Comprehensive Management System of Ocean Dumping Activities in the Republic of Korea

2019 Science day

Korea Institute of
Ocean Science & Technology

Kim Chang-joon

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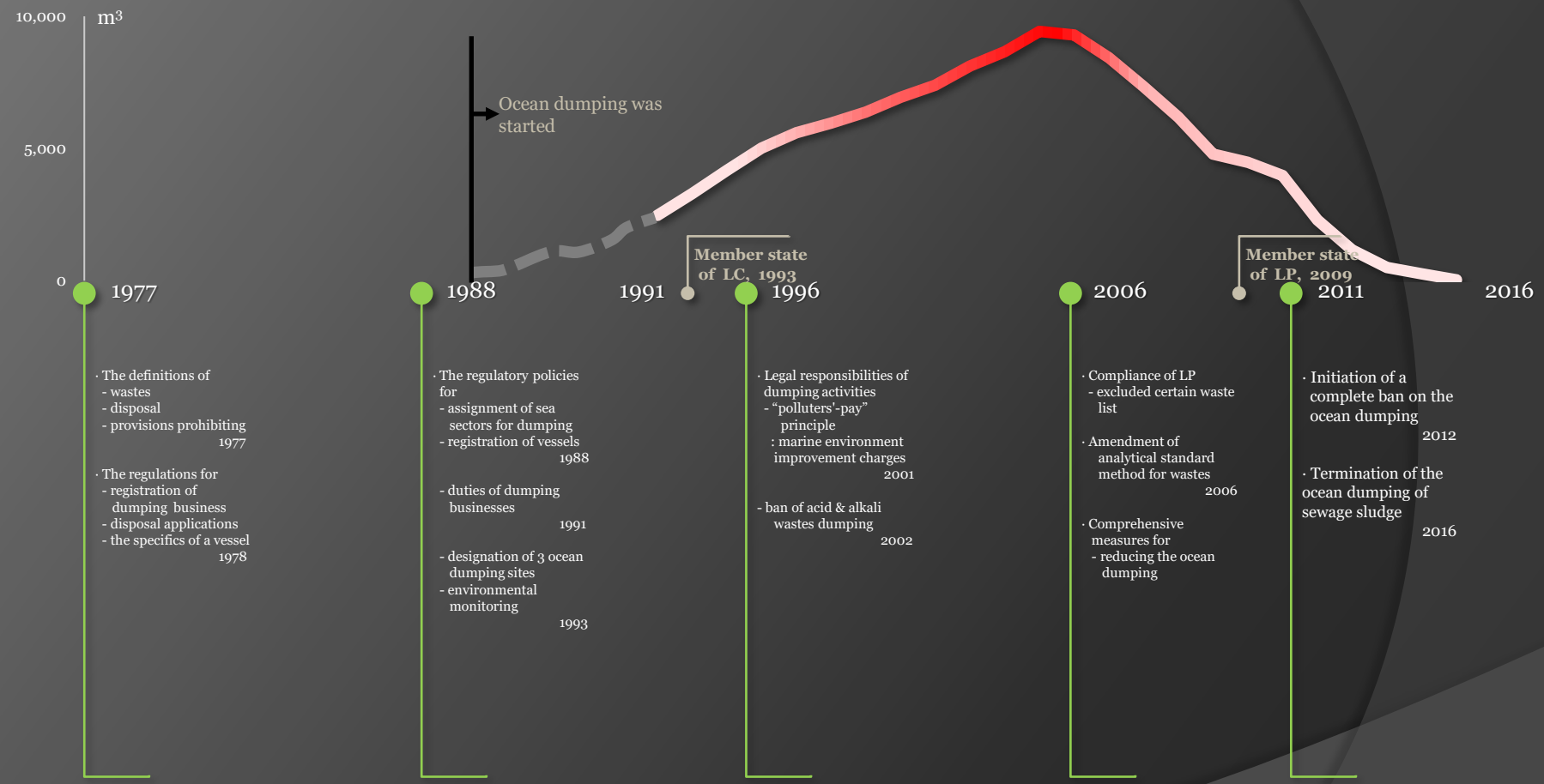
II. Field Monitoring Process on the Ocean Dumping Sites in Rep. of Korea

III. Inspection of Legal Compliance for Ocean Dumping business

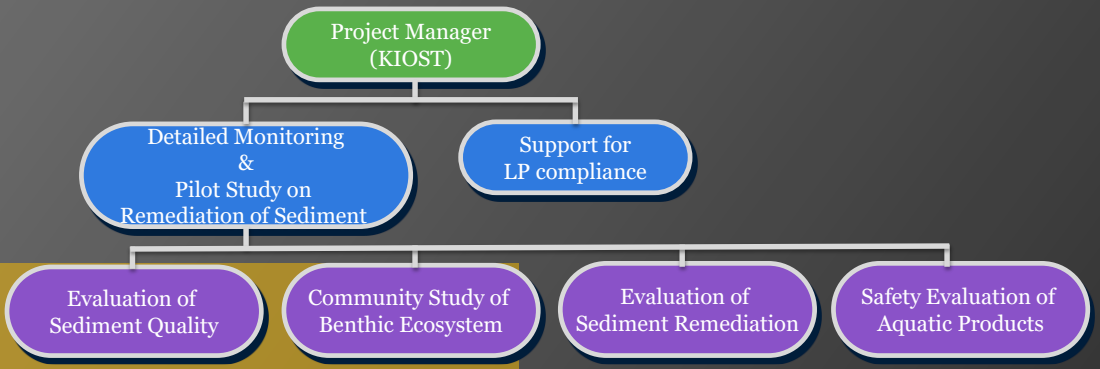
I. Changes in the Legal System for Ocean Dumping in Rep. of Korea

- The Marine Pollution Prevention Act
  - The enforcement decree of the marine pollution prevention act



II. Field Monitoring Process on the Ocean Dumping Sites in Rep. of Korea

- "Development of the best practical technology & management options for the national disposal of waste at sea"



◆ Marine Sediment Sampling and Benthic Ecosystem Survey

- Chemical characteristics of Marine Sediment
  - · Particle size, Water contents, Chemical oxygen demands
  - · Total Organic carbon contents (TOCs)
  - · 37 Polychlorinated biphenyls (PCBs)
  - · 27 Polycyclic aromatic hydrocarbons (PAHs)
  - · Mineral oil
  - · 12 Heavy metals
- Risk assessment & community study of benthic ecosystem

◆ Satellite Surveillance of Water Quality and Waste Disposal Activity at Sea

- Korean geostationary ocean color imager (GOCI)
- Moderate resolution imaging spectroradiometer (MODIS)

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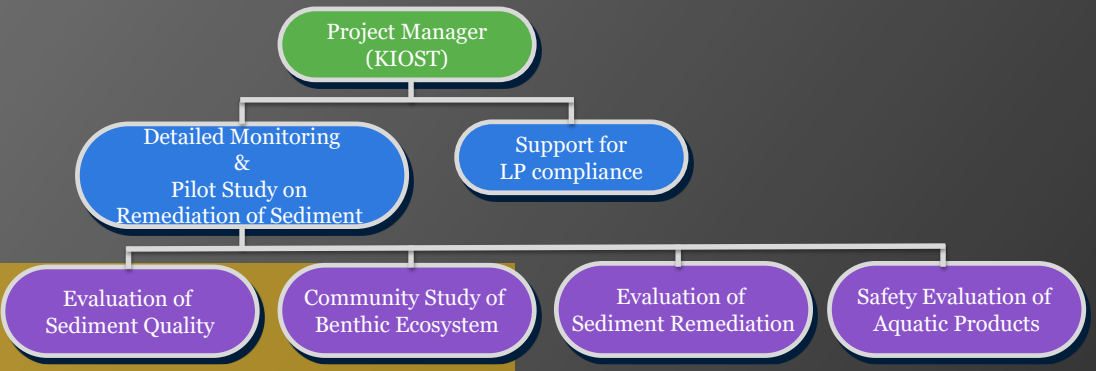

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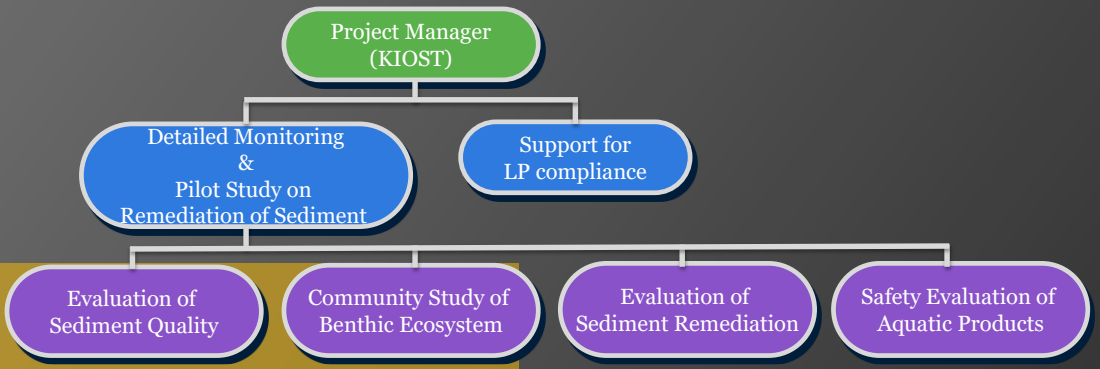

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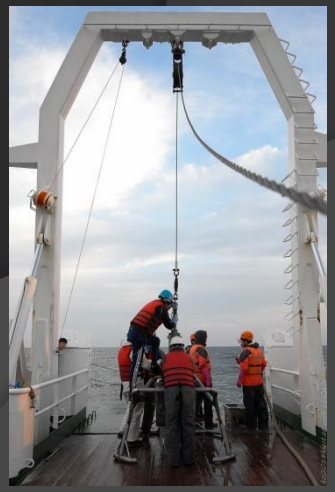
Box Corer Sampling



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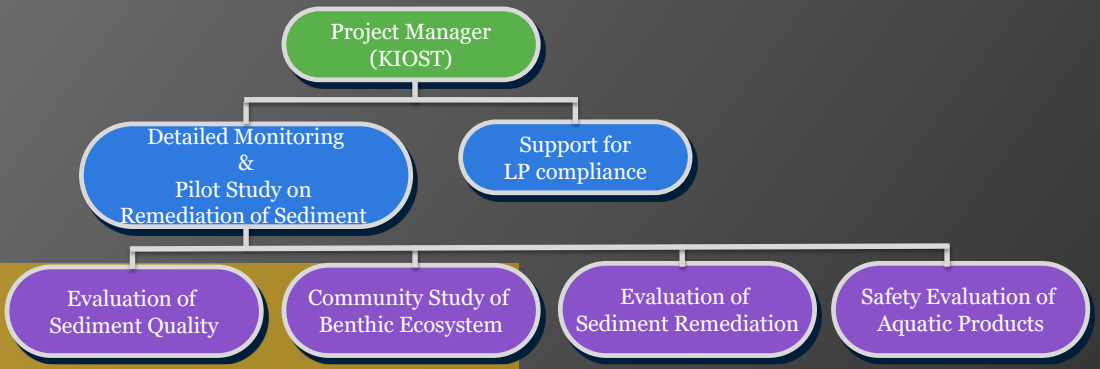

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Ultra Clean Surface Seawater Sampling

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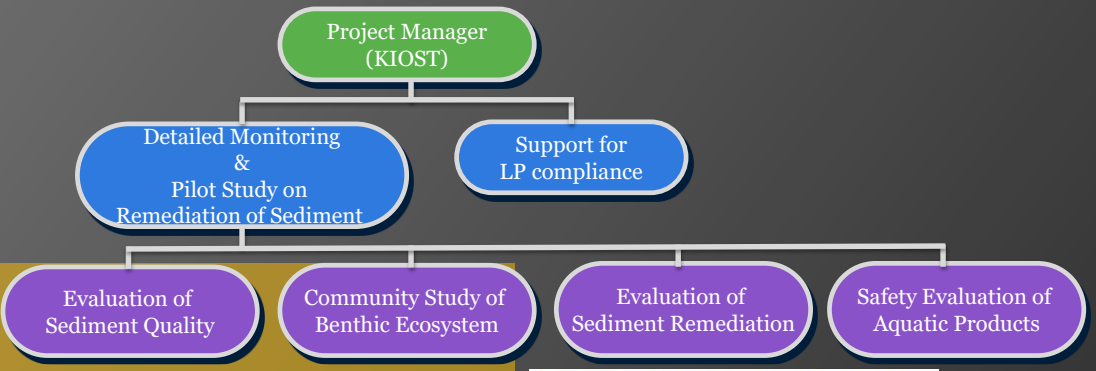

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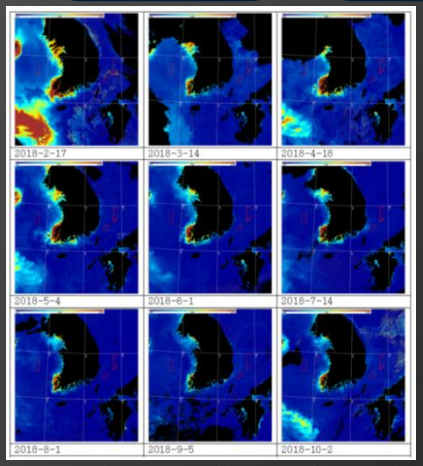
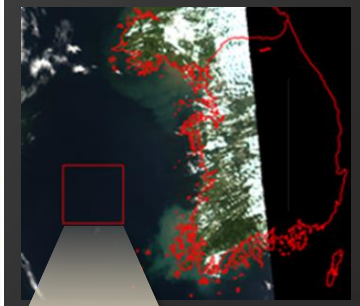
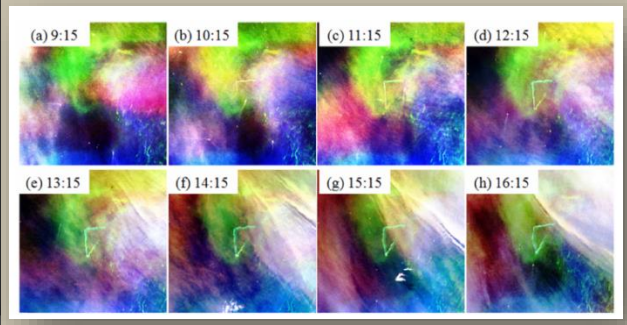


An exemplary series of images of the total suspended substances concentration (mg/L) in ocean dumping sites, Korea by GOCI imager in 2018



Satellite Surveillance



RGB images for disposal ship's track seen in GOCI on 19 July 2011 (KST) in the Yellow Sea

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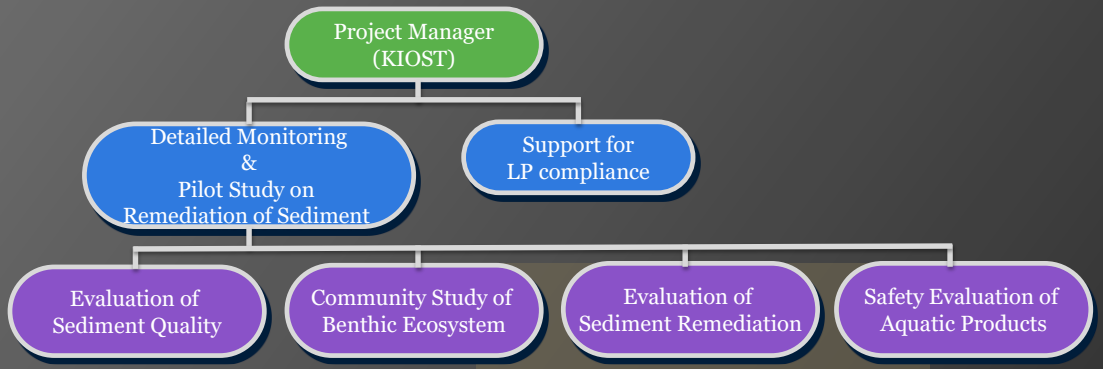

- ◆ Capping Required Sector
  (heavy contamination)
  - In-situ capping on contaminated sites
    · Capping on contaminated sediment using dredged materials
- ◆ Natural Recovery Sector
  (moderate contamination)
  - Monitoring on regular basis

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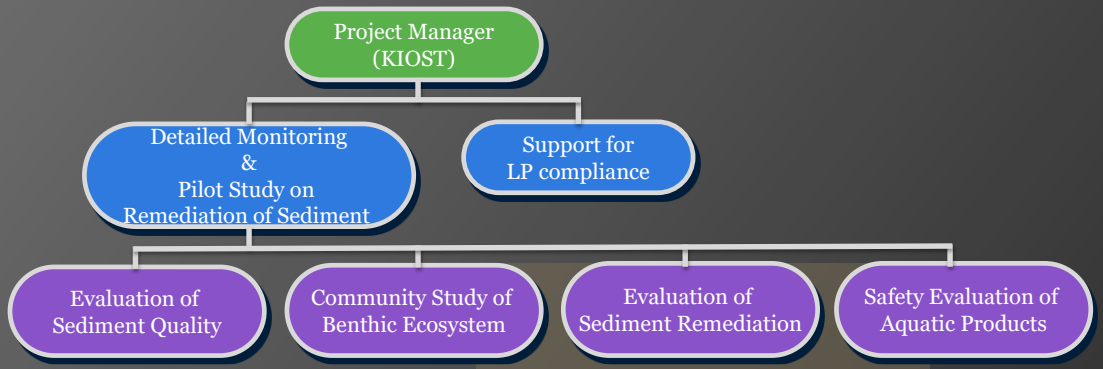

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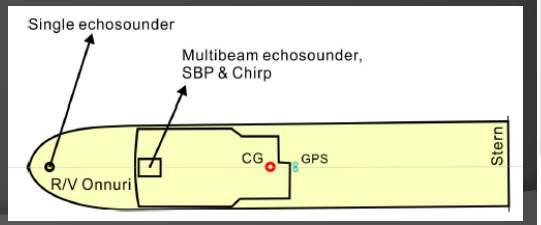

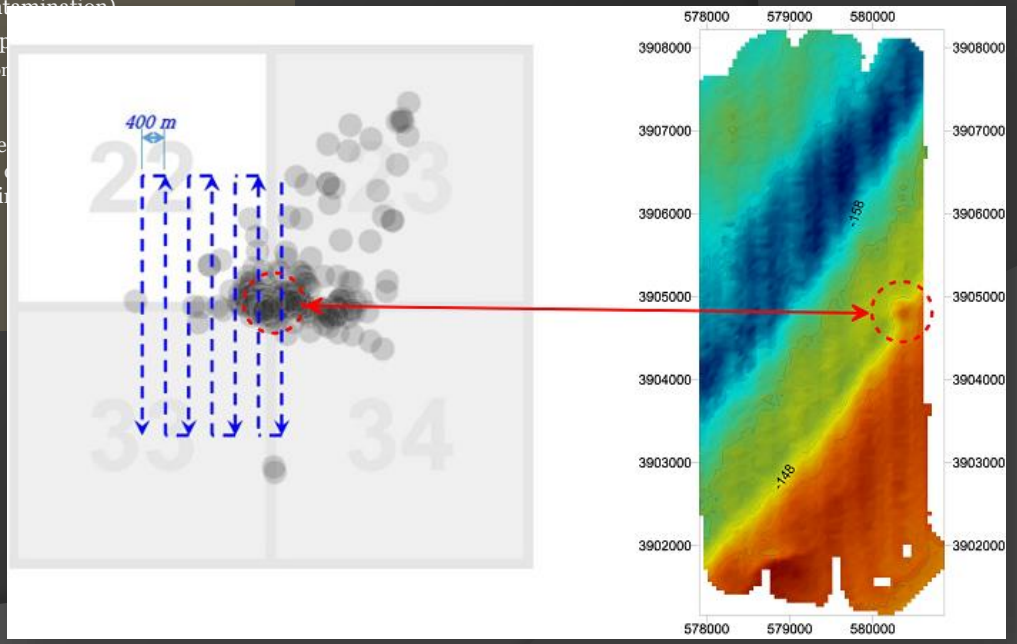

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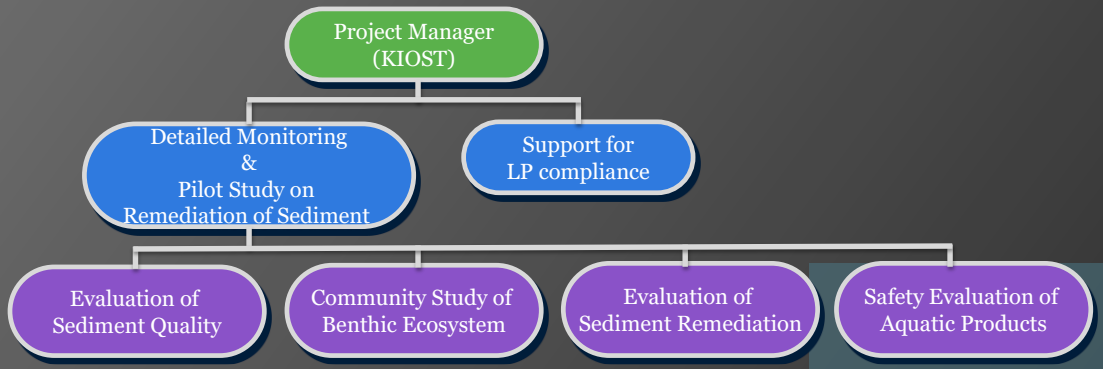

- 6 Heavy metal contents in aquatic products
  - Safety evaluation
  - Bioaccumulation monitoring
    - As, Cr, Cu, Mn, Pb, Zn

III. Inspection of Legal Compliance for Ocean Dumping business

- Action lists & action levels for ocean dumping

	(mg/kg) d.w.	Upper Level	Lower Level
Fish Wastes	Hg	5	1
	PCB 28	0.15	0.03
	PCB 52	0.15	0.03
	PCB 101	0.15	0.03
	PCB 118	0.15	0.03
	PCB 138	0.15	0.03
	PCB 153	0.15	0.03
	PCB 180	0.15	0.03
Dredged Materials	As	70	20
	Cd	10	2.5
	Cr	370	80
	Cu	270	65
	Hg	1.2	0.3
	Ni	52	35
	Pb	220	50
	Zn	410	200
	7 PCBs	0.180	0.023
	7 PAHs	45	4

When if
Below the upper level
but,
Above the lower level

Standard Test for Toxicological Impacts

Luminous bacteria(left) and benthic mphipods(right) used as samples for testing the suitability of wastes for ocean dumping

▲ Luminous bacteria(left) and benthic amphipods(right) used as samples for testing the suitability of wastes for ocean dumping

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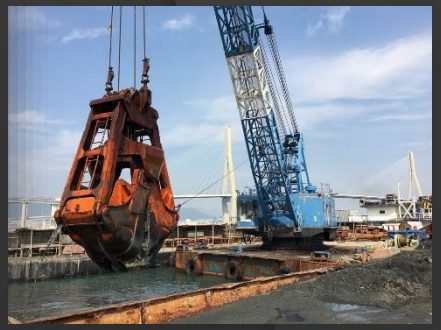
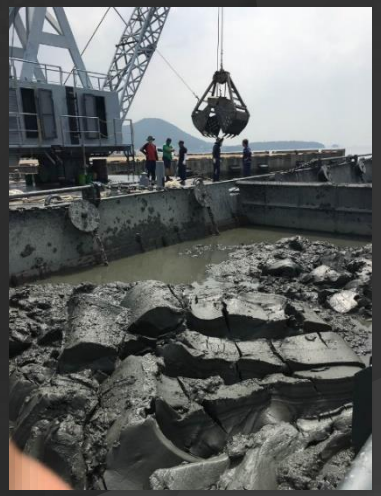
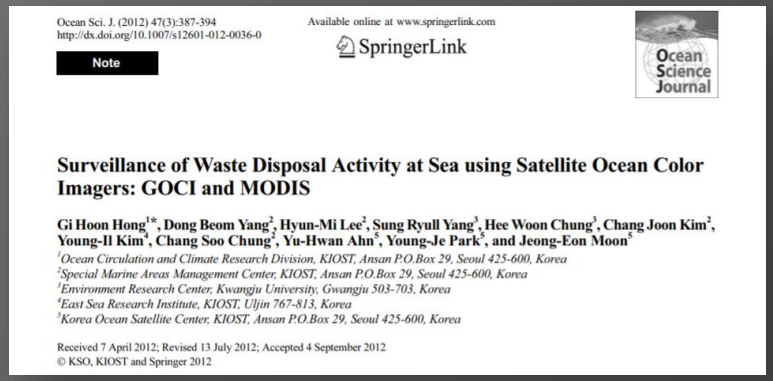




- Surveillance & checking over illegal dumping by waste transport vessel
- Enhanced supervision & inspection over the waste generators
- Enhanced safety inspection on waste storage facilities



Ocean Sci. J. (2012) 47(3):387-394
http://dx.doi.org/10.1007/s12601-012-0036-0

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Note

Surveillance of Waste Disposal Activity at Sea using Satellite Ocean Color Imagers: GOCI and MODIS

Gi Hoon Hong[1*], Dong Beom Yang[2], Hyun-Mi Lee[2], Sung Ryull Yang[3], Hee Woon Chung[3], Chang Joon Kim[2], Young-Il Kim[4], Chang Soo Chung[2], Yu-Hwan Ahn[5], Young-Je Park[5], and Jeong-Eon Moon[5]

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[2]Special Marine Areas Management Center, KIOST, Ansan P.O.Box 29, Seoul 425-600, Korea
[3]Environment Research Center, Kwangju University, Gwangju 503-703, Korea
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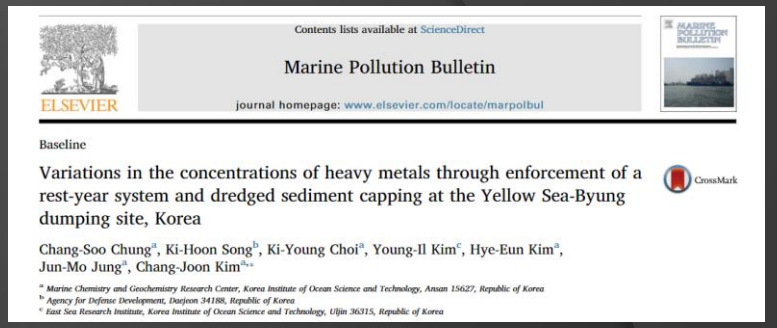

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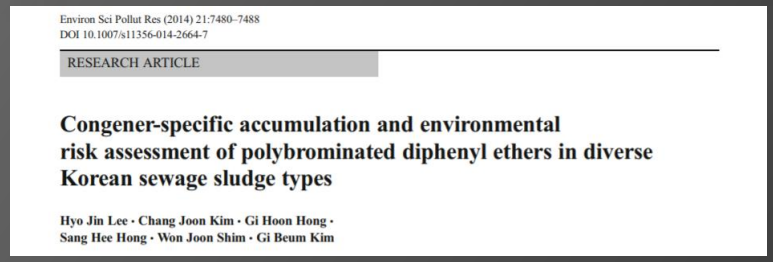
Baseline

Variations in the concentrations of heavy metals through enforcement of a rest-year system and dredged sediment capping at the Yellow Sea-Byung dumping site, Korea

Chang-Soo Chung[a], Ki-Hoon Song[b], Ki-Young Choi[a], Young-Il Kim[c], Hye-Eun Kim[a], Jun-Mo Jung[a], Chang-Joon Kim[a,*]

[a] Marine Chemistry and Geochemistry Research Center, Korea Institute of Ocean Science and Technology, Ansan 15627, Republic of Korea
[b] Agency for Defense Development, Daejeon 34188, Republic of Korea
[c] East Sea Research Institute, Korea Institute of Ocean Science and Technology, Uljin 36315, Republic of Korea

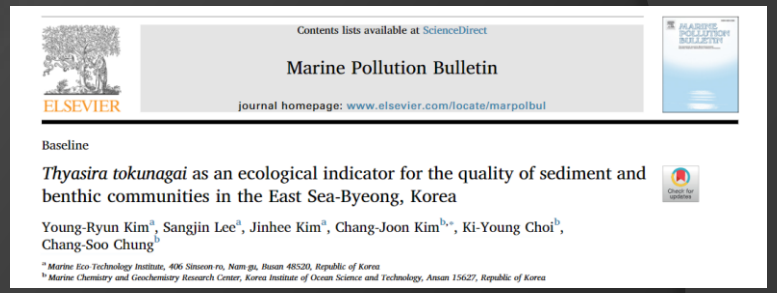


Environ Sci Pollut Res (2014) 21:7480–7488
DOI 10.1007/s11356-014-2664-7

RESEARCH ARTICLE

Congener-specific accumulation and environmental risk assessment of polybrominated diphenyl ethers in diverse Korean sewage sludge types

Hyo Jin Lee · Chang Joon Kim · Gi Hoon Hong · Sang Hee Hong · Won Joon Shim · Gi Beum Kim



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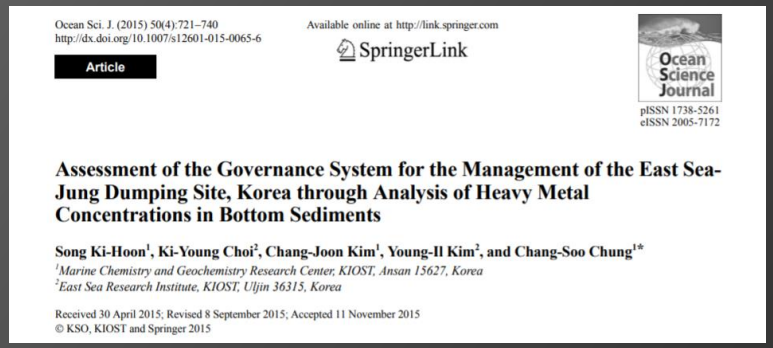
Baseline

Thyasira tokunagai as an ecological indicator for the quality of sediment and benthic communities in the East Sea-Byeong, Korea

Young-Ryun Kim[a], Sangjin Lee[a], Jinhee Kim[a], Chang-Joon Kim[b,*], Ki-Young Choi[b], Chang-Soo Chung[b]

[a] Marine Eco-Technology Institute, 406 Sinseon-ro, Nam-gu, Busan 48520, Republic of Korea
[b] Marine Chemistry and Geochemistry Research Center, Korea Institute of Ocean Science and Technology, Ansan 15627, Republic of Korea



Ocean Sci. J. (2015) 50(4):721–740
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Article

Assessment of the Governance System for the Management of the East Sea-Jung Dumping Site, Korea through Analysis of Heavy Metal Concentrations in Bottom Sediments

Song Ki-Hoon[1], Ki-Young Choi[2], Chang-Joon Kim[1], Young-Il Kim[2], and Chang-Soo Chung[1*]

[1]Marine Chemistry and Geochemistry Research Center, KIOST, Ansan 15627, Korea
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