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LitusGo Manual

Module 6

Coastal water quality

Education, Audiovisual & Culture Executive Agency

Education and Culture DG

Lifelong Learning Programme

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Preface to the LitusGo Education Manual

The LitusGo Manual is part of the LitusGo educational package which is included in the LitusGo portal: www.litusgo.eu. LitusGo aims at the training and capacity building of Local Authorities and local stakeholders in Integrated Coastal Zone Management issues and the reaction to the impacts of climate change.

This Manual consists of 20 autonomous, self-contained and inter-related modules. The modules are available in four languages, Greek, English, Maltese and Turkish and in three different forms: the dedicated wiki application in the LitusGo portal, the dvd and the hard copy version. This hard copy version of the LitusGo Manual consists of 20 self-contained booklets, one for each module, kept in a hard collective case.

List of modules of the LitusGo Educational Manual

Module 1:	European legal framework
Module 2:	Stakeholder involvement/Public participation
Module 3:	Sustainable tourism-carrying capacity
Module 4:	Water resources management
Module 5:	Fisheries/fish farming
Module 6:	Coastal water quality
Module 7:	Ecosystems management (land and coastal ecosystems)
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Module 9:	Air pollution
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Module 11:	Landscape and marine-scape management
Module 12:	Coastal erosion control
Module 13:	Community annoyance issues 1: noise pollution
Module 14:	Community annoyance issues 2: light and thermal pollution, odours
Module 15:	Archeological areas/historic sites/cultural heritage
Module 16:	Extreme conditions management: flood risks, coastal flooding and storm surge
Module 17:	Droughts
Module 18:	Desertification
Module 19:	Energy use, consumption and management
Module 20:	Green buildings

Credits

The LitusGo Education Manual has been developed by the LitusGo Educational Manual Working group:
Modules 1, 2, 6, 7, 8, 9, 12, 13, 14, 16, 17, 18, 19 have been prepared by the scientific team of the beneficiary/coordinators ISOTECH Ltd. Major authors: Michael I. Loizides, Chemical/Environmental Engineer and Xenia I. Loizidou, Civil/Coastal Engineer. Constantinos Georgiades (MSc in ICZM) is responsible for the overall editing. The hard copy of the educational Manual is designed by Anastasia Georgiou.

Modules 3, 4, 5, 10, 11, 15, 20 have been prepared by the scientific team of the Sustainable Aegean Programme of ELLINIKI ETAIRIA - Society for the Environment and Cultural Heritage. Major authors: Georgia Kikou, Geographer, MSc Environment (Manager of the Sustainable Aegean Programme), Alexandros Moutaftsis, Economist, MSc Environment, Leonidas Economakis, Political Sciences, MA International Development.

Dr Alan Pickaver on behalf of partner The Coastal & Marine Union (EUCC) was responsible for the quality control of the educational material.

LitusGo partnership:

Coordinator/Beneficiary**:**

ISOTECH Ltd Environmental Research and Consultancy www.isotech.com.cy

Cyprus:

Municipality of Pafos www.pafos.org.cy

AKTI Project and Research Centre, www.akti.org.cy

Greece:

ELLINIKI ETAIRIA - Society for the Environment and Cultural Heritage www.ellet.gr **/ Sustainable Aegean Programme**, www.egaio.gr

ONISIS web development www.onisis.gr

Malta:

Municipality of Kirkop www.kirkop.gov.mt

The Netherlands:

EUCC – The Coastal & Marine Union www.eucc.net

1| Theoretical background

Coastal water quality is one of the most sensitive and vulnerable resources, being negatively impacted by a variety of anthropogenic activities. Deterioration of coastal water quality has been among the earliest global coastal concerns. This concern has trigged the initiation of serious management efforts in many locations that have become early examples of coastal management programs [2].

In the European Union the quality of coastal waters is defined and protected since 1976 by the Bathing Water Directive 76/160/EEC which has set the limits for physical, chemical and microbiological parameters through regular monitoring throughout the bathing season. The 1976 EU Directive subsequently led to the 2006 Bathing Water Directive 2006/7/EC. This new directive moves from simple monitoring of the water quality to water quality management and it incorporates cyanobacteria monitoring and management.

Table 1. Important parameters that need monitoring (according to the 2006 Bathing Water Directive 2006/7/EC) [6]:

For coastal waters and transitional waters

	A	B	C	D	E
	Parameter	Excellent quality	Good quality	Sufficient	Reference methods of analysis
1	Intestinal enterococci (cfu/100 ml)	100 (*)	200 (*)	185 (**)	ISO 7899-1 or ISO 7899-2
2	Escherichia coli (cfu/100 ml)	250 (*)	500 (*)	500 (**)	ISO 9308-3 or ISO 9308-1

(*) Based upon a 95-percentile evaluation. See Annex II.
(**) Based upon a 90-percentile evaluation. See Annex II.

Member States shall ensure that monitoring of the parameters set out in table 1 takes place in accordance with Annex IV of the directive 2006/7/EC. Every year they must determine the duration of the bathing season and draw up a monitoring calendar for those waters. The calendar should provide for at least four samples to be taken per season (except where the season is very short or where there are special geographic constraints). The sampling interval should not be longer than one month. In the event of temporary pollution, a sample should be taken to confirm such an occurrence, but it may be excluded from the samples provided for, in the calendar. In such cases, an additional sample should be taken after the pollution has ended, replacing the excluded sample. There is one competence authority for each country, responsible for coastal water monitoring.

Information relating to the classification and description of the bathing waters and their possible pollution should be made available to the public in an easily accessible manner and near the area concerned, using appropriate means of communication, including the internet. In particular, notices banning or advising against bathing should be rapidly and easily identifiable [10]. Every year the Commission will publish a summary report on the quality of bathing water, based on the reports that the Member States should submit to it before the start of each bathing season.

According to the European Environment Agency the quality of bathing water across Europe declined slightly between 2009 and 2010, but the overall quality was still high. More than nine out of 10 bathing water sites now meet the minimum requirements.
Cyprus was the star performer, with 100% of its bathing water sites meeting strict guide values, followed by Croatia (97.3%), Malta (95.4%), Greece (94.2%) and Ireland (90.1%). The results are from the annual Bathing Water Report from the European Environment Agency (EEA) and the European Commission, which compare water quality in more than 21,000 coastal and inland bathing sites across the EU-27.
The Commission has also adopted new signs and symbols that will be used to inform the public on bathing water classification and on bathing restrictions [11].

Over the last few years Mediterranean coastal areas have become overdeveloped and overpopulated. The Mediterranean Sea has become one of the world's most popular tourist destinations and one of the most 'looking for' places for escapes. One of the impacts of

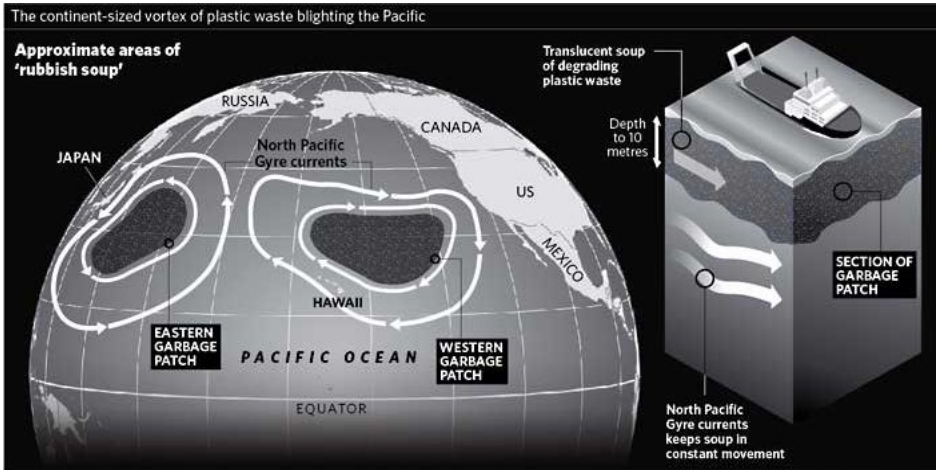
this overdevelopment is the negative effects on coastal water quality. The most important issue is water pollution. Coastal waters belong to one of the most sensitive ecosystems -70% of the European coastal ecosystem is now under the threat of extinction [4].

2| Objective

Although the issue of coastal water quality received wide interest, local authorities and local stakeholders are not yet well informed or trained and thus they are not able to take action and decisions that promote schemes for the protection and management of coastal water quality. The LitusGo project is doing an effort to contribute to this training gap on coastal water quality and provide local authorities and local societies with skills and competences to take local action.

3| Problem

Our oceans have the role of landfills. For example: there are two vortices in subtropical regions of the Pacific Ocean between Hawaii and Japan, which are classified as the large dumps of the Pacific. They are vortices of trash, where approximately 100 million tons of garbage circulate (picture 1).



Picture 1. Vortex of trash near Hawaii and Japan [8].

Coastal water quality is affected both by land and marine sources of pollution. It is estimated that more than 80% of the debris that reaches the sea comes from land based sources. Here are some of the major sources:

Land-based causes/sources:

- Coastal urbanization: 130 million people live permanently along the Mediterranean coastline, a figure that doubles during the summer season because of tourism.
- Coastal intense overdevelopment.
- Intensive tourism development.
- Release of untreated sewage into the sea.
- Industrial waste from coastal outfalls.
- Times of high rain.
- Heat or thermal pollution.

Marine sources:

- Ships: increase in ship traffic.

- Marine debris/litter from tourist boats (which tends to accumulate on coastlines).
- Accidental pollution from oil spills and other sources.
- Discharge of sewage and litter from ships and land coastal areas.

4| How to deal with the problem

Local Authorities and local stakeholders have an important role to play for the improvement of coastal water quality. They need to upgrade their skills and capacity in order to deal with the problem. Some suggestions are:

- Introduce education/ training programs aiming at creating and maintaining awareness among local decision makers and local stakeholders (eg civil society (NGOs) etc

- Awareness raising campaigns: Municipalities may organize targeted seminars for:
  - Farmers, with practical information on the use of pesticides and fertilizers, as a way to prevent marine pollution from the basin.
  - Fishermen, with information on the use of environmentally friendly fishing equipment and increasing overall environmental awareness (e.g. proper disposal of used fishing equipment, use of biodegradable fishing lines).
  - Tourism sector, to provide information on promoting coastal environmental consciousness for tourists.

- Awareness raising events/ activities:
  - Municipalities can organise coastal clean ups with the participation and volunteering of local people.
  - Info days.
  - Awareness rising campaigns at schools.

- Upgrade of existing wastewater treatment facilities. Do not allow any untreated waste water go into coastal waters.

- Marine Patrol and Anti-pollution infrastructure: Local Authorities can have their own marine patrolling boats and cooperate with the central government for optimum results. They can also participate in the purchase, management and operation of an anti-pollution vessel for the reduction of marine litter (photo 1).

Photo 1. Anti-pollution vessel for the reduction of marine litter [7].

- Keep streets, sidewalks, parking lots and storm drains clear of

trash and debris.

- Eg Municipalities can place storm drain covers with reinforced materials that allow a large flow of water to go through and effectively block dirt, debris, sediment and oil [9] (photo 2).

Photo 2. Storm drain covers, (allows 750 lt of water per square foot, per minute through the drain) [9].

References/useful information:

E-sources:

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