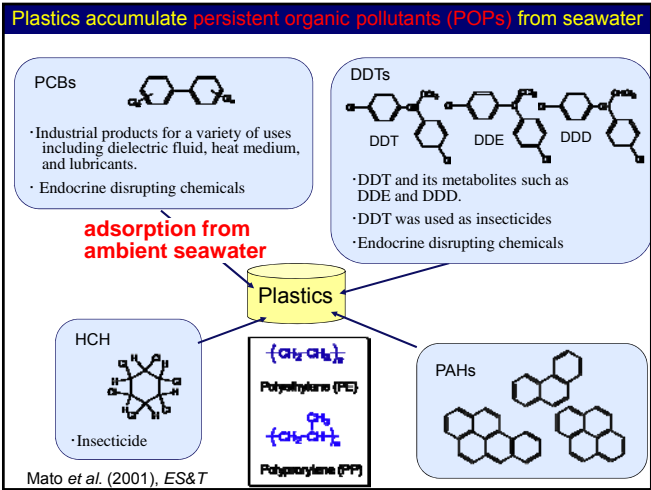
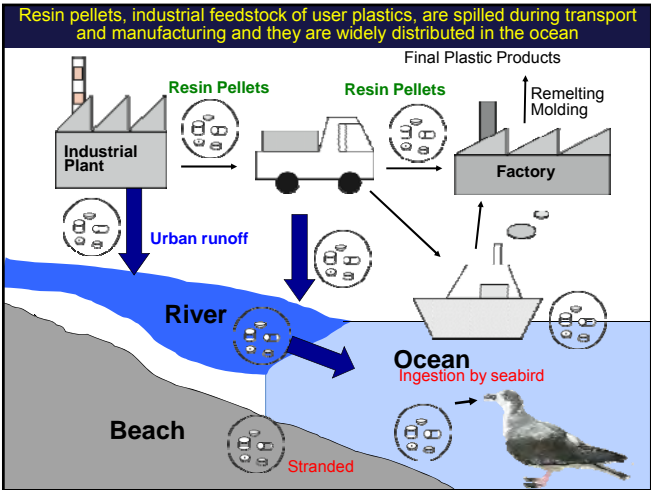


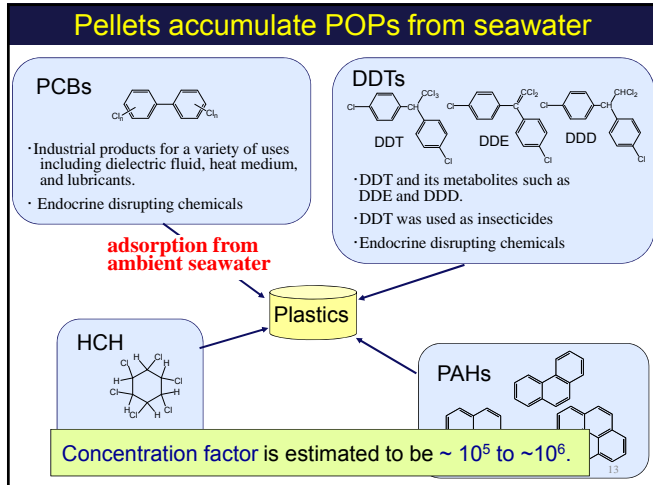
Trashes on high-tide line on our beaches



Trashes on high-tide line on our beaches







International Pellet Watch

Global Monitoring of Persistent Organic Pollutants (POPs) Using Beached Plastic Resin Pellets

Since 2005



14

International Pellet Watch

To globally monitor persistent organic pollutants (POPs) by using beached plastic resin pellets


To understand magnitude and spatial distribution of chemical risk associated with marine plastics.

Under cooperation with world NGO

established in 2005

International Pellet Watch

Global Monitoring of Persistent Organic Pollutants (POPs) Using Beached Plastic Resin Pellets



More than 50 pieces (~100 pieces) per one location

Air Mail

Laboratory of Organic Geochemistry, Dr. Hideshige Takada,
Tokyo University of Agriculture and Technology,
Fuchu, Tokyo 183-8509, Japan

16



Laboratory of Organic Geochemistry
 Dr. Hideshige Takada,
 Tokyo University of Agriculture and Technology,
 Fuchu, Tokyo 183-8509, Japan

More than 50 pieces (~100 pieces) per one location

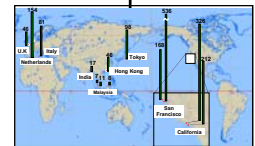
Sorting

PE, yellowing pellets

Analysis for POPs (PCBs, organochlorines, PAHs)

By GC-MS/MS, GC-MS, GC-ECD
 more than 5 pools of 5 pellets
 to exclude sporadic high concentration

Mapping POPs pollution



•Sending the data via Internet to the collaborators

•Releasing the results on web

18



Polychlorinated biphenyls (PCBs)

$$Cl_m - C_6H_4 - C_6H_4 - Cl_n$$

$$m + n = 1 - 10$$

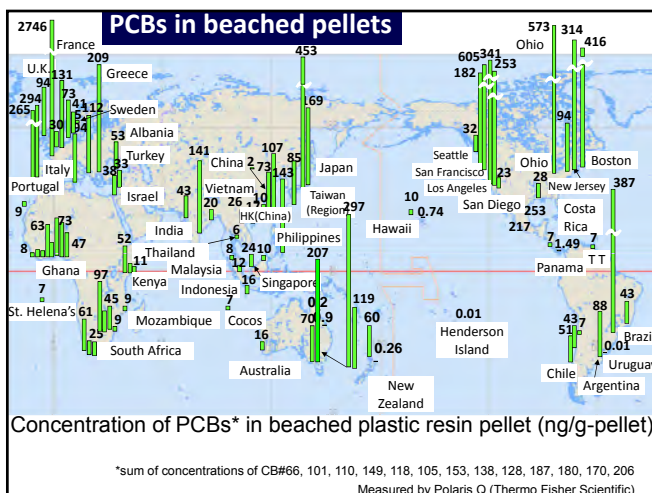
Commercial PCBs mixtures were used in a wide variety of applications, including

- Dielectric fluids in capacitors and transformers
- Heat transfer fluid

PCBs were **used from 1950s to early 1970s** in industrialized countries.

Their usage was banned in 1970s

PCBs are deleterious to marine life, especially upper-trophic-level organisms that tend to accumulate the compounds in their tissues. While the precise toxicological effects of PCBs are often unclear, they have been implicated in reproductive abnormalities in marine mammals (e.g., porpoises, seals, sea lions, whales).^{1,46,47} In addition to being linked to a variety of chronic diseases in humans (e.g., skin lesions, reproductive disorders, liver damage), PCBs are suspected of being carcinogenic.



Faculty of 1000

Marine Pollution Bulletin 69 (2013) 219–222

Contents lists available at ScienceDirect

Marine Pollution Bulletin

journal homepage: www.elsevier.com/locate/marpolbul

Baseline

Accumulation of plastic-derived chemicals in tissues of seabirds ingesting marine plastics

Kosuke Tanaka ^{a,*}, Hideshige Takada ^{a,*}, Rei Yamashita ^a, Koortuko Mizukawa ^a, Masa-aki Fukuwaka ^b, Yutaka Watanuki ^c

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ARTICLE INFO

Keywords:
Polychlorinated diphenyl ethers (PCDEs)
Plastic debris
Adipose
North Pacific Ocean
Short-tailed shearwater
Ingestion simulation

ABSTRACT
We analyzed polychlorinated diphenyl ethers (PCDEs) in abdominal adipose of oceanic seabirds (short-tailed shearwaters, *Puffinus tenuirostris*) collected in northern North Pacific Ocean. In 3 of 12 birds, we detected higher-brominated congeners (viz. BDE209 and BDE183), which are not present in the natural prey (gelatin fish) of the birds. The same compounds were present in plastic found in the stomachs of the 3 birds. These data suggested the transfer of plastic-derived chemicals from ingested plastics to the tissues of marine-based organisms.

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Transfer of chemicals from ingested plastics to biological tissue

Question to be addressed :
Transfer of chemicals from ingested plastics to biological tissue

The diagram shows a silhouette of a bird. Inside its stomach, there is a cluster of polychlorinated diphenyl ether (PCDE) chemical structures. An arrow points from these structures to a yellow triangle in the bird's abdominal adipose tissue, which also contains PCDE structures. A question mark is placed near the arrow, indicating the question of chemical transfer.

Materials and methods

Collection of seabirds and their prey (lantern fish, squid)

T/V Wakatake Maru (Hokkaido Pref.)
By-catch in driftnet
June–July 2003, 2005

A map showing the sampling area in the North Pacific Ocean, off the coast of Hokkaido, Japan. The area is marked with a grid of dots. The coordinates are 40°00'N–47°30'N, 180°00' E–178°00' W.

Sampling area
40°00'N–47°30'N, 180°00' E–178°00' W
55°30'N–58°30'N, 178°00' E–178°00' W

Abdominal adipose of circus of short-tailed shearwater by-catch

The image shows a photograph of a short-tailed shearwater. To its right are several smaller photographs of its internal organs and stomach contents: Proventriculus, Gizzard, abdominal adipose, Resin pellets, Fragments of plastic, Fiber, Styrofoam, and Plastic sheets. A 1 cm scale bar is provided.

• Amount of plastics found in stomach
• PBDEs concentrations in abdominal adipose

Plastics detected in digestive tract of short-tailed shearwater

Four photographs showing plastic debris found in the digestive tracts of short-tailed shearwaters. The debris is labeled with sample numbers: wk05016, wk05018, wk05030, and wk05019. The debris includes various types of plastic, such as fragments, pellets, and fibers.

PBDEs : Flame retardants

applied in various electric products and fabrics.

Illustrations of various products that contain PBDEs: a refrigerator, a television, curtains, a car seat, and a car.

3 technical products (mixtures of congeners)

Penta BDE
(Br4, Br5)

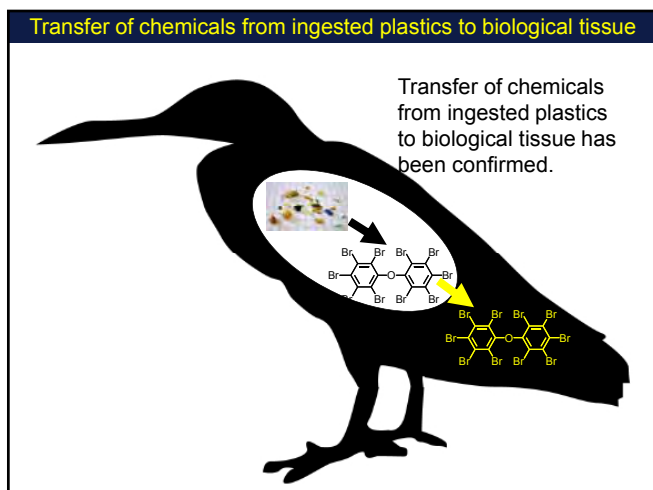
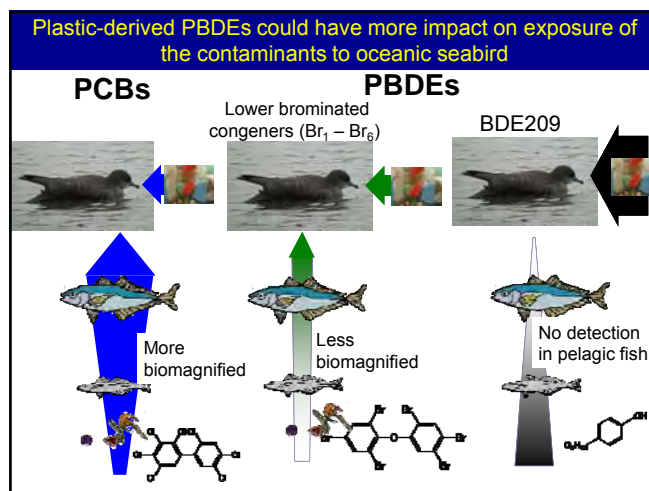
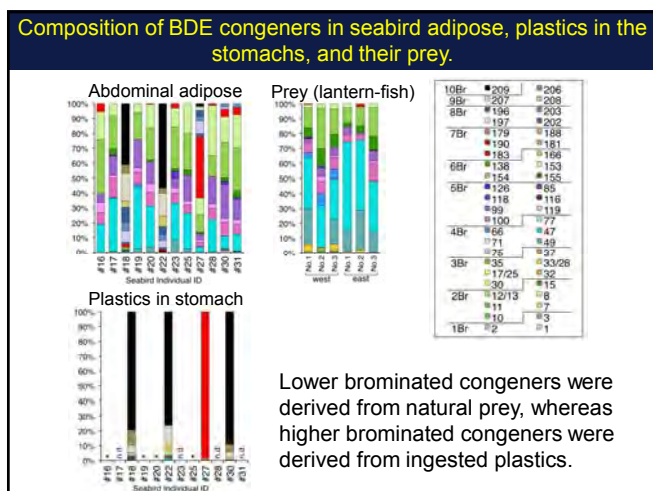
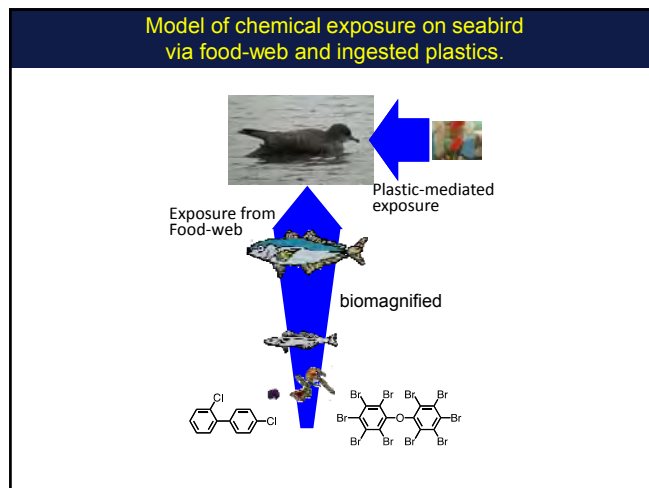
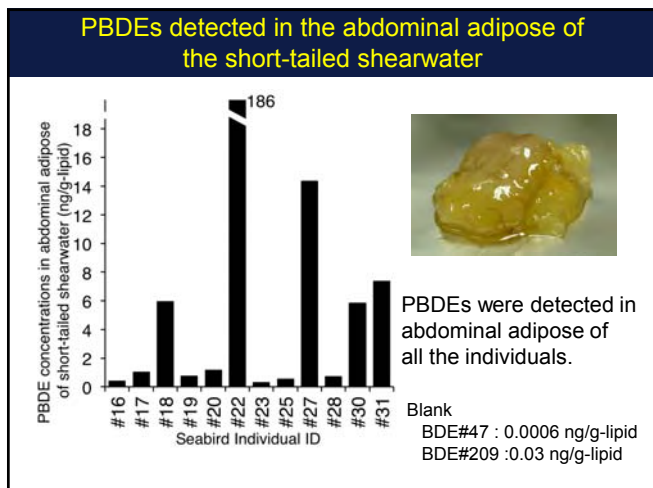
e.g., BDE47

Octa BDE
(Br7,8)

e.g., BDE183

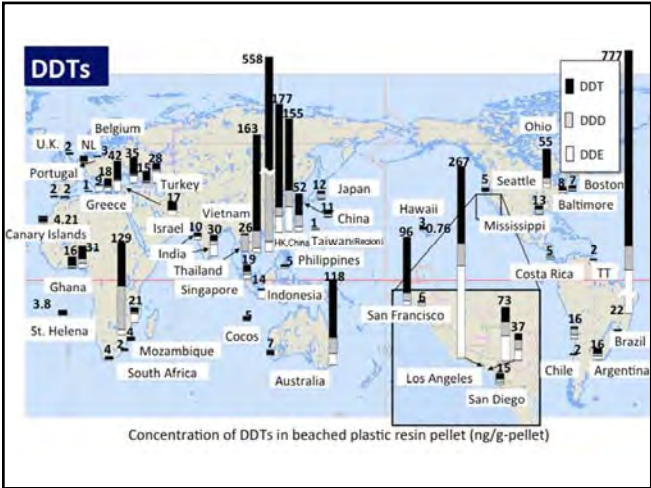
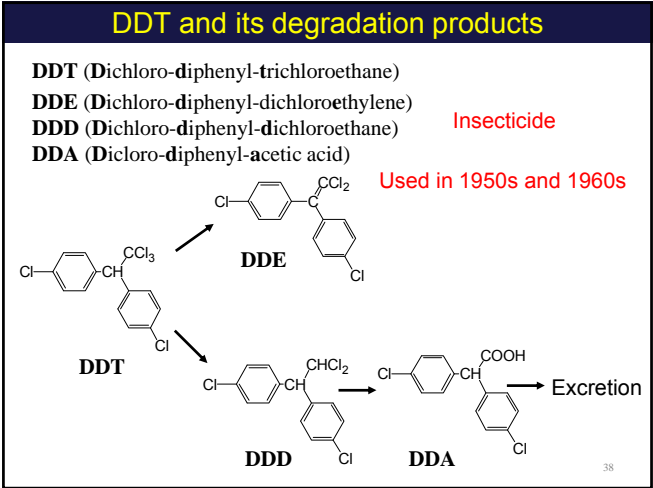
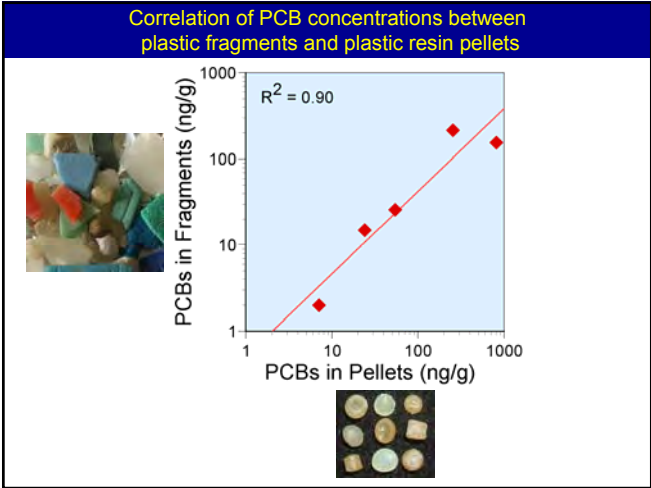
DecaBDE
(Br10)

e.g., BDE209



Conclusion

Marine plastics carry hazardous chemicals in marine ecosystem, even to internal tissue of marine biota.



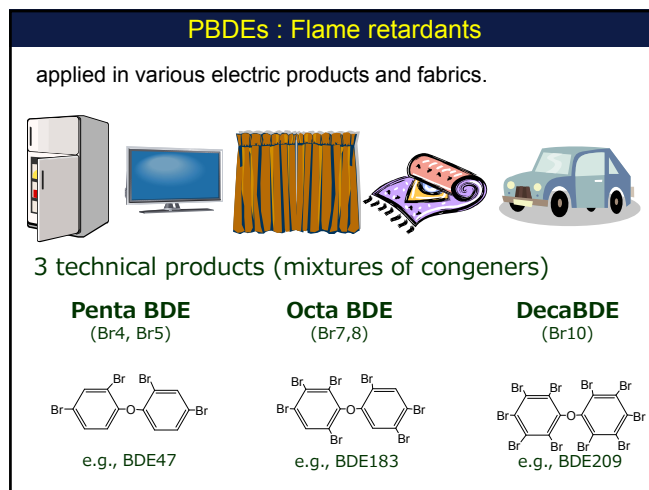
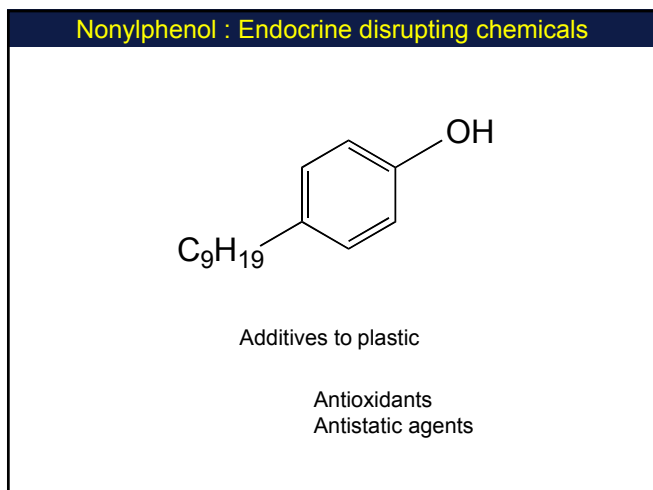
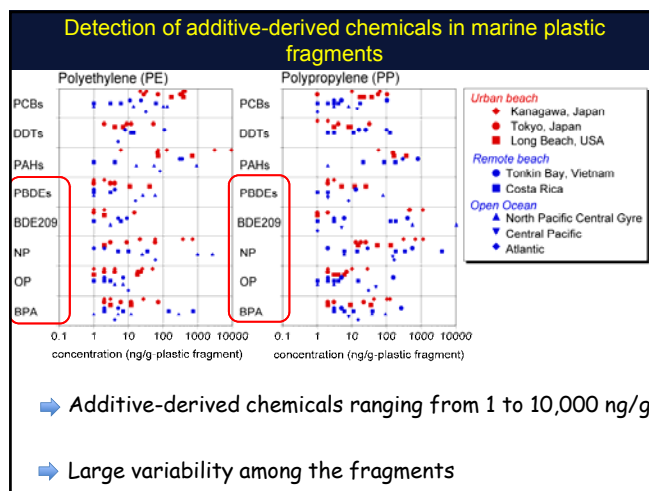
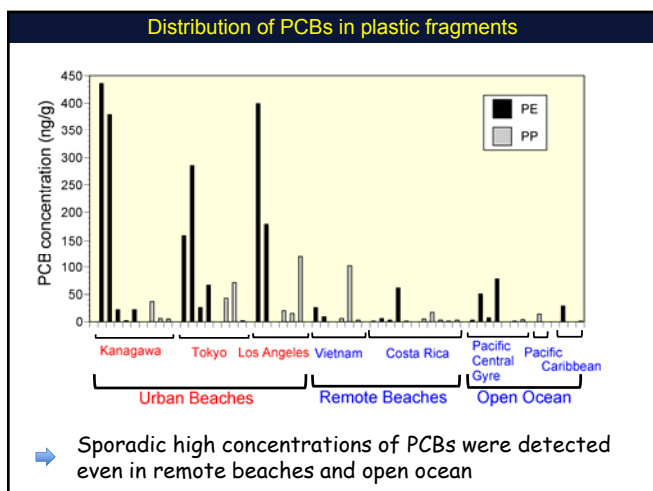
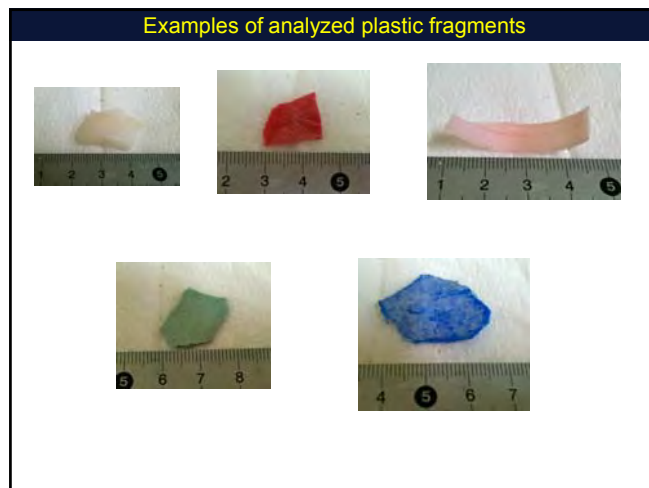
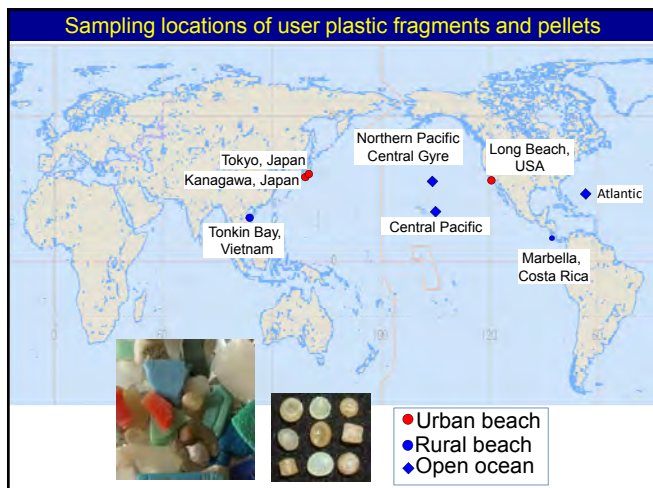
Detection of polybrominated diphenyl ethers (PBDEs) in tissue of seabirds and the ingested plastics

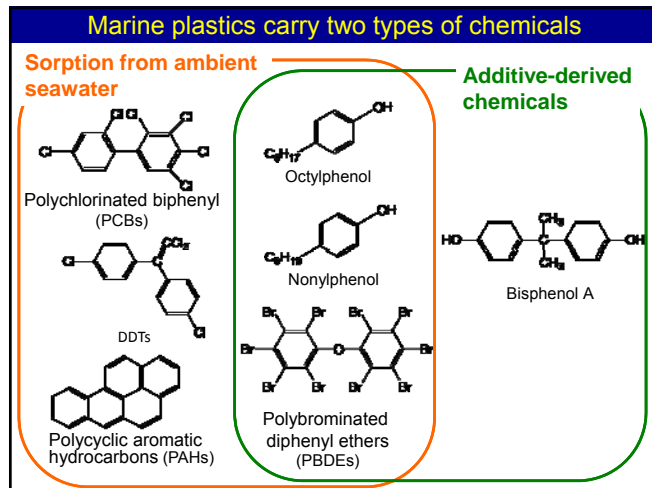
Kosuke Tanaka¹, Hideshige Takada¹
Rei Yamashita¹, Yutaka Watanuki²

¹Laboratory of Organic Geochemistry (LOG), Tokyo Univ. Agric. and Technol., Japan
²Faculty of Fisheries, Hokkaido University, Hakodate, Hokkaido, Japan

Short-tailed shearwater *Puffinus*







International Pellet Watch

<http://www.pelletwatch.org/>

Marine debris, Marine litter

↓

Marine **Plastic** debris

No single-use plastic!

Hideshige TAKADA

Laboratory of Organic Geochemistry (LOG)
Tokyo University of Agriculture and Technology (TUAT)
Japan

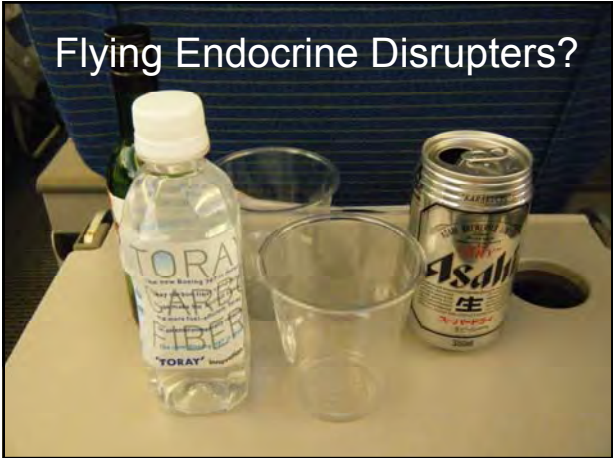
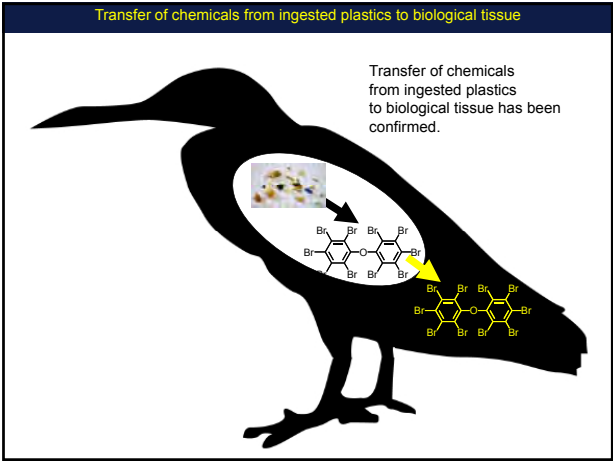
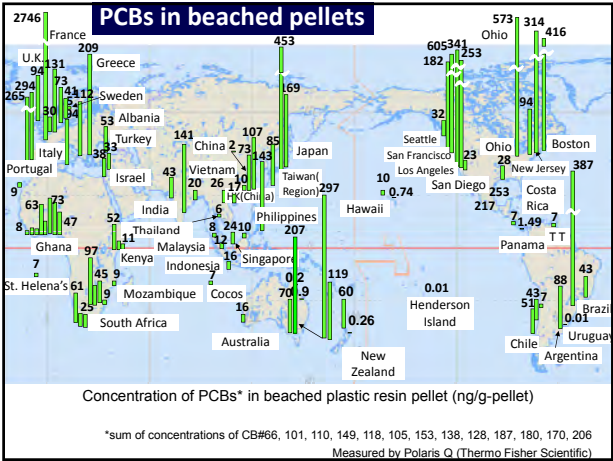
Nature, vol. 494, p.169-171, 2013

COMMENT



Policy : Classify plastic waste as hazardous

Rochman, Chelsea M.; Browne, Mark Anthony; Halpern, Benjamin S.; Hentschel, Brian T.; Hoh, Eunha; Karapanagioti, Hrissi K.; Rios-Mendoza, Lorena M.; Takada, Hideshige; Teh, Swee; Thompson, Richard C.

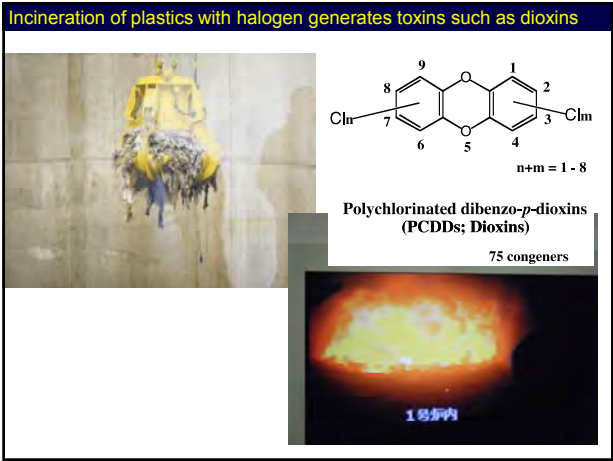
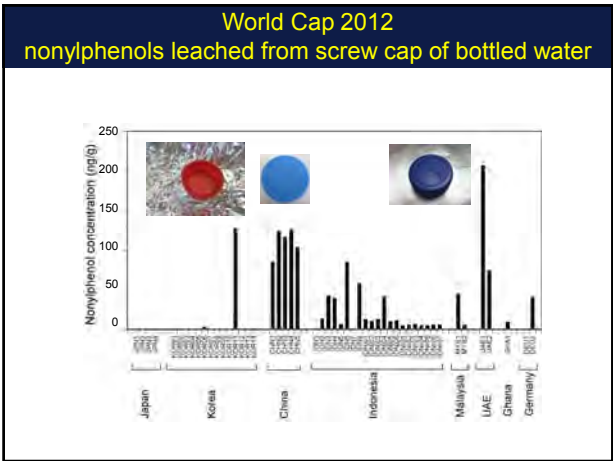


Nonylphenol : Endocrine disrupting chemicals

CCCCCc1ccc(O)cc1

Additives to plastic

Antioxidants
Antistatic agents



3R

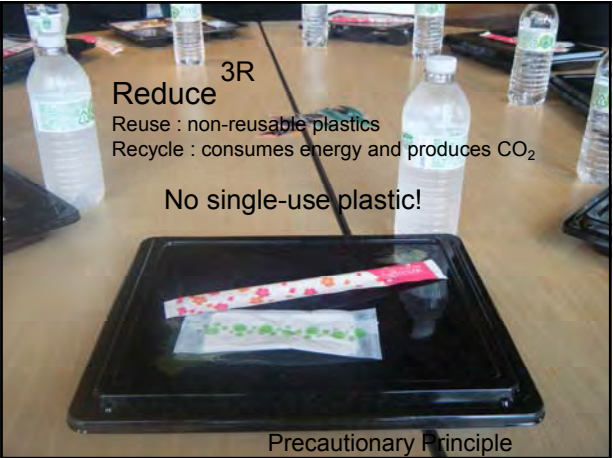
Reduce

Reuse : non-reusable plastics

Recycle : consumes energy and produces CO₂

Precautionary Principle

No single-use plastic!





Maritime State University named after
Admiral G. Nevelskoy

Institute of Sea Protection and Shelf Development









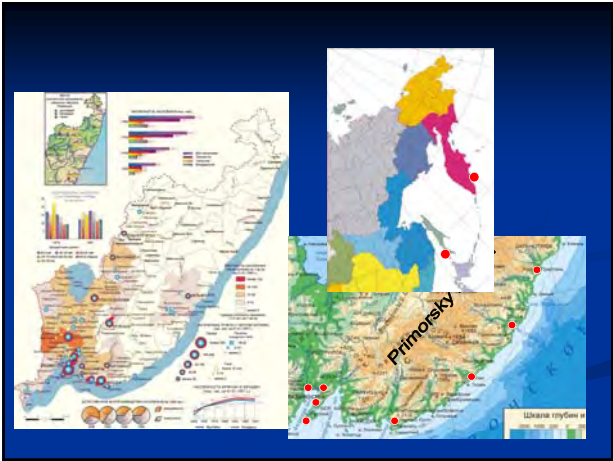
*Marine litter monitoring in coastal areas
using sailing boat*

Okinawa 2013

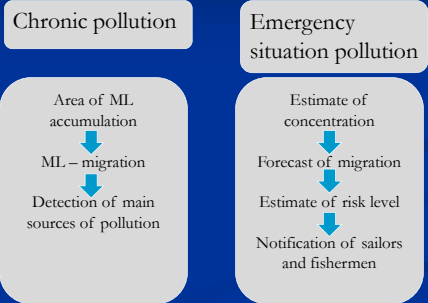
Sergey Moninets
Maria Vysockskaya
moninets@msun.ru







Two variants



Guidelines



Yacht «RIF»

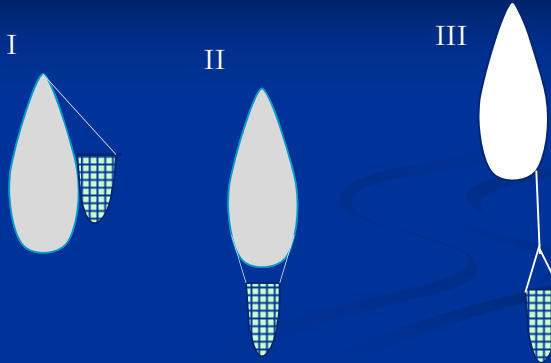
L – 13,6 m
B – 4,0 m
H – 2,2 m
Displacement ton - 10,5 t
V_{eng} – 6,5 kt
V_{sail} – 3-10 kt
Navigation area – unlimited
Crew – 4-7 psn
Endurance- 40-60 days



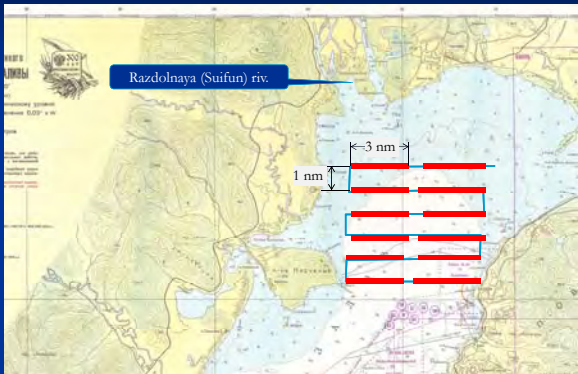
Trawl

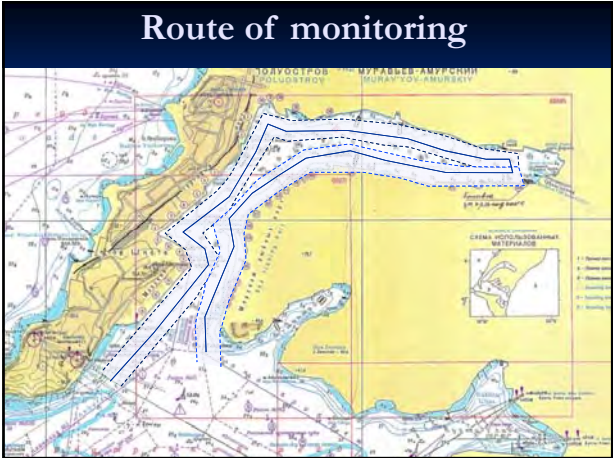
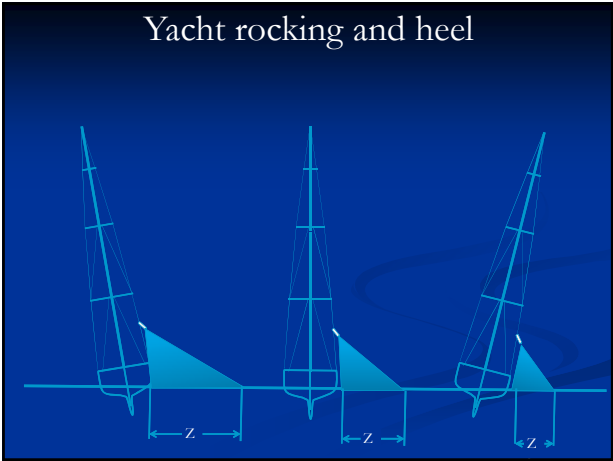
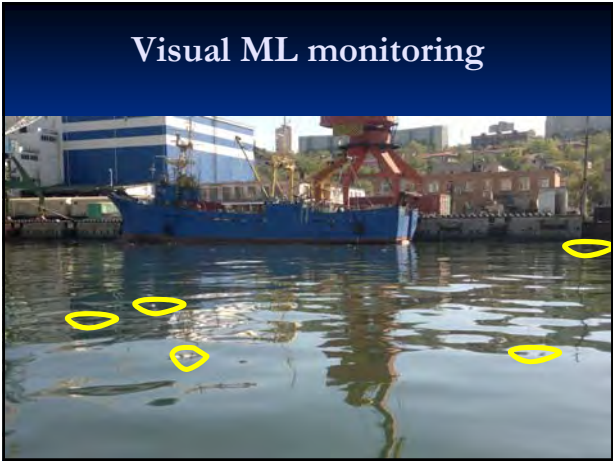


Three variants of trawling



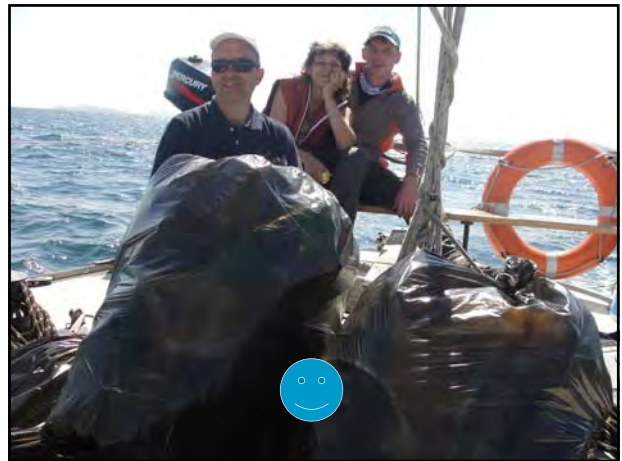
Area of trawling





Conclusion

- Sail boat can be successfully used for monitoring the floating debris by trawling and visually methods,
- Sail boat can be useful for monitoring remote parts of the coast



Thank you!



Marine Litter Monitoring in RO Korea

2013. 10

MALi Center

Kang Sung Hoon



Contents

1. Overview of the National ML Monitoring Programme of RO Korea
2. Major findings from 2012 Monitoring
3. Monitoring of Foreign-origin Marine Litter
4. Issues of marine litter monitoring
5. Suggestion for the regional monitoring network and programme



1. Overview of the National Marine Litter Monitoring Programme



National Marine Litter Monitoring Programme

- Legal basis: Marine Environment Management Act, Article 5 and 24
- Policy basis: 1st Comprehensive ML Management Plan
 - Sectoral plan of Comprehensive Marine Environment Plan
 - Duration: 2009-2013
- Major contents
 - 20 sites in RO Korea for 6 time (bimonthly)
 - Data card identifies 100 litter items
 - Local and foreign origin



Implementing Mechanism



Regular programme

- National Marine Litter Monitoring Programme (2008 ~)
- International Coastal Clean-up (2001 ~)

Ad-hoc programme

- Foreign-origin Marine Litter Monitoring Programme (2010 ~ 2012)

Scientific and precise Marine Litter data

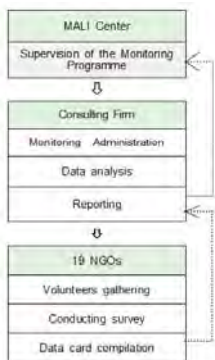
Monitoring Sites and Implementation

- 20 sites
- 19 NGOs around the nation
- 6 times/year (Month 1, 3, 5, 7, 9, 11)



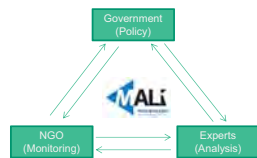


Implementing Process



- Monitoring by NGOs and public
- Data analysis by experts
- Financial support by Government

Synergy among stakeholders



Monitoring Method

- Monitoring Guidelines
- 100 m stretch at an undisturbed coastal area
- Data card
- 100 items
- Timing: Bi-monthly (month of 1,3,5,7,9,11)

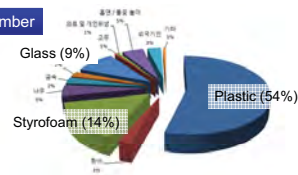


2. Results of 2012 Marine Litter Monitoring

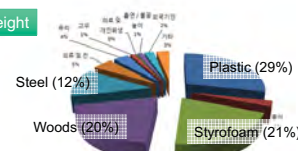


2012 Monitoring Results (Item composition)

By number



By weight

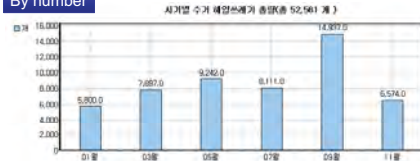


Rank	Debris item	Number
1	Cigarettes / cigarette filters	2 189 252
2	Bags (plastic)	1 126 774
3	Food wrappers / containers	943 233
4	Caps, lids	912 246
5	Beverage bottles (plastic)	883 737
6	Cups, plates, forks, knives, spoons	512 517
7	Beverage bottles (glass)	459 531
8	Beverage cans	457 631
9	Straws, stirrers	412 940
10	Bags (paper)	331 476
Top 10 total debris items		8 229 337



2012 Monitoring Results (Monthly variation)

By number



By weight



2012 Monitoring Findings

- Plastics dominant (54%) in number (Styrofoam 2nd with 15.2%)
- Plastics dominant (28.5%) in weight (Styrofoam 2nd with 20.5%)
- Styrofoam dominant (32.3%) in volume (Plastics 2nd with 28.8%)

Fisheries sector is one of major polluters

Fisheries related litter covers 28.1% with Styrofoam (size 2.5~50cm), plastic buoys, ropes and nets

- Summer dominance

Strong seasonal effect due to Typhoon, heavy rain, etc.





Marine Litter Data Management and Service



Marine Litter Information System

Open to public

output

input

20 Site Data Card



3. Foreign-origin Marine Litter Monitoring



Overview of Foreign-origin Marine Litter Monitoring

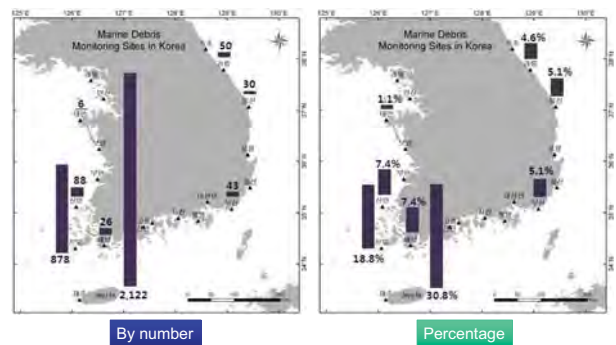
- Project duration: 2010~2012
- Sites: 20 sites (in 2012, 23 sites)
- Monitoring:
 - Month of 1, 3, 5, 7, 9, 11 (2010)



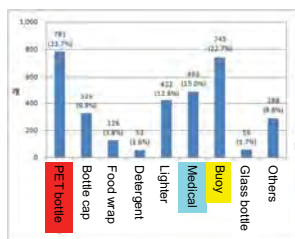
Scientific and precise data on ML of foreign-origin



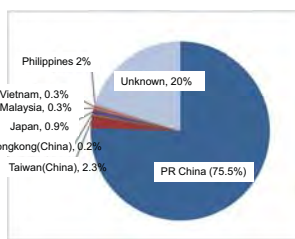
Results of Foreign-origin ML Monitoring (2010)



Results of Foreign-origin ML Monitoring (2010)



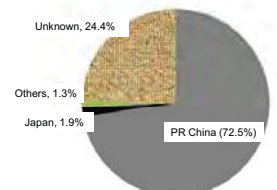
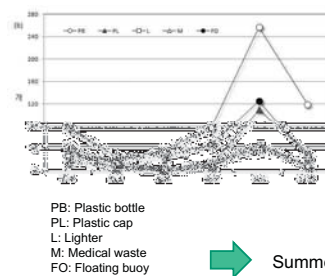
By Type (number)



By Country / Region



Results of Foreign-origin ML Monitoring (2012)



Summer time dominance

2010 and 2012 results are fairly consistent



4. Proposal for Regional Monitoring Network and Programme



Issues relating to Marine Litter Monitoring

- No information about the Pick-up Per Unit Effort (PUPUE)
 - ✓ Most of the monitoring programme is associated with general public for awareness building
 - ✓ Thus, scientific data collection is mostly not possible
- Varied Litter Classification (various monitoring card)
 - ✓ Simple ICC data card
 - ✓ Complicated national monitoring cards (eg. Korea, NPEC etc.)
- Varied spatial and temporal monitoring
 - ✓ Seasonal variation
 - ✓ Site differences

A major factor that limits our understanding of (and therefore the ability to manage) marine litter, is the lack of clearly identified objectives and inconsistencies in sampling design and litter classification systems between litter surveys. These inconsistencies are such that they prevent or severely confound the analysis of spatial and temporal patterns (UNEP 2009)



Limitation of varied monitoring methods and data cards

- Limitation to scientific comparison due to the difference between data collection and recording
 - Varied monitoring timing, methods, categorization among RO Korea, Japan, China and Russia
 - Monitoring is carried out mainly for awareness building purposes, not scientific purpose
 - Lack of data credibility due to monitoring performed by laymen, not the experts or trained personnel
- ICC data card may not be used for scientific analysis
 - Limited number of category and monitoring by layperson



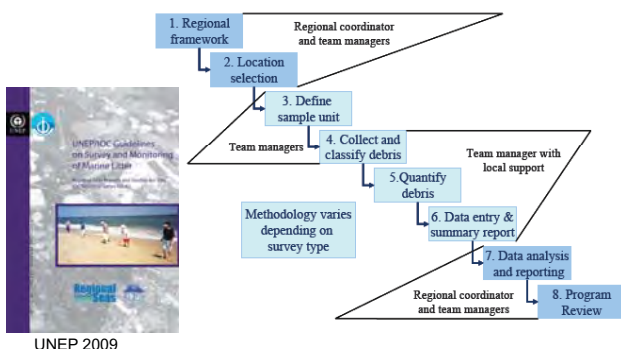
Regional ML Monitoring Network and Programme



Various Data Cards



Developing a Regional Monitoring Programme



UNEP 2009



Proposal for Regional ML Monitoring Programme

- Possibly a NOWPAP initiative
- At least two sites at each NOWPAP member states
- A unified monitoring card (possibly from UNEP 2009)
- Maintaining uniform Pick-up per unit effort (PUPUE) per site
- Monitoring by trained NGO personnel at each site
- Results will be reported to NOWPAP ICC



Benefits of Regional Monitoring Programme

- Enhancing collaboration between countries
- Increasing public awareness within the region
- Training of monitoring personnel
- Gathering of scientifically sound marine litter data
- Empowering NGOs
- NOWPAP regions' Global leadership in marine litter management



Improved management interventions



Thank you!



“A management approach for environmentally responsible diving and snorkelling practices”

Chloe Hunt – The Reef-World Foundation






www.greenfins.net




Green Fins

4. "Participate in regular underwater surveys to establish coral reefs by establishing and implementing environmentally friendly guidelines to promote sustainable diving and snorkelling tourism industry"

9. Operate under a "minimum discharge" policy for wrecks

The Code of Conduct



Who is Green Fins

The image shows a map of South Asia with several logos overlaid. The logos include UNEP (United Nations Environment Programme), Green Fins (a logo with a sun, waves, and a fish), Red World (a logo with a globe and a fish), NGOs (a green box with the text 'NGOs'), and GOV (a purple box with the text 'GOV'). A red and white diagonal flag is also present. The map shows countries like India, Pakistan, Bangladesh, and Sri Lanka, with major cities and water bodies labeled.

Green Fins Approach

Effecting measurable and lasting change within the diving industry and among local communities with regards to reducing damage to the marine environment from diving



1. Awareness raising
2. Assessments
3. Cooperation and support
4. Management



The bottom right corner features three logos: the Green Fins logo (a circular emblem with a sun and waves), the UNEP logo (a blue circular emblem with a white 'U' and 'N'), and the Reef-World logo (a stylized blue and orange emblem with the text 'Reef-World' and '1994' below it).

[illegible]

2. Assessments

Case Study

The Philippines

- Rejuvenation by Reef-World in 2010
- National Team - DENR
 - CMMO – SCREMP (DAO)
- Anilao, Mabini
- Local Management Teams
 - 15 dive centre members

Puerto Galera

30 dive centre members

El Nido, Palawan

14 dive centre members

60 snorkel operator members



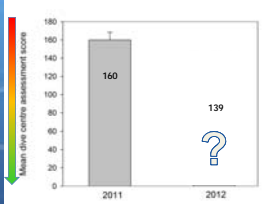
THE GREEN FINS CODE OF CONDUCT
A Responsible Diving Workshop
18-31 May 2012
Cebu, Philippines



Case Study

The Philippines – Puerto Galera


Analysis of non-weighted



17 out of 26 (65%) reduced their scores

Fig 1. Mean dive centre assessment scores (weighted) for Puerto Galera from initial evaluations (2011) and reassessments after one year of the Green Fins initiative implementation (2012), n = 26, error bars represent SE.

Green Fins members implemented effective environmental policies after contact with the Green Fins systems



Case Study

The Philippines – Puerto Galera

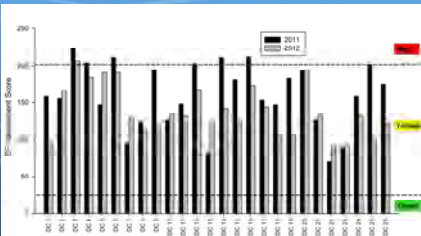



Fig 2. Changes in dive centre (DC) assessment scores in the Puerto Galera region between initial assessments in 2011 and re-assessments in 2012, n = 26.

Green Fins approach may reduce threats to marine ecosystems



The Philippines – Puerto Galera





Fig 3. Changes in 2011 and re-assessments in 2012 for assignment criteria for assignment and high (red) through Green Fins promote environmental standards




3. Cooperation and Support



- Public private partnership
- Beach and reef clean ups
- Education programmes and campaigns to increase public awareness of marine litter issues
- Enhanced governance
- Reduced conflict
- Effective management



4. Management



National / Local GFs Management Teams

- Collaborative approach
- Champions
- Sharing of lessons learned
- They say what they need...
 - Recruitment of members
 - Managing Green Fins
 - Assessor Manual and Training
 - Strengthening of national laws



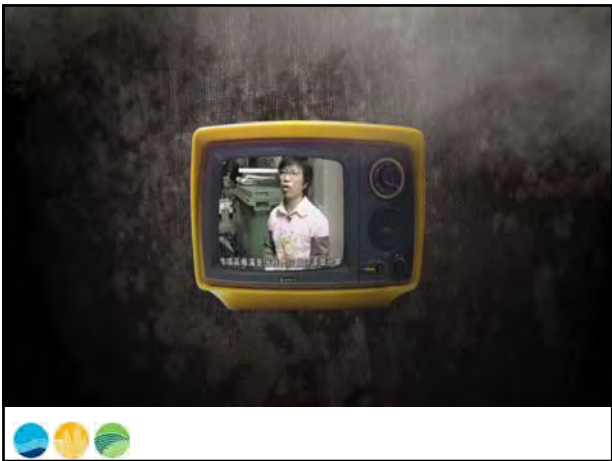
Green Fins Expansion

A Vision for the future...

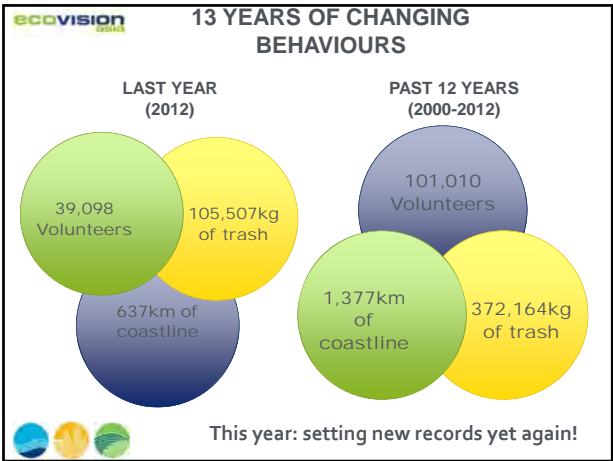
- Green Fins Japan using Cape Maeda as a pilot site
- Identifying environmentally responsible dive and snorkel centres for tourists
- Network being used by Governments, global scientific and conservation communities
- Expansion to do more in local communities – training for job creation, etc...

Thank you









BUILDING ON SUCCESS
Three Challenges make participation easy and bring home the message of personal responsibility

清潔香港 HONG KONG CLEANUP

In 2012, Ecovision successfully expanded the scope and scale of the 12-year-strong Coastal Cleanup and introduced the Hong Kong Cleanup, with three Challenges cleaning up the coasts, country parks and urban environments.

In 2013, the aim is to continue to promote and grow the Country and City Cleanup Challenges as part of the Hong Kong Cleanup, and to dramatically increase the participation and reach of the overall event and its associated education campaign.

- 清潔海灘 COASTAL CLEANUP CHALLENGE
- 清潔郊外 COUNTRY CLEANUP CHALLENGE
- 清潔城市 CITY CLEANUP CHALLENGE

THE 2013 OFFICIAL CAMPAIGN

清潔香港 HONG KONG CLEANUP

Take the pledge – and share it!

21/9 - 1/11

Special thanks to artist Liina Klaus for her collaboration on this year's campaign

ON-AIR PROMOTION
6,000+ promo spots aired through key partner Fox International Channels

Five months long on-air campaign on selection of channels (total cumulative homes of 2.14m), driving awareness and behaviour change through programming

ON-AIR ELEMENTS

- Public Service Announcement for Hong Kong Cleanup
- Individual Promos for Coastal, Country and City Cleanups
- Celebrity Endorsements with calls to action
- Factoids on the effects of waste
- Long-program support on associated subject
- Event Recaps of cleanup activities
- Award Ceremony Event Highlight
- Art and Photo Exhibit Highlight

CHANNELS

Primary: National Geographic Channel Hong Kong
Secondary: Star Chinese Movies, NatGeo Wild, Star World, FOX Asia, tvN Asia



ecovision

ONLINE ENGAGEMENT

Using the power of Internet to maximum advantage



HKCleanup.org - is maintained as the year-round online home to the Cleanup campaign. More than just an event site, it serves as a place for participants and community members to share, discuss, learn and act.

Social Media Integration – The Hong Kong Cleanup Facebook, Twitter pages and NGC Facebook Page (50,000+ fans) with regular updates, photo uploads, article links, event announcements and teams, sponsors and partners info. Youtube is used to share exclusive videos produced for the Cleanup.

Email Direct Marketing - Monthly updates are shared via newsletters, photos and challenges – sent to 12,000+ subscribers with the purpose of maintaining on-going relationship with teams, sponsors and supporters.



ecovision

SUPPORTING ORGANIZATIONS

Reaching into business, sports and youth communities



- The Food and Environment Hygiene Department (FEHD), Leisure and Cultural Services Department (LCS), Environmental Protection Department (EPD), and Agriculture, Fisheries and Conservation Department (AFCD) support and endorse this community event.
- Chambers of commerce, NGOs, associations and community groups increase the scope of the marketing reach via outreach to corporate Hong Kong, promoting the event through the dedicated websites and newsletters, database support, and registration support (links to entry form, etc)
- Education Department Bureau (EDB) and school partners help extend team participation and volunteer recruitment by utilizing databases to promote and register participants, and outreach to local schools, students and teachers.
- Other activity groups such as sports clubs, hiking groups, fitness centres and youth groups encourage entry and reach people at grassroots level and have potential partner challenges and competitions.





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The Rubbish Diet Challenge





ecovision

OFFICE, HOME & SCHOOL CHALLENGE

Choose your Challenge(s)...

 Food Waste Challenge

 Paper Reduction Challenge

 Plastic Bag Challenge

 Recycling Challenge

 Smart Energy Challenge

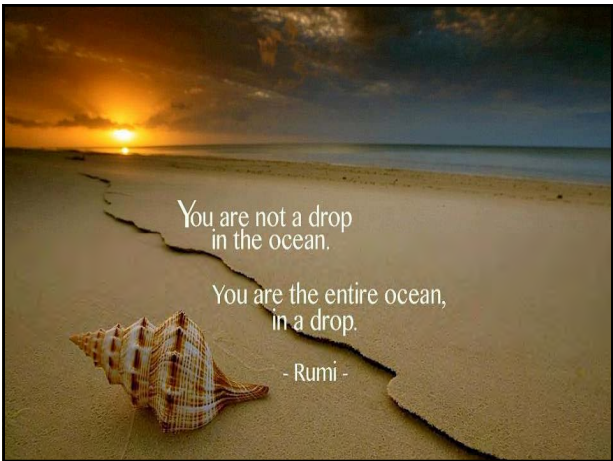
And make a difference!

 城市清潔
CITY CLEANUP
CHALLENGE 比賽

What does it take? It's Easy!

- Register today or at HKcleanup.org
- Consider one or more of the five activities
- Put up a poster – share the message!
- Share the Pledge postcard with others
- Take the quiz, try the tips... think of ways you can reduce waste at source!





International Coastal Cleanup Efforts in Alaska

Loretta Brown
Center for Alaskan Coastal Studies

Center for Alaskan Coastal Studies

Our mission: To foster responsible interactions with our natural surroundings and to generate knowledge of the unique marine and coastal ecosystems of Kachemak Bay through science-based environmental education and stewardship



Coastal Monitoring



School Field Trips and Summer Programs



Winter Ecology



Kachemak CoastWalk

Non-profit education organization founded in 1982



Wynn Nature Center



The Center for Alaskan Coastal Studies
Headquarters



Peterson Bay Field Station

The State of Alaska:

Population: 722,190
Area: 570,641 sq. miles (1,477,268 sq. km.)
Coastline: 40,000 miles (64,374 km)

Comparisons to Japan

Population: 127,500,000
Area: 378,000 sq. km
Coastline: 35,000 km

ICC and CoastWalk



Limitations:

- Few roads to catcher beaches
- Proximity to population centers is essential for these cleanups
- Often can't reach beaches most in need of cleanup

Benefits:

- Can involve hundreds
- Excellent educational experience
- Creates a sense of responsibility for local beaches

Remote Cleanups



Limitations:

- Debris Transport
 - Weather
 - Cost
- Safety Concerns

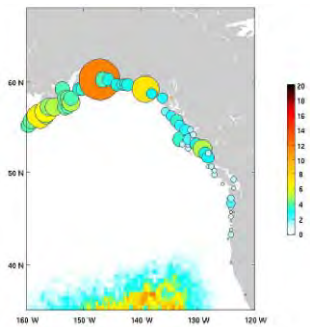
Benefits:

- Access to heavily debris beaches
- Access to critical habitat areas

Pre-Tsunami Marine Debris in Alaska



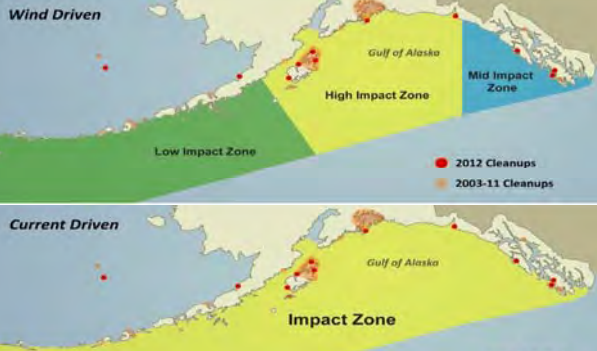
Tsunami Debris Projections



Miller, Ian and Brennan, Jim 2012. "Debris Accumulation Scenarios in Washington State from the March 2011 Tohoku Tsunami." Washington Sea Grant.

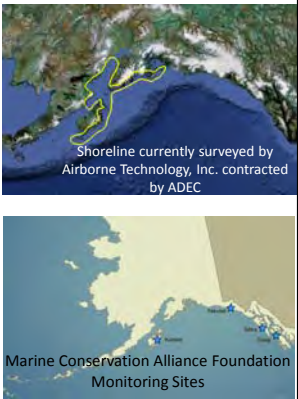
Tsunami Debris Impact

Alaska



Development Staff. 2012. "A Plan for the Cleanup of Tsunami-Related Marine Debris off Alaska". Marine Conservation Alliance Foundation June 8, 2012

Tsunami Debris Monitoring in Alaska



Montague Island Before 2012

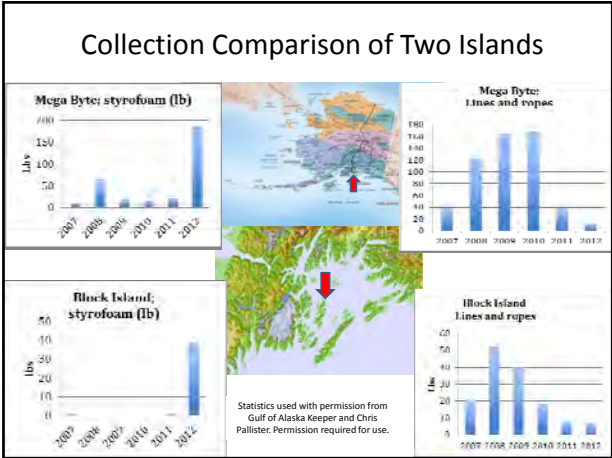
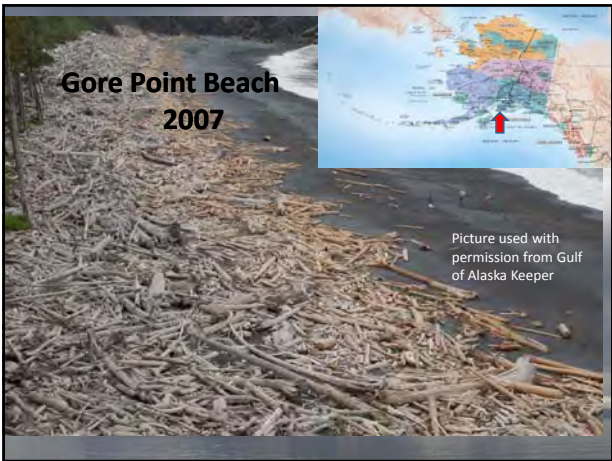


Pictures used with permission from Gulf of Alaska Keeper



Pictures used with permission from Gulf of Alaska Keeper and Center for Alaskan Coastal Studies

Montague Island 2012



Concerns:

- Foam plastic breakup through seasonal weathering
- Debris Disposal



- High Transportation Cost
- Funding sources

CACS Challenge Grants

- **Award Amount:** \$2,000 with a \$1000 non-federal match
- **Emphasis:** Marine debris clean-up along shoreline and prevention of recreational fishing debris
- **Success Stories:** Kodiak Island’s Island Trails Network marine debris started under a challenge grant



Expanded CoastWalk Model to Other Alaskan Communities

Challenge Grant Award-Supported Accomplishments				
	2008	2009	2010	2011
Number of Volunteers	368	515	483	328
Number of Volunteer hours	1,922	2003	1725.5	1344
Number of Challenge Grants	11	8	11	10
Total amount granted (USD)	\$8,875	\$15,000	\$13,400	\$14,547.41
Pounds of debris removed	12,665	14,377	13,290	13,466
Miles of beaches, salmon stream corridors, and intertidal areas	107.5	44.8	46.25	41



NOAA Community-Based Marine Debris Clean-Up and Prevention Grant Program

Fostering Change through Education and Outreach

- **CoastWalk – 2012 Results**
 - Kachemak Bay cleanup and coastal monitoring
 - Over 1500 Volunteers
 - 958 Hours
 - 100.25 Miles
- **Local School Involvement**
 - Over 500 students (K-12)
- **Anchorage Museum Curriculum Development for Gyre Exhibit**



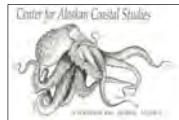
Building Awareness through Community Art



Washed Ashore: Homer on Tour



Loretta Brown
Center for Alaskan Coastal Studies
loretta@akcoastalstudies.org
907-235-6741








Let's Do It! movement & World Cleanup

Let's do it!
Pille Pirn
Asia Coordinator

Let's Do It!

- Let's Do It! is a civic movement that aims to conduct projects that tackle social problems.
- The fundamental ideology of the movement aims for a clean and healthy planet.
- Its greatest project so far has been World Cleanup.

The start

It all started in 2008 in Estonia

- Trash was the problem in our forests, so we decided to gather volunteers and clean it up in one day! It worked! Approx. 4% from the population was participating – **50 000** volunteers.



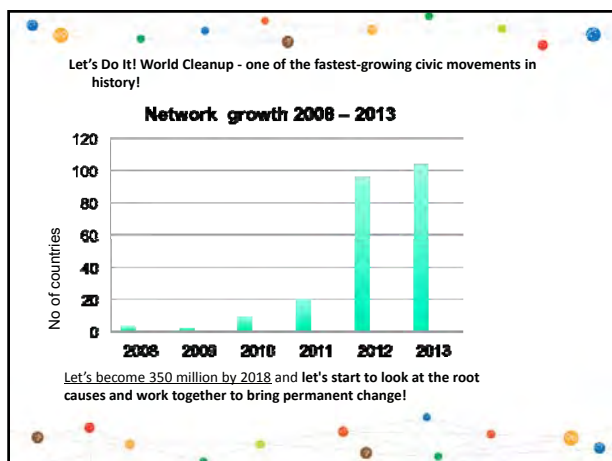
In numbers:

- **preparation time** - 7 months
- **team** - more than **600** volunteers
- **mapping of the waste** - 300 volunteers, mapping weekends, **special software**
- **more than 500** partners
- **a zero-budget** campaign with **opinion leaders, actors, musicians, sportsmen**

Let's Do It! World Cleanup

To spread the idea and inspire cleanup actions in other countries, the volunteer team offers:

- **waste map** (Online tool, Application : Let's Do It!);
- **network**;
- **a country-cleaning manual**;
- **communication tools** (adverts, designs, etc);
- **e-mail consulting**;
- **support in partners negotiations**;
- **experience-sharing conferences**;
- **a very own coordinator**

LET'S DO IT! MEDITERRANEAN



Mediterranean cleanup 10 May 2014

Mission:
1 000 000 volunteers, 22 countries, 1 DAY
Cleanup action uniting the countries around the Mediterranean sea to **clean up the sea** and surrounding areas.

More info: <http://letsdoitmediterranean.wordpress.com/>

Coming soon... Things.info
<http://www.letsdoitworld.org/news/thingsinfo-home-every-thing> (data+map)

How was it made?

Things.info is a platform for mapping man-made things and their relationships. Here you can support the platform development by adopting a thing you like.

*Every thing, every product has a unique story, we plot to tell that story!
Starting with production and ending with reuse or recycling!*

Who made it? *What materials were used?* *Where was it made?*
What to do with things we don't need? *Who owns it?*



Thank you!

www.letsdoitworld.org

Let's do it!






OCEAN CONSERVANCY'S

TRASH FREE SEAS® PROGRAM

Sonya Besteiro, Associate Director of the International Coastal Cleanup

 Ocean Conservancy 



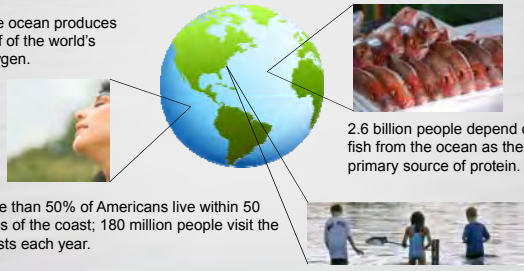
Why the Ocean Matters?



The ocean covers 70% of the Earth's surface and contains 97% of the planet's water.

The ocean produces half of the world's oxygen.

2.6 billion people depend on fish from the ocean as their primary source of protein.

More than 50% of Americans live within 50 miles of the coast; 180 million people visit the coasts each year.




 Ocean Conservancy  © 2013 Ocean Conservancy

Ocean Conservancy: Our Mission

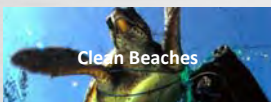
Ocean Conservancy educates and empowers citizens to take action on behalf of the ocean. From the Arctic to the Gulf of Mexico to the halls of Congress, Ocean Conservancy brings people together to protect the ocean and its wildlife for future generations.




 Ocean Conservancy  © 2013 Ocean Conservancy




Ocean Conservancy: Our Work




Clean Beaches



Sustainable Fisheries




Wildlife





Emerging Issues



Smart Choices for a Healthy Ocean



Marine Protected Areas

 Ocean Conservancy  © 2013 Ocean Conservancy

Ocean Trash: More than an Eyesore



 Ocean Conservancy  © 2013 Ocean Conservancy



Solutions Toward Ending Ocean Trash

Ocean Conservancy's Trash Free Seas® Program

1. Removal
2. Prevention



Ocean Conservancy scientists sort through trash collected on Santa Cruz beaches to better understand what's ending up in the ocean and how to prevent such trash in the first place.

 Ocean Conservancy  © 2013 Ocean Conservancy

Removal: International Coastal Cleanup

- World's largest volunteer event on behalf of ocean and waterway health
- Largest body of data on marine debris in the world
- Over 27 years: 9 million people, 153 countries, 150 million pounds of trash, 300,000 miles of beach
- Annual release of data report regularly receives 150 million+ impressions



Removal: Employee Engagement Cleanups



Moving Toward Prevention



Solution: Rippl Mobile App

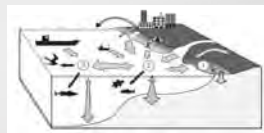
- Provides free green living tips to help improve day-to-day habits
- Allows users to set goals and track progress to show impact
- Pushes out adjustable reminders to help users succeed based on individual needs, schedule and habits
- Offers opportunities to suggest tips to the community, and share success with friends



Solution: Building the Case

National Center for Ecological Analysis and Synthesis
University of California, Santa Barbara

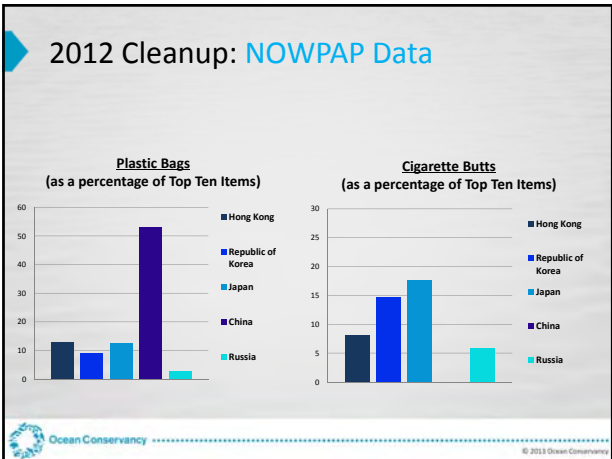
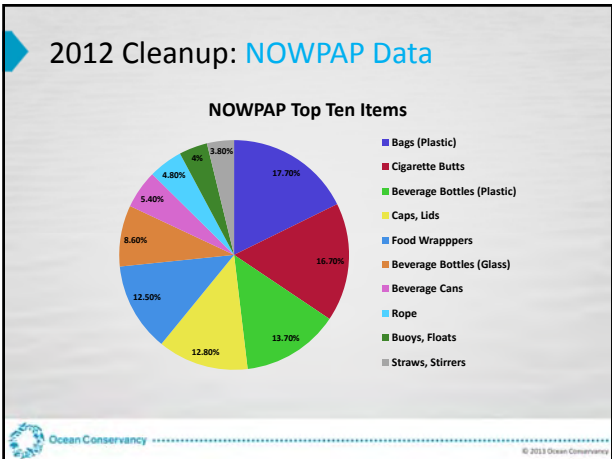
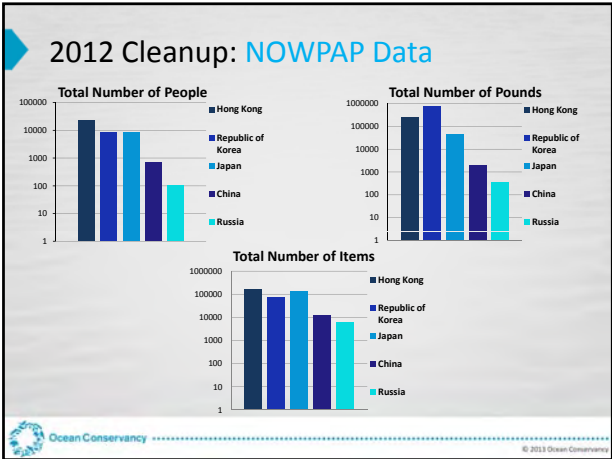
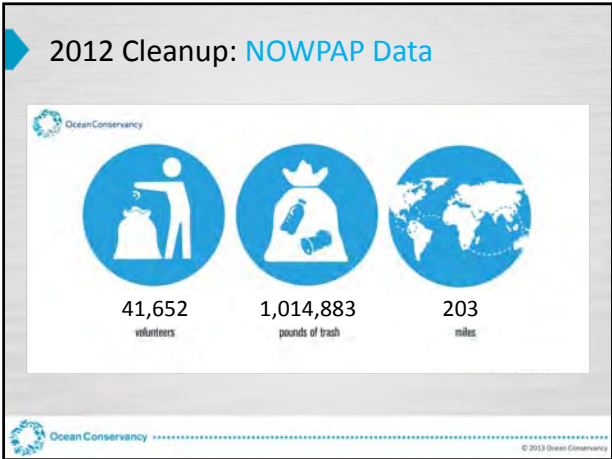
- ✓ How much?
- ✓ Where does it go?
- ✓ What are the impacts?
- ✓ How to fill data gaps?



Ryan et al. 2009

Solution: Trash Free Seas Alliance®





2013 Cleanup: **New Volunteer Data Form**

VOLUNTEER OCEAN TRASH DATA FORM

HERE IS HOW IT WORKS:

1. Collect trash and count items
2. Record items
3. Estimate a weight
4. Record your report

AND SUBMIT:

Submit your report online or by email to cleanup@oceanconservancy.org

TRASH COLLECTED

Item	Count	Weight (kg)
Aluminum cans		
Aluminum foil		
Aluminum trays		
Aluminum bottles		
Aluminum containers		
Aluminum lids		
Aluminum caps		
Aluminum pieces		
Aluminum other		
Aluminum total		
Plastic bottles		
Plastic containers		
Plastic lids		
Plastic caps		
Plastic pieces		
Plastic other		
Plastic total		
Styrofoam		
Styrofoam containers		
Styrofoam pieces		
Styrofoam other		
Styrofoam total		
Cardboard		
Cardboard boxes		
Cardboard pieces		
Cardboard other		
Cardboard total		
Other		
Other items		
Other pieces		
Other other		
Other total		
Total		

Ocean Conservancy

2013 Cleanup: **New Ocean Trash Poster**

International Coastal Cleanup
WHAT WILL YOU FIND?

1. **1st Fact:** 80% of the trash found during the 2013 International Coastal Cleanup was plastic.
2. **2nd Fact:** 10% of the trash found during the 2013 International Coastal Cleanup was Styrofoam.
3. **3rd Fact:** 1% of the trash found during the 2013 International Coastal Cleanup was glass.
4. **4th Fact:** 1% of the trash found during the 2013 International Coastal Cleanup was metal.
5. **5th Fact:** 1% of the trash found during the 2013 International Coastal Cleanup was paper.
6. **6th Fact:** 1% of the trash found during the 2013 International Coastal Cleanup was wood.
7. **7th Fact:** 1% of the trash found during the 2013 International Coastal Cleanup was fabric.
8. **8th Fact:** 1% of the trash found during the 2013 International Coastal Cleanup was food.
9. **9th Fact:** 1% of the trash found during the 2013 International Coastal Cleanup was other.
10. **10th Fact:** 1% of the trash found during the 2013 International Coastal Cleanup was unknown.

Ocean Conservancy

2013 INTERNATIONAL COASTAL **CLEANUP**

Ocean Conservancy

Prevention: **Individual Action**

10 THINGS YOU CAN DO FOR TRASH FREE SEAS

1. **1. CAN IT**
Use reusable containers and bottles.
2. **2. TIE IT**
Tie up trash and dispose of it properly.
3. **3. STOW IT**
Store trash in a designated area.
4. **4. BURY IT**
Bury trash in a designated area.
5. **5. REMOVE IT**
Remove trash from the beach.
6. **6. BURY OUT**
Bury trash in a designated area.
7. **7. RECYCLE IT**
Recycle trash in a designated area.
8. **8. REUSE IT**
Reuse trash in a designated area.
9. **9. REFUSE IT**
Refuse trash in a designated area.
10. **10. REINVENT IT**
Reinvent trash in a designated area.

Ocean Conservancy

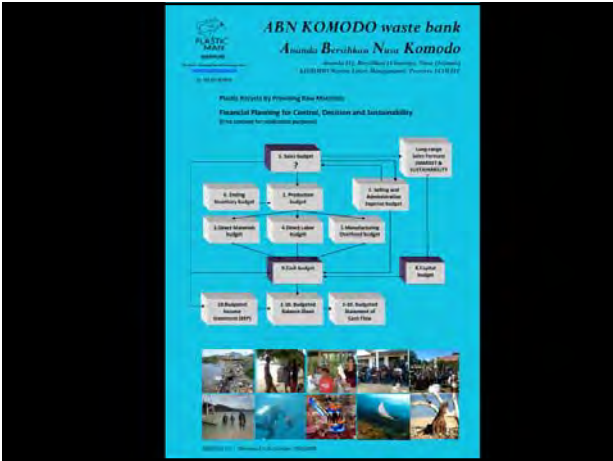
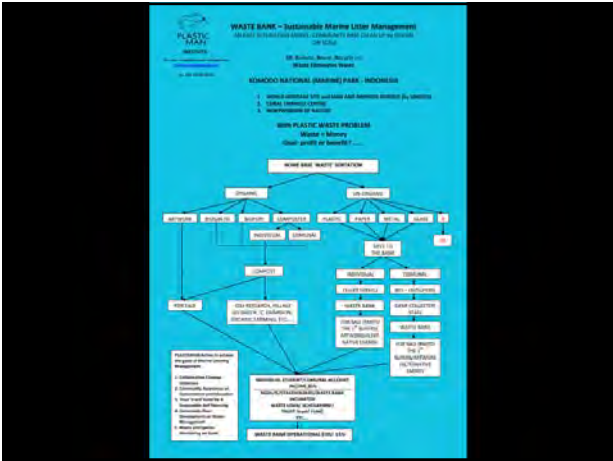
THANK **YOU!**

Ocean Conservancy

END

STEFAN RAFAEL
“Plasticman”

From : Komodo, Flores, Indonesia



Garbage Bank Account Card





KOMODO SEND WARM REGARDS, AND
SAY Hi ! =)



THANK YOU



Division of Technology, Industry and Economics
UNEP

Integrated Solid Waste Management for Coastal cities

To address land based sources of marine litter

Surya Prakash Chandak
Senior Programme Officer
International Environmental Technology Centre (IETC)

October 2013

Need for ISWM

- Cities are facing an increasing growth in population, and shares in GDP growth, resulting in – among other things – increasing quantities of waste being generated
- Due to changing lifestyles and consumption patterns, the quantity of waste generated has increased with quality and composition of waste becoming more varied and changing.
- Industrialization and economic growth has produced more amounts of waste, including hazardous and toxic wastes.
- There is a growing realization of the negative impacts that wastes have had on the local environment (air, water, land, human health etc.)
- Complexity, costs and coordination of waste management has necessitated multi-stakeholder involvement in every stage of the waste stream. This calls for an integrated approach to waste management.
- Local Governments are now looking at waste as a *business opportunity*, (a) to extract valuable resources contained within it that can still be used and (b) to safely process and dispose wastes with a minimum impact on the environment

2

Challenge # 1: Waste Generation

Rapid growth in waste generation and new waste streams due to population growth and lifestyles

Globally, 2.5 to 4 billion tons of waste was generated in 2006

MSW	Worldwide: 1.84 billion tons (2004) 25 OECD countries: 610 million tons (2006)
Industrial non-hazardous waste	Typically 1.1 – 1.8 billion tons in countries like EU, USA, China (2006)
C&D	10-15% of total waste in developed countries (2006)
Hazardous waste	338 million tons (2001)
E waste	20 – 50 million tons world wide (2005)
Automobile	8 – 9 million tons in EU (2006)

Annual MSW in Million Tons

Legend: Asia, EU, USA, LAC, South Africa

Challenge # 2: Severity of Impacts

- Severe health impacts particularly on community in vicinity of dumpsites.
- Pollution of surface and sub-surface water bodies due to leachate contamination.

Payatas, Philippines

Nairobi, Kenya

- Air pollution from emissions of spontaneous combustion in dumps.
- Adverse impacts on fauna and flora.

Challenge # 3: Increasing Costs

OECD countries:

Municipal waste – USD120 billion/year

Industrial waste – USD150 billion/year

Developing countries:

20-50% of recurring budget of municipalities is spent on solid waste management although only 50% of urban population is covered. In low-income countries collection alone drains 80-90% of total waste management budget.

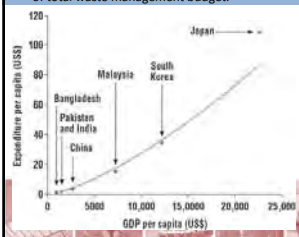


Figure 14: Municipal Urban Waste Services Expenditures


City/Country	Year	Per Capita Expenditure on SWM (US \$)	Per capita GNP (US \$)	% GNP Spent on SWM
New York, USA	1991	186	22,240	0.84
Toronto, Canada	1991	67	20,440	0.33
Stockholm, France	1995	43	24,990	0.25
London, England	1991	46	14,350	0.28
Kuala Lumpur, Malaysia	1994	15.25	4,000	0.38
Budapest, Hungary	1995	13.80	4,130	0.33
Sao Paulo, Brazil	1989	13.32	2,540	0.52
Buenos Aires, Argentina	1989	10.15	2,140	0.47
Tel Aviv, Israel	1995	8.11	3,080	0.26
Bogota, Colombia	1994	7.75	1,620	0.48
Caracas, Venezuela	1989	6.67	2,450	0.27
Riga, Latvia	1995	6	2,420	0.25
Manila, Philippines	1995	estimated 4	1,670	0.37
Bucharest, Romania	1995	2.37	1,450	0.16
Hanoi, Vietnam	1994	predicted 2	250	0.80
Mumbai, India	1995	1.77	350	0.51
Lahore, Pakistan	1995	1.77	390	0.45
Shanghai, P.R. China	1995	1.46	270	0.54
Akron, Ohio	1994	0.66	390	0.17

Challenge # 4: Limited Infrastructure and Policy Framework





- Rely on end-of-pipe solutions with focus on collection and disposal with coverage of collection is around 50%
- Safe disposal
 - Only 30% practised in middle-income developing countries
 - Only 5% practised in low-income developing countries
- Lack of supportive policy framework, especially to address emerging waste streams
- Limited implementation of policies at best in selected big cities



Challenge#6: GHG Emissions



1. Rotten waste
2. Open burning
3. Landfills
4. Thermal treatment (e.g. incineration)
5. Biological treatment (e.g. composting)
6. Collection and transportation
7. Lost energy to offset fossil fuels



Turning Challenges into Opportunities

20th CENTURY

WASTE MANAGEMENT

“How do we get rid of our waste efficiently with minimum damage to public health and the environment?”



21st CENTURY

RESOURCE MANAGEMENT

“How do we handle our discarded resources in ways which do not deprive future generations of some, if not all, of their value?”



Source: Dr. Paul Connnett, Zero Waste, Power Point



Defining ISWM

Integrated solid waste management refers to the strategic approach to sustainable management of solid wastes covering all sources and all aspects, covering generation, segregation, transfer, sorting, treatment, recovery and disposal in an integrated manner, with an emphasis on maximizing resource use efficiency.

United Nations Environment Programme, Division of Technology, Industry and Economics

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Integrated Waste Management
based on 3R (reduce, reuse and recycle)

The diagram illustrates the flow of waste management based on the 3R principle (Reduce, Reuse, Recycle). It shows the flow from various waste sources (Residential, Industrial & Commercial, Services) through Collection, Segregation, Recycling, and Waste Exchange to Final disposal or Resource recovery.

Waste Sources:

- Residential (labeled with 3R)
- Industrial & Commercial (labeled with 3R)
- Services (Healthcare, Laboratory, etc.) (labeled with 3R)

Waste Management Process:

- Collection of Waste**
- Segregation of Waste**
- Recycling waste (organic & inorganic)**
- Waste Exchange**
- Discarded waste**

Final Disposal and Resource Recovery:

- Final disposal** (via Sanitary Landfill, Incineration)
- Resources** (Plastics, wood, steel, paper, glass, and compost/biogas)

Additional Notes:

- Methane & heat are recovered from the waste management process.
- Energy is generated from the waste management process.
- Treatment, Recovery, and Final waste are part of the process.



IETC projects on ISWM

- Wuxi New District, China – 2008
- Pune City, India – 2008
- Maseru City, Lesotho – 2009
- Matale City, Sri Lanka – 2009
- Nova Hamburgo, Brazil – 2009
- Nairobi – 2010
- Bahir Dar, Ethiopia – 2010
- Pathum Thani, Thailand – 2011
- Addis Ababa – 2011







Danang, Vietnam - 2012




Kampot, Cambodia - 2012



Bangkok – 2012



Honduras - 2013



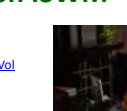



Guidelines / Manuals on ISWM



Volume 1 - Waste data: waste characterization and quantification with future trends
http://www.unep.org/ip/etc/Publications/spc/ISWMPlan_Vol1.pdf

Volume 2 - Assessment of current waste management system
http://www.unep.org/ip/etc/Publications/spc/ISWMPlan_Vol2.pdf

Volume 3 - Target setting and identification of issues of concern for stakeholders
http://www.unep.org/ip/etc/Publications/spc/ISWMPlan_Vol3.pdf

Volume 4 - How to develop an ISWM plan?
http://www.unep.org/ip/etc/Publications/spc/ISWMPlan_Vol4.pdf

ISWM for coastal cities

- Sea based sources for waste in coastal cities (e.g. shipping and floating debris)
- Land based sources of marine litter (e.g. waste dumping and coastal tourism)
- ISWM to also include the facilities for treatment, recycling and disposal of marine litter



Land based sources of marine litter

- Direct dumping of waste from land based sources into marine environment
- Carry over of waste from water estuaries emptying into marine environment
- Illegal disposal practices

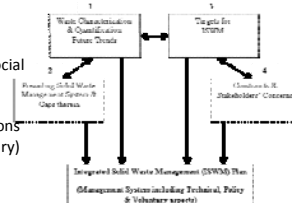
GPA's mandate & work programme on marine litter

GPA mandate: Reduced amount of land-based litter and solid waste introduced into the marine environment Online forum & partnership will focus on Honolulu Strategy (LBS/SBS/Removal).

- Component 1: Development of online forum/platform
- Component 2: Global Partnership on Marine Litter
- Component 3: Support to regional activities
- Component 4: Demonstration of marine litter reduction strategies for Land-based sources

Proposed methodology for ISWM in coastal cities

- Awareness raising and seeking political support
- Baseline data on
 - waste data (quantification and characterization with future trends)
 - Assessment of current waste management system (institutions, policies, financing, infrastructure and technology)
- Target setting for ISWM
- Stakeholders' concerns
- (environmental, economic, social technical) for meeting the targets
- ISWM Plan with detailed actions (policy, technical and voluntary)
- Demonstration Projects



Technologies

- Methodology to assess technologies (**Sustainability Assessment of Technologies, SAT**) was developed to assist practitioners to provide financial, environmental, social and technical assessment to policy makers for well informed decision-making
- Various compendium of technologies are compiled to provide information on technology routes, technology providers and technology details (wherever available)



Future vision

- To provide technical support on ISWM for coastal cities
- To build capacity in partner institutions in Integrated Solid Waste Management
- To develop joint projects for coastal cities in partnership with Northwest Pacific Action Plan (NOWPAP) of UNEP



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Thank You...

