

An underwater photograph showing a diver in the upper right corner, surrounded by a massive, dense pile of discarded tires that fills most of the lower and middle portions of the frame. The water is a deep blue, and the scene is dimly lit, emphasizing the scale of the marine litter problem.

# STOPPING MARINE LITTER TOGETHER!

Each and every one of us  
can **contribute**  
in keeping our coasts and seas litter free!

MARLISCO



Stopping Marine Litter Together

MARine Litter in Europe Seas:  
Social Awareness and CO-Responsibility

# MARINE LITTER: A PROBLEM OF GLOBAL CONCERN

This brochure is Deliverable D6.4 of the «MARine Litter in European Seas: Social Awareness and CO-Responsibility (MARLISCO)» project funded by the European Commission. It has been prepared by MIO-ECSDE. The views and opinions expressed in this material are the sole responsibility of the author and do not necessarily reflect the views of the EC.

#### Credits

Compiled by: Thomais Vlachogianni, Anastasia Roniotes, Joana Veiga  
Contributions by: Luigi Alcaro  
Edited by: Anastasia Roniotes  
Layout by: Pavlina Alexandropoulou

#### Acknowledgements

MARLISCO is a collective effort of a considerable number of dedicated people, across several countries in Europe. Special thanks to all MARLISCO partners that contributed to the development of a series of outputs upon which this brochure is based.

#### Suggested Citation

Vlachogianni, T., Roniotes, A., Veiga, J., MIO-ECSDE, 2015. Marine litter brochure sectors-specific 'Stopping marine litter together!'. Deliverable D6.4. MARLISCO project Marine Litter in European Seas: Social Awareness and Co-Responsibility. (EC FP7 Coordinated and Support Action, SIS-MML-289042).

#### Other MARLISCO resources

Alampe I, Malotidi V, Vlachogianni T, Scoullou M. Know, Feel, Act! to Stop Marine Litter: Lesson plans and activities for middle school learners. MIO-ECSDE, 2014.

Hartley BL, Holland M, Pahl S, Thompson RC. How to Communicate with Stakeholders about Marine Litter – A Short Guide to Influencing Behavioural Change. Plymouth, UK, 2015

Kershaw et al, 2013. Review of the current state of understanding of the distribution, quantities and types of marine litter. Deliverable D1.1 report. MARLISCO project. (EC FP7 Coordinated and support action, SIS-MML-289042), 2013.

Kershaw PJ, Alcaro L, Garnacho E, Doyle T, Maes T, Painting S. Review of existing policies that may be applied to mitigate the impact of marine litter. Deliverable report D1.3. MARLISCO project. MARine Litter in Europe Seas: Social Awareness and CO-Responsibility. (EC FP7 Coordinated and support action, SIS-MML-289042), 2013.

Maes T, Garnacho E. Summary of current methods of monitoring and assessment for marine litter. Deliverable D1.2 report. MARLISCO project. MARine Litter in Europe Seas: Social Awareness and CO-Responsibility. (EC FP7 Coordinated and support action, SIS-MML-289042), 2013.

Orthodoxou DL, Loizidou XI, Loizides MI. The MARLISCO Guide for Reducing Marine Litter: Get Inspired and Become Innovative Through Best Practices, ISOTECH LTD, 2014.

Vlachogianni T, et al. Understanding the science-society nexus through the marine litter challenge: Lessons learned & recommendations from the MARLISCO project. MIO-ECSDE. Deliverable D6.6. MARLISCO project. MARine Litter in Europe Seas: Social Awareness and CO-Responsibility. (EC FP7 Coordinated and support action, SIS-MML-289042), 2015.

**Marine Litter has a truly global distribution,  
it is a problem with no borders...**

## WHAT IS MARINE LITTER?

Marine litter can be defined as any persistent manufactured or processed solid material that is discarded, disposed of or abandoned in the marine and coastal environment. It is generated due to intentional or accidental discharges, and can also enter the sea when blown by winds or washed out via rivers and storm drains. It may be visible (macro-litter), hardly visible or even invisible to the naked eye (micro-litter)...

## WHY IS MARINE LITTER A PROBLEM?

- **It is a threat to wildlife and ecosystems**  
Litter items kill or cause suffering to marine mammals, reptiles, fish and seabirds that are trapped by them or mistake them for food.
- **It is a threat to human health and livelihood**  
Litter in the sea and on beaches can cause serious injuries and damage.
- **It can cause bio-accumulation of pollutants and toxics**  
Any toxics leaching from litter items may build up in an organism, or pass from one organism to another through the food chain.
- **It travels long distances**  
Travelling with sea currents, waves, winds and runoff, it can be found in places very far from its source. Often species from distant locations "hitchhike" on litter items and may disrupt the balance of native species.
- **It is long lived**  
A single plastic bottle poses threats to sea life and people for hundreds of years - the time it takes to fully degrade in the sea.
- **It is difficult to track**  
It is almost impossible to follow the route and fate of a litter item: where it came from, what happened along the way and why it ended up where it did.
- **It is out of sight, out of reach**  
Micro-litter is invisible due to its small size. Heavy macro-litter items at the bottom of the sea are out of sight. Both are almost impossible to remove.

## WHERE IS MARINE LITTER?

Marine litter is found in all seas and coasts around the world... lying on shores... floating anywhere from the surface to the bottom of the sea... even in the most pristine environments far away from any human settlements, such as the Arctic, Antarctic and in the middle of the ocean.



## WHERE DOES MARINE LITTER COME FROM?

Any waste material that is improperly disposed of, as well as any materials that are improperly transported or stored, have the potential to become marine litter.

Marine litter comes **mainly** from **land** based practices, such as:

- inappropriate waste disposal at home.
- inadequate waste management at all stages: collection, transportation, treatment and final disposal.
- discharge of untreated municipal sewage, either due to the lack of treatment plants or due to heavy storms.
- irresponsibly discharged industrial waste which may contain scrap from the production process, packaging or raw material, plastic resin pellets, as well as untreated wastewater.
- tourism and recreational activities that fill beaches with cigarette butts, plastic bags, food packaging, beverage cans, cartons and toys ... Many beach goers leave behind much more than their footprints in the sand...

Litter from land sources finds its way to the sea via rivers, drains, sewage outlets, storm water outflows or when blown by winds, or even swept with the tide.

But **sea based** activities can also be important sources, such as:

- commercial fishing that disposes of fishing related waste (fishing gear, nets, etc.), etc.
- merchant and leisure shipping (large cargo ships, cruise liners, ferries, etc.) that disposes of sewage, lost cargo, etc.
- recreational shipping (small boats used for fishing, yachting and water sports) that disposes of litter items such as bottles & tins, sewage, fishing and sports gear, etc.
- offshore oil and gas platforms that dispose of drilling equipment, pipes, storage drums, packaging items, etc.
- aquaculture fisheries that dispose of net cages, construction materials, feed sacks, etc.

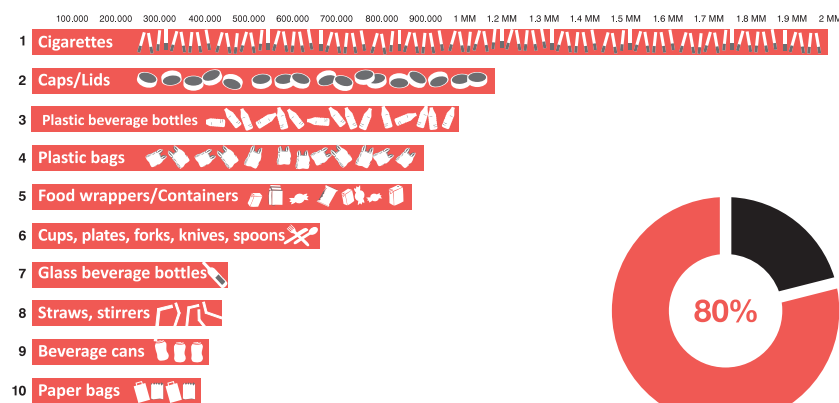
**Moreover, litter produced on board often ends up in the sea. Inadequate management facilities on ships, in ports and marinas make the problem worse.**

The root causes of marine litter have to do with the prevailing production and consumption patterns (the more we consume the more waste we produce), a failure to enforce legislation and our indifferent attitudes!

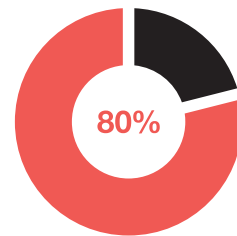
## MARINE LITTER IN NUMBERS

## THE ISSUE OF PLASTICS & MICROPLASTICS

Which are the top 10 items found on beaches?



Source: Ocean Conservancy, International Coastal Clean up 2012



Worldwide, 80% of the total number of waste items is made up of this top 10 list.

What is the estimated average **lifetime** of a litter item, once it has entered the sea?

Item	Approximate time to degrade
Newspaper	6 weeks
Apple core	2 months
Cotton gloves	1-5 months
Wool gloves	1 year
Plywood	1-3 years
Painted wood	13 years
Tin can	50 years
Disposable diapers	50-100 years
Plastic bottle	100s of years
Aluminium can	80-200 years
Glass bottle and jars	undetermined

Source: Mote Marine Laboratory, 1993

These are only estimates. The lifetime of a litter item, especially if made of plastic, depends on where it ends up... a sunny Mediterranean shore? Or at the bottom of the dark, cold North Sea?


Plastics consistently make up 60 to 80% of all marine litter items found in the European Seas.

For most plastic products, their mechanical integrity and durability is their most important property. However, this property turns to a disadvantage once plastics become waste, as they take very long to decompose. It is estimated that it takes hundreds of years for plastics to fully degrade in the sea. They very gradually lose their physical properties, elasticity, colour and shape and become brittle and start to break down. This process is faster when plastic is exposed to UV radiation (sunshine), high temperatures and physical abrasion, such as on a beach, but much slower if it ends up in the seabed.

Plastic items gradually fragment into ever-smaller pieces called **microplastics** (with a diameter smaller than 5mm). Microplastics enter the sea also via:

- losses of small resin pellets that are the industrial raw material of plastic products;
- clothes washing processes that release synthetic microfibers;
- cleaning and personal care products (e.g. abrasives) that contain microbeads.

This floating “plastic dust” is ingested by a wide range of organisms. Invisible to the naked eye, microplastics mingle with plankton and simply cannot be scooped out of the oceans...



## HOW DOES MARINE LITTER AFFECT WILDLIFE & ECOSYSTEMS?

### Entanglement /entrapment

Animals are attracted to litter items due to their natural curiosity or when in search of food or shelter. Entanglement /entrapment may not necessarily cause death but torturous pain is very likely... when the animal does not grow normally, or while the litter item becomes embedded in the animal's flesh as it grows around it.

### “Ghost fishing”

So-called “ghost nets” are accidentally lost or deliberately discarded fishing nets that continue to catch fish as they keep on drifting in the sea or along the bottom, often for very long periods. Their “catch” attracts other fish, mammals and sea birds searching for food, which are often caught or entangled in them, causing a vicious lethal circle.

### Ingestion

Fish, birds and mammals may swallow a litter item accidentally or because it resembles their prey. For example, turtles eat plastic bags mistaking them for jellyfish; birds feed on or feed their young with floating plastic items, mistaking them for fish, crabs or eggs. Ingestion can lead to starvation or malnutrition if the ingested items fill up their stomach. Sharp objects, e.g. metal and broken glass, can wound the digestive tract and cause infection and pain. Ingested items may also block the animal's air passage, and eventually cause its death by suffocation.

### Bio-accumulation

Birds of prey and other carnivorous animals have been found with large concentrations of e.g. plastics in their stomachs after preying on smaller birds that previously ingested fish with these plastics in them... Marine organisms are also exposed to toxics released from litter items, either directly by ingestion of plastics or indirectly by ingestion of marine organisms that have eaten plastic. These toxics can bio-accumulate in these animals or their concentrations can be amplified through the food-web (bio-magnification) in other organisms at a higher trophic level, posing health risks. For humans who are at the top of the food chain, the consequences are yet unknown.

### Alien species invasion

Some species hitch a ride on litter items and invade seas they would normally never reach. When these establish themselves in a new environment they interact with native species and may pose threats to the biota and ecosystems. Alien species invasion is one of the most important threats to global biodiversity.

### Damage of benthic habitats

Litter in the sea can damage benthic habitats in many ways, through e.g. abrasion of coral reefs from fishing gear; disruption of colonies; disrupted oxygenation of the sediment or ‘smothering’ of benthic communities; etc

### Damage of coastal habitats

Heavy machinery occasionally used to remove litter items from beaches damage the shore habitats.



## HOW DOES MARINE LITTER AFFECT PEOPLE, THEIR PROPERTY & LIVELIHOOD?

- Rusty metal and broken glass on the beach or the seabed may **injure** people...
- Medical waste (syringes, bandages, etc.) and sewage pose a **public health hazard** through transmission of infectious diseases...
- Scuba divers may be seriously injured or even drowned due to **entanglement**...
- Seafood that is contaminated with **toxics** meant for human consumption may pose another health risk...
- Littered coasts are certainly not appealing to the **eye**...
- Littered beaches do not attract tourists ... and fewer **tourists** means less income for the coastal communities.
- Beach **clean ups** are rather **costly**, especially in remote areas that are difficult to access or lack infrastructure (waste bins, etc.).
- Drifting fishing nets and ropes wrap around propellers, anchors, etc. causing costly or irreparable **damage to boats** and yachts.
- Floating litter poses a significant **navigational hazard** to marine vessels.
- **Fishermen** especially, have to deal with the cost of repairing or replacing damaged or lost fishing gear, nets, etc. On top of that, “ghost nets” that continue to trap fish, leave fishermen with smaller catches...

Any harm to ecosystem functions and the services they provide, due to marine litter, ultimately affects people's livelihoods.

## HOW CAN WE ADDRESS THE CHALLENGING ISSUE OF MARINE LITTER?

### Waste reduction

Good waste management must begin with the prevention of its generation in the first place. Pollution should be prevented at source. Waste that is never produced does not have to be disposed of and cannot become marine litter.

### Improved waste management

Waste should be collected and handled properly, either for reuse and recycling or for environmentally safe disposal. The economic value of waste needs to be underlined in order to move towards a 'zero-waste economy'.

### Waste composition

Not only waste quantity but also waste quality is an issue. Waste should not lead to more hazardous compounds when it breaks up to smaller pieces and decomposes.

### The manufacturer's role

Extended producer responsibility makes a product's manufacturer responsible for the entire life-cycle of the product and especially for its take-back, recycling and final disposal.

### “Design for life cycle”

This approach challenges the product designers to consider the entire life of the product, including its recycling and disposal options.

### Working at all levels

Prevention or remedy actions e.g. clean-ups have to be taken in many locations, through numerous activities and by many committed people. This requires streaming of efforts at local, national and international level.

### Education, information and training

These are vital in any effort towards a more waste-wise society. A tailor-made approach should be used in the different sectors (e.g. tourism, maritime sector, land based industry, etc.) and the general public, to raise the awareness of everyone on the sources and effects of marine litter and the ways of reducing it at source.

# RESPONSIBLE CITIZENSHIP

As an individual, what can I do?

WE CAN ALL  
BE PART OF  
THE SOLUTION  
AS CITIZENS AND  
AS PROFESSIONALS

- I minimise consumption in order to minimise my waste.
- I reuse products whenever possible.
- I recycle as much as possible. Bottles, cans, cell phones, ink cartridges, and many other items can be recycled!
- I am responsible for what I dispose and how.
- I remember, no matter where I am, that land and sea are connected.
- I don't throw litter anywhere except in the proper bins. I never throw trash in the street, on the banks of rivers or directly in the sea.
- I avoid "single use" disposable cups, plates and utensils.
- I avoid using plastic bags; I prefer reusable bags instead.
- Before going to the beach I think of the packaging I carry and how to minimise my waste.
- I refuse to buy items with excess packaging.
- I prefer a single product in a large size than many smaller units of the same product.
- When outdoors I carry and store my lunch in non-disposable containers.
- I prefer items made from recycled material.
- I prefer clothes and fabrics made by natural fibers because synthetic ones degrade into microplastics.
- When outside, if there are no bins around I take my trash with me.
- I never release balloons as they soon after become litter on land and sea.
- I practice water activities, fishing, yachting and sports responsibly.
- When planning to take a cruise I explore the most eco-friendly options.
- I support environmentally responsible marinas.
- I respect the efforts of street cleaners and public services.
- I serve as an example to others. I encourage my friends and family to help keep our beaches and oceans clean.
- I take part in beach and other clean-ups.
- I unite forces! Effectiveness is multiplied when organized in groups.

I do not forget  
that with  
my personal actions  
and commitment  
I can make  
a difference!!!

# INDUSTRY

As an industry professional, what can I do?

## It depends on the type of industry that you represent, but in general:

- Minimise the packaging of your products and/or the amount of plastic used in your products. This will bring about significant reductions in the amount of packaging and plastic that may be released in the environment throughout the lifecycle of the product and can reduce use of raw materials.
- Adhere to (or even initiate) industry-led instruments and initiatives to reduce the amount of litter produced and specifically marine litter, and if possible, link them to a code of practice, pledge or certification scheme, as this will give your industry a market advantage.
- Consider eco-design or 'cradle-to-cradle' design for your products, i.e. consider the whole life cycle of the product at the design phase, minimising the likelihood that it will be improperly discarded or accidentally lost and improving its recyclability.
- Alert consumers and encourage them to properly dispose a product at the end of its life cycle. Also inform them on the considerations your industry has taken in terms of prevention of pollution and improved resources management in the design and production.
- Promote the best health, safety and environmental practices in the manufacturing process.
- Improve the awareness and understanding of the industry sector on the marine litter issue, its implications and the sector's share of responsibility in tackling the problem.
- Adopt and implement Extended Producer Responsibility practices, in which a producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle.
- Share best practices on enhancing opportunities to recover plastic products for recycling and/or energy recovery and ensure that no more plastics are sent to landfills by 2025.
- Contribute to any public, regulatory or scientific debate and provide balanced and objective science-based information to help answer questions about products manufacture or service offered, as relevant.

## If you are a plastics converter or manufacturer:

- Prevent the release of plastic pellets into the environment.
- Along the value chain, all employees must be educated on how to properly handle and dispose of plastic pellets with the goal to reach zero pellet losses at each step of the production and logistic processes.
- Ensure that there are no material losses in your production line and put in place an effective wastewater treatment plant.
- Develop biotechnological solutions that will foster degradation of plastics in compost units or provide additional solutions to divert plastics from landfills and provide additional plastic waste management options.

## If you are a manufacturer of cosmetics, personal hygiene products or abrasives:

- Avoid using plastic micro beads in your products, since they will very soon find their way into the aquatic and marine environment and possibly the food chain.
- Replace plastic micro beads with other non-hazardous natural abrasive material (such as rice, apricot seeds, clay, nut shells, bamboo and many others).
- Inform consumers on the considerations your industry has made in terms of prevention of pollution and improved resources management in the design and production of your products. Consumers are growingly sensitive to these choices and this can grant you a marketing benefit.

## If you are a product designer:

- Consider eco-design or 'cradle-to-cradle' design for your products, i.e. consider the whole life cycle of the product at the design phase, minimising the likelihood that it will be improperly discarded or accidentally lost and improving its recyclability.
- Improve the reparability of products thus extending their lifetime. Opt for durability rather than disposability.



# MARITIME SECTOR

As a maritime sector professional, what can I do?

## In general:

- Minimize taking aboard what may potentially become garbage and avoid on board generation of waste, in particular light materials such as plastic packaging which can be easily blown away
- Handle, process and store garbage safely and bring it to shore for proper disposal.
- Your staff is a crucial element of your initiatives and policies, so make sure they are properly trained, understand the issues at stake and their role in contributing to solutions.
- Improve the awareness and understanding of the maritime sector on the marine litter issue, its implications and the sector's share of responsibility in tackling the problem.
- Serve as an example to others and encourage them to help keep the oceans free of debris.
- Support environmentally responsible ports and marinas.

## If you are a fisherman:

- Bring all of your trash back to shore for proper disposal in trash cans or recycling bins, including all pieces of fishing line and other fishing gear.
- Don't throw litter caught in your nets back overboard! Bring it out to shore, find an appropriate bin and dispose of it. This requires some effort on your part, but it is well worth the trouble, both for the environment and for you (remember that fish can get caught in litter and fish can ingest small pieces of fragmented plastic). 'Fishing for Litter' initiatives may exist in your area, with possible waste-fee waivers or other benefits if you and your crew take part in them.
- Participate in a 'Fishing for Litter' initiative, where you commit yourself to bring to shore any waste that gets caught in your nets during your normal fishing operations.
- Act together with other fishermen facing the same problem. Let your local authority or a local civil society group know about the problems that you are facing and together try to identify what can be done.
- Inform the local authorities if you detect a large marine litter item or marine litter accumulations, which can also pose a threat to navigation. Provide them the coordinates of the location and a description of the item(s).

## If you are a small boat owner:

- Properly store and secure all trash on your boat.
- Make sure that you do not throw any waste created on board into the sea. Take it out to port and dispose of it in the appropriate bins.

## If you own or manage a shipping company:

- Ensure that your ships meet the requirements of European regulations and international conventions (e.g. annex V of MARPOL Convention).
- Provide adequate facilities on board so that the recyclable fraction of waste is sorted and sent for recycling, or deposited in recycling bins, when the ship enters a port.
- Train your staff (from the office workers to the ships' cooks) on the effects of marine litter and on how to appropriately store and dispose of all types of waste.

## If you are a local authority hosting a fishing port or marina:

- Provide rubbish and recycling bins where boats can dispose of their waste.
- Put up information signs urging boat users and owners to bring their litter back to shore, indicating where their waste can be disposed.
- Implement the 'polluter pays principle' to fine any boat that is caught throwing their waste in the sea.
- Organize or promote information campaigns targeted to the maritime sector professionals on management of waste produced on board or collected during fishing activities.
- Participate or support initiatives such as 'Fishing for Litter', in which fishermen voluntarily bring ashore litter that is collected during their normal fishing practices. These actions are strengthened and encouraged if there are suitable disposal facilities for this type of waste and if the waste disposal fees are not charged to the fishermen.
- Adhere to a voluntary scheme and implement stewardship concepts such as the Blue Flag Programme (where a beach or marina is awarded a Blue Flag if it meets certain environmental criteria), eco-labelling, etc.
- Inform your clients or users about your initiatives and encourage them to support your efforts towards a responsible behaviour in pollution prevention and proper waste handling.

# TOURISM

As a tourism sector professional, what can I do?

- Prevent and minimize litter generation in the first place by favouring products with less packaging; inviting suppliers to take back packaging; avoiding the use of single-use products (e.g. plastic bags); instead of bottled water offering filtered tap water; using refillable containers for soap, cleaners, food, etc.
- Inform your clients about your initiatives to prevent pollution and waste and encourage them to support your efforts with attractive boards or signs and linking actions to impacts (e.g. if you are close to the shore).
- Reuse packaging containers for holding and storing materials.
- Place separate waste containers in public areas (but also in kitchens, other food and beverage outlets, housekeeping and administration areas) and invite guests to use the containers as labelled.
- Contact local recycling authorities and dealers for support.
- Ensure that the area around your establishment is regularly cleaned and the generated waste properly disposed of.
- Contribute to awareness raising and training programmes on marine litter and the sustainable management of waste, targeting management and other staff, tourists, suppliers, contractors and tour operators. Your hands-on staff are a crucial element of your initiatives and policies, so make sure they are properly trained, understand the issues at stake and their role in contributing to solutions.
- Participate in, organise or support beach cleanups organised by others (either directly by involving your staff or indirectly by providing financial or other support), perhaps as part of your corporate social responsibility scheme.
- Adhere to a voluntary scheme and implement stewardship concepts such as the Blue Flag Programme (where a beach or marina is awarded a Blue Flag if it meets certain environmental criteria), eco-labelling, etc.
- Implement initiatives that encourage all tourism related stakeholders to assume responsibility for the problem of marine litter and its solutions (i.e. the Responsible Snack Bars Project, where a national government encourages beach snack bar owners and operators, to voluntarily assume responsibility for keeping the beach litter free and promoting appropriate messages to their customers).
- Promote the development of partnerships within the tourism sector towards properly managing waste produced in specific tourist destinations.

If you are a professional at a coastal HORECA:  
(Hotel / Restaurant / Café)

- Avoid single use products such as plastic disposable plates, food containers, cups, stirrers and straws. The use of these items will increase considerably the load of waste generated and these are among the most common items found on beaches. E.g. provide drinking plastic straws only when explicitly requested by the client and not by default when you serve a drink.
- Inform your clients about your initiatives to prevent pollution and waste and encourage them to support your efforts with attractive boards or signs and linking actions to impacts (e.g. if you are close to the shore, display an attractive board with the degradation times of different types of litter).
- Support or take part in a Deposit-Refund Scheme for e.g. drink bottles or even the specific packaging you use for your products, to encourage the delivery and proper disposal of these items. You can establish a protocol with a recycling company, as the material collected is often much more valuable in terms of quality when separated at the source than if collected together with other types of waste or items.
- Provide appropriate ashtrays to your clients or even make them available for beach users.
- Make sure that your waste containers are in good shape, have a lid or other confinement mechanism and are emptied with sufficient frequency, to avoid that they are knocked-down or that litter is blown away.

# MARLISCO



Stopping Marine Litter Together

MARine Litter in Europe Seas:  
Social Awareness and CO-Responsibility  
[www.marlisco.eu](http://www.marlisco.eu)



This brochure has been prepared by MIO-ECSD E.

MARLISCO is a FP7 project funded  
by the European Commission.



PlasticsEurope



honkytonk

