

M/V *Med Taipei* Settlement Outcome: Lost Shipping Container Research

M/V *Med Taipei* Accident

During a transit from San Francisco Bay to the Port of Los Angeles on February 26, 2004, the M/V *Med Taipei* encountered a storm and lost 15 forty feet shipping containers in MBNMS, and another nine south of the Sanctuary. One of these containers was discovered by the Monterey Bay Aquarium Research Institute (MBARI) on June 9, 2004 on Smooth Ridge at a depth of 1,281 meters, 17.5 nm NW of Point Pinos.

Phenomenon of Container Loss

This was not an isolated incident. Containerized maritime trade grew eight-fold from 1985 to 2007, and worldwide there are now approximately 5 to 6 million containers in transit at any given moment. An estimated 10,000 shipping containers are lost at sea every year, often due to the nexus of rough seas and inadequate or faulty securing mechanisms (e.g., Fig. 1). Many containers are not weighed prior to loading, resulting in extreme forces being placed on container stacks when bad weather strikes. Depending on the cargo, containers may float at the surface for several days or weeks prior to sinking. Unfortunately, it is not mandatory to report container losses to all relevant management agencies.

2011 Research Cruise

One of the diverse mitigation projects identified during the settlement negotiation process with the shipping companies called for monitoring of the impacts, natural habitat recovery rate, and decomposition rate/characteristics of container TGHU7712262. On March 8-10, 2011, a science team led by Andrew DeVogelaere (MBNMS) and James Barry (MBARI) conducted a research expedition aboard MBARI's R/V *Western Flyer*. The ROV *Doc Ricketts* was deployed to address the following goals:

- Assess the container's current condition by gathering high-resolution imagery.
- Describe sea life on the container and at different distances from it.
- Bring public attention to this deep-sea phenomenon that has been increasing with economic globalization.



Figure 1. Container shipping accidents are estimated to result in 10,000 containers lost at sea annually. Photo credit: <http://www.cargolaw.com/gallery.html>. Used with permission.

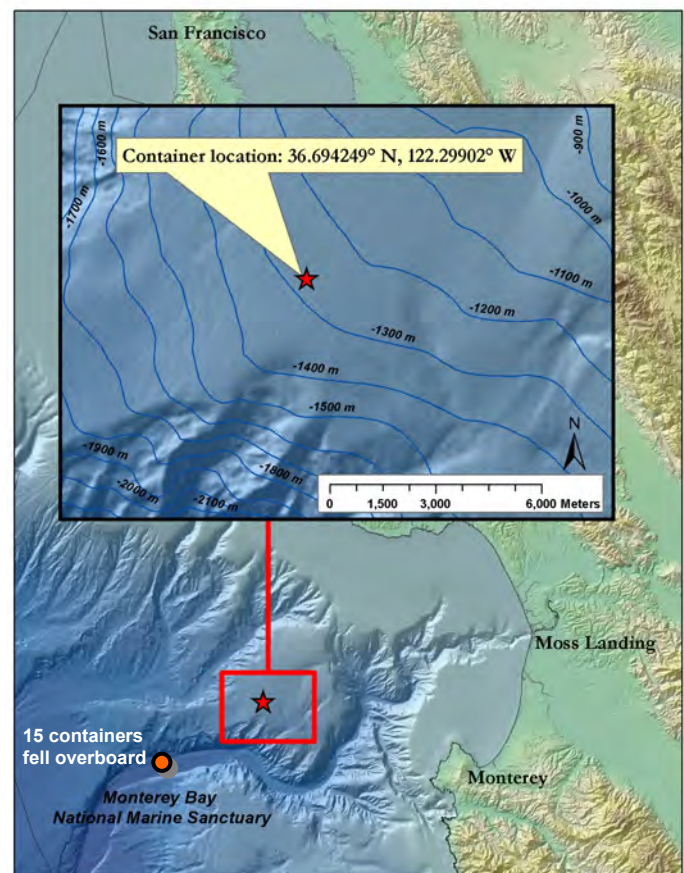


Figure 2. The reported position of the container ship M/V *Med Taipei* when it lost 15 containers overboard on February 26, 2004 (orange circle). One of these containers landed on the seafloor, just outside of Monterey Bay (red star). Map credit: Chad King, MNBMS.

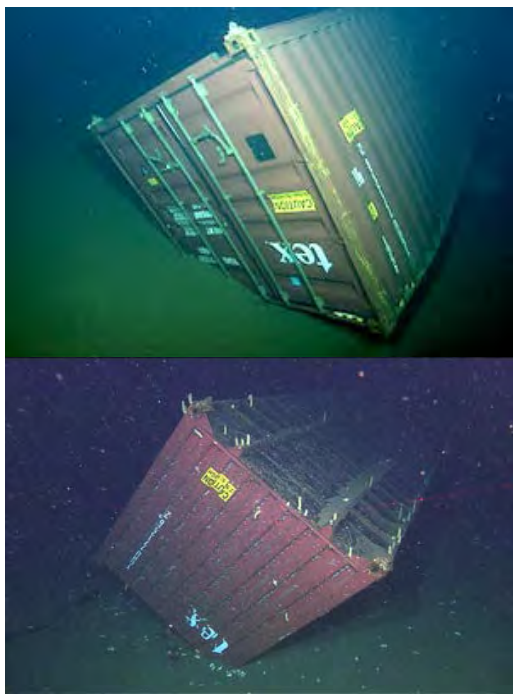


Figure 3. Container TGHU7712262 in 2004 (top) and 2011 (below). Although colonized by various deep-sea species such as *Neptunea* snails, the container appeared to be in near perfect structural condition. Photo credit: MBARI/MBNMS.

Key Findings

Visual surveys and biological community assessments conducted by ROV *Doc Ricketts* indicated that the fallen container has likely contributed to ecological impacts at three different scales:

- Upon impact with the seafloor, there was clearly an immediate crushing of any organisms present on the seafloor.
- Taxa on and immediately adjacent to the container were different from those that are further away, suggesting that the introduction of hard substratum caused local changes in ecology (Table 1).
- This and other lost containers comprise an expanding benthic footprint, which may be serving as hard substratum “stepping stones in the deep”, enabling the migration of invasive species between world ports.

In addition, the container showed little sign of wear or decay after seven years in 1,281 m of water (Fig. 3). Released container contents – many of which are toxic – can cause contamination, but in this case the cargo of 1,159 steel-belted tires had not escaped. The thousands of containers already on the seafloor will likely be there for many hundreds of years and will be joined by thousands more each year, leading to high cumulative impacts.

Other Findings

- The muddy sand seafloor at 1,281 m was a beautiful smooth seascape, with delicate tube worms every few inches, abundant lacey-white sea cucumbers, and red sea pens.
- We discovered an association between sea pigs (*Scotoplanes*) and juvenile Lithodid crabs (Fig. 4).
- Humans are impacting this deep-sea environment before we even understand what species live there and how the ecosystem functions.



Figure 4. A previously unknown association between juvenile crabs and sea pigs. Photo credit: MBARI/MBNMS.

| Taxa On Container | Taxa on Surrounding Seafloor |
|--------------------------------------|--|
| Aeolidiidae (nudibranch) | <i>Allocentrotus fragilis</i> (fragile urchin) |
| Brisingiida (Asteroidea) | <i>Anthoptilum grandiflorum</i> (sea pen) |
| <i>Calliostoma</i> (white top snail) | <i>Asteronyx</i> sp. (brittle stars on whips) |
| <i>Clavularia</i> sp. (octocoral) | <i>Bathysiphon</i> (benthic foram) |
| Eggcases (<i>Neptunea amianta</i>) | Lithodidae (crabs) |
| Eggcases (unknown) | <i>Lycenchelys</i> sp. (snake head eelpout) |
| Hormathiidae (fly trap anemones) | <i>Neptunea amianta</i> |
| <i>Neptunea amianta</i> | Ophiuroidea |
| Rare deep sea scallop | <i>Pennatula phosphorea californica</i> |
| Sabellid polychaetes | <i>Scotoplanes globosa</i> (sea pigs) |
| Serpulid polychaetes | <i>Tritonia diomedea</i> (large nudibranch) |

Table 1. Taxa observed on container differed substantially from species identified on surrounding seafloor.

Media Coverage

The container cruise generated widespread interest from international, national, and local media. For full citations, please contact Andrew DeVogelaere at andrew.devogelaere@noaa.gov.

PRESS RELEASE

MBNMS/MBARI Joint News Release, March 7, 2011

HIGHLIGHTS

Discovery Channel Canada, “Daily Planet,” May 30, 2011

<http://watch.discoverychannel.ca/daily-planet/may-2011/daily-planet---may-30-2011/#clip477268>

Radio New Zealand, “This Way Up with Simon Morton,” Richard Scott interviewer/producer, April 23, 2011 [12:01 min. download]

<http://www.radionz.co.nz/national/programmes/thiswayup/audio/2487831/lost-shipping-containers>

BBC News, “Ship container 'stepping stone' risk for alien invaders,” Jason Palmer, March 15, 2011

<http://www.bbc.co.uk/news/science-environment-12718251>

National Public Radio, “All Things Considered,” Christopher Joyce, April 1, 2011, [3:08 min. download]

<http://www.npr.org/2011/04/01/135040267/lost-then-found-shipping-containers-on-seafloor>

New Hampshire Public Radio, “Word of Mouth,” Virginia Prescott, March 15, 2011, [33:29 min. download]

<http://www.nhpr.org/word-mouth-march-15th-2011>

ASK Magazine for Kids, MBNMS lost container story to be published in October 2011 issue, 40,000 copies to be printed.

NEWSPAPERS

San Francisco Chronicle, “In Monterey Bay sanctuary, a look at sunken cargo,” March 7, 2011

Santa Cruz Sentinel, “Bay Area team uses robot to search for shipping containers littering ocean floor” March 7, 2011 [also carried in *San Jose Mercury News*, *Contra Costa Times*, and other regional papers]

Santa Cruz Sentinel, “Bay Area research team launches submersible robot: Scientists investigate ecological consequences of shipping containers lost at sea,” March 8, 2011

Monterey Herald, “Voyage to sunken shipping container,” March 8, 2011

The San Diego Union-Tribune, “Garbage in the ocean sparks research, local discussion,” March 8, 2011

New Times (San Luis Obispo), “Into the drink: Local oceanographic research adds an ecological angle to an international maritime discussion,” June 8, 2011

TELEVISION

KSBW-8 Morning and Evening News (NBC, Monterey County), March 7, 2011

Univision 57 TV News (Spanish Language Channel), March 8, 2011

KTVU-TV 2 (San Francisco) [Also carried on KRXI-Reno], March 9, 2011

KSBW-8 Evening News (NBC, Monterey County), March 11, 2011

INTERNET

New Scientist (blog), March 8, 2011

First Science, March 9, 2011

Physorg.com, March 9, 2011

BoingBoing (blog), March 9, 2011

AZrobotics, March 18, 2011

National Public Radio, April 1, 2011

Earth Justice (blog), April 4, 2011

Singularity Hub, April 5, 2011

Slashdot (blog), April 6, 2011

The Mid-County Post, April 7, 2011

SupplyChainDigest, April 20, 2011

Failure Magazine, June 12, 2011



Figure 5. The MBNMS/MBARI lost container research cruise generated widespread interest from national and international media outlets.

VIDEO

YouTube (ksbwtv), MBARI Explore Sunken Containers In Monterey Bay

YouTube (simon299), Shipping container lock (0:29)

YouTube (simon299), Push core of sediment in Monterey Bay (0:20)

YouTube (simon299), Suction sampling off the container (0:18)

YouTube (simon299), ROV launch (2:45)

RADIO & PODCASTS

KSCO Radio AM 1080, March 11, 2011

NEWSLETTERS

California Ocean Communicators Alliance, April 13, 2011

OTHER PRINT MEDIA

MBNMS Fact Sheet, March 2011

Shipping Industry Taking Notice

The media coverage listed above has been picked up by the international shipping industry. Since the March 2011 cruise, reprints and adaptations of the MBNMS lost container story have appeared in the publications of Devine Intermodal, Dedola Global Logistics, and the International Longshore and Warehouse Union, as well as on blogs such as Shipping Reporter, Trade Currents, and the Maritime Accident Casebook.

Opportunities for More ONMS Involvement

Because of the public's fascination with deep-sea exploration and the container's connections to the global economy and our own consumption, this story has captured the interest of people around the country and around the world. To maximize public attention on the Sanctuary program, ONMS could contribute in several ways:

- Using program expertise on the rates of disintegration of maritime heritage resources to estimate shipping container decay rates.
- Identifying whom in NOAA works with the International Maritime Organization (IMO) on regulations affecting the container shipping industry.
- Participating in international fora on the topic.

An Expanding Issue with Broad Implications

Time demands placed on the shipping industry mean that safety protocols and securing methods have not kept pace with increasing container ship capacities. The navigational hazards and marine debris/contamination associated with container loss are already the subject of discussion in the European Union. Through research on a single container lost and found in the MBNMS, we have altered the global discussion on container loss by inserting previously unaddressed themes. Scientists, governments, and the shipping industry are now aware that in addition to container loss being a problem of trash on beaches and threats to human life, it is an issue of impacts to deep-sea ecology and potentially creating a corridor of habitat for invasive species in the depths below shipping highways. We have seen that the shipping industry is listening and beginning to engage in the discussion. We are hopeful that this research can be used to leverage support for reforms to container securing regulations, to continue to educate the public about the beauty of the deep sea, and to increase awareness of the impacts of our own consumption.



Figure 6. Numerous deep-sea species had colonized the container. Photo credit: MBARI/MBNMS.



Figure 7. ROV Doc Ricketts being launched for the journey to the container site. Photo credit: MBARI.

