



DREDGING AND SEDIMENT MANAGEMENT IN THE PORT OF LISBON

THE ENVIRONMENTAL APPROACH

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Summary

- **The Port of Lisbon**
- **Location of the Port of Lisbon**
- **Sustainable Development Strategy**
- **Dredging Plan 2010-2015**

The Port of Lisbon

- Seaport
- Wealthiest region of Portugal
- Mainly a landlord Port
- Administração do Porto de Lisboa
– APL, S.A.



/// The Port of Lisbon



Natural port at the cross of the main maritime trade lines
TEN-T: core network port (83 out of 319 maritime ports)

The Port of Lisbon

MULTI-FUNCTIONAL PORT
CARGO



The Port of Lisbon

MULTI-FUNCTIONAL PORT
CRUISES AND PASSENGERS



The Port of Lisbon

MULTI-FUNCTIONAL PORT

**RECREATIONAL AND
SPORTS BOATING**



The Port of Lisbon

MULTI-FUNCTIONAL PORT

COMPLEMENTARY ACTIVITIES

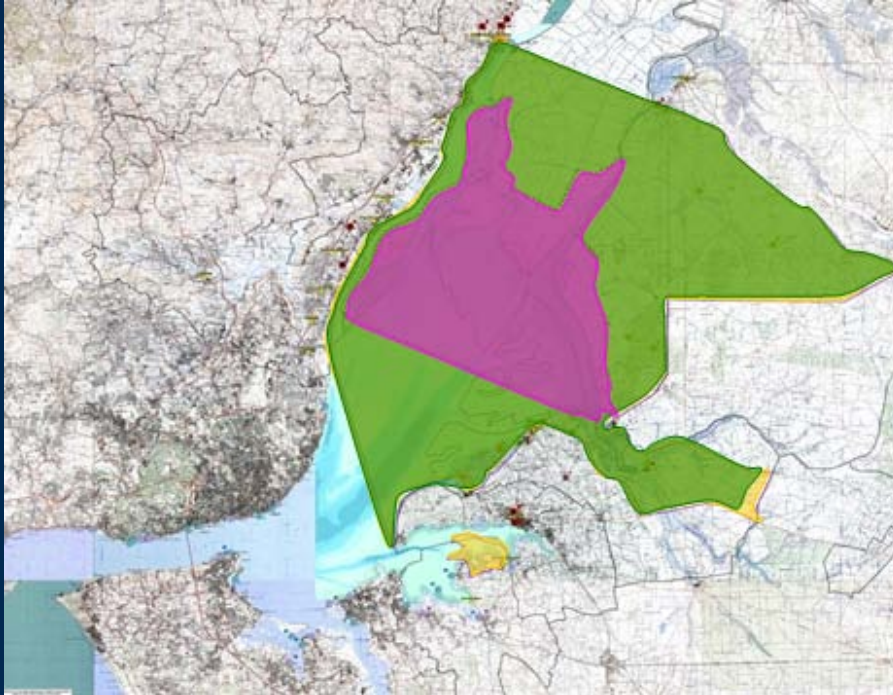


Location of the Port of Lisbon



The Jurisdiction of the Port of Lisbon Authority

Location of the Port of Lisbon



NATIONAL LEVEL

Natural Reserve of Tagus Estuary (RNET)

EUROPEAN LEVEL

Natura 2000 Network

- Special Protection Area (ZPE Tejo)
- Site of Community Importance (SIC)

INTERNATIONAL LEVEL

Wetland of International Importance

Sustainable Development Strategy

VALORIZATION OF THE TAGUS ESTUARY



“It is our aim to improve our knowledge on the estuary system, both on its physical and ecological components in order to adopt the most adequate practices”.

Dredging Plan 2010-2015

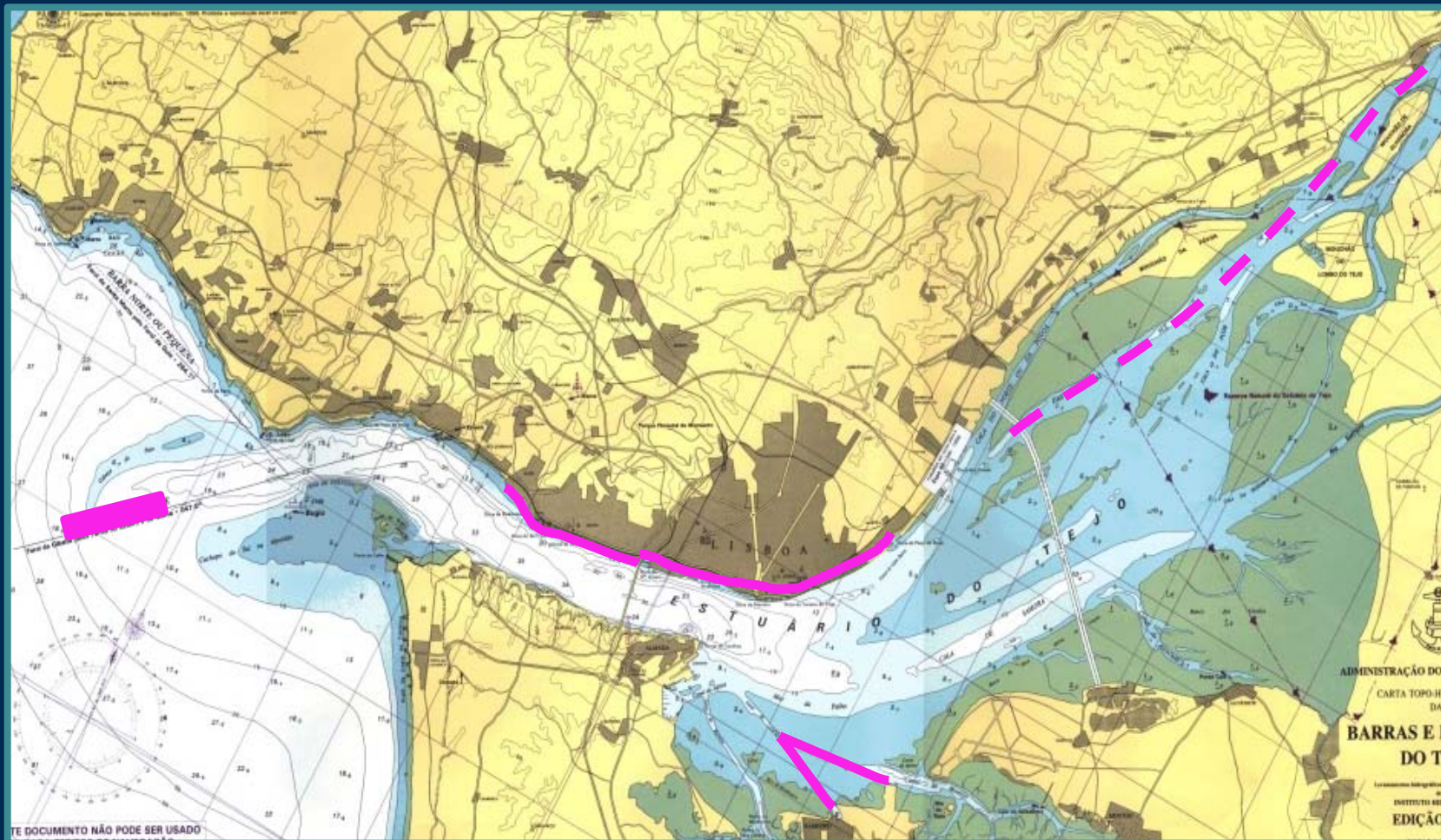
**Water Framework Directive
National Water Legislation and other Environmental Legislation**

ENVIRONMENTAL PERMIT FOR DREDGING AND DISPOSAL WORKS



Dredging Plan 2010-2015

MAINTENANCE DREDGING



Dredging Plan 2010-2015

MAINTENANCE DREDGING

SEDIMENT CHARACTERIZATION PROGRAMME



FREQUENCY OF DREDGING

3 to 4 dredging campaigns a year



FREQUENCY OF CHARACTERIZATION

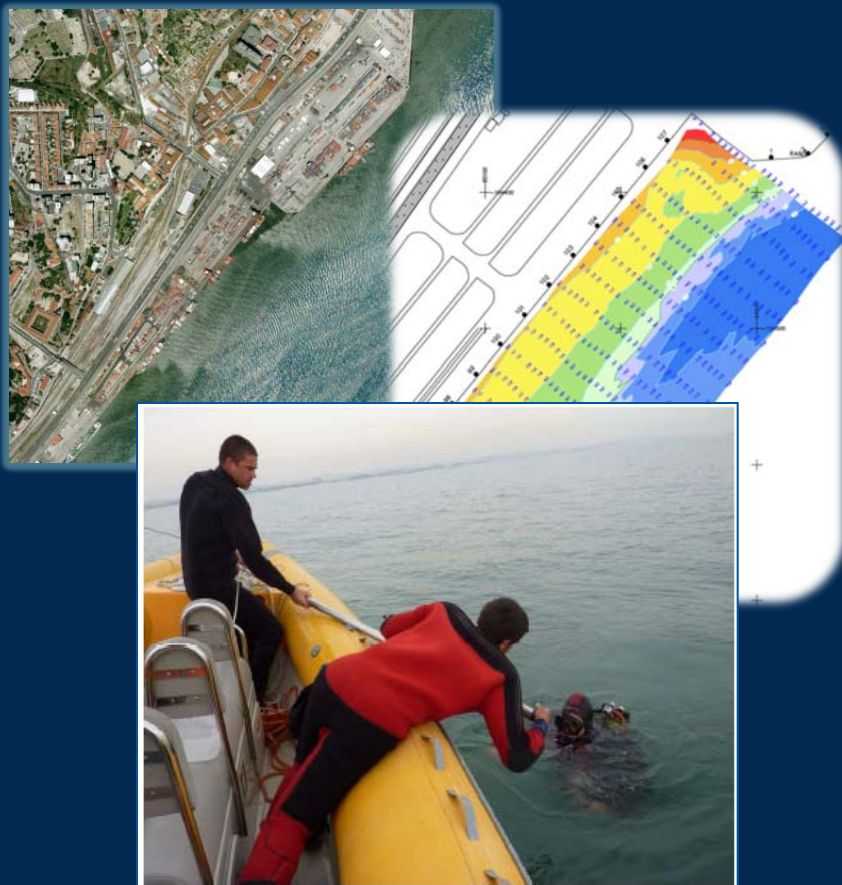
Once every 3 years



Dredging Plan 2010-2015

MAINTENANCE DREDGING

SEDIMENT CHARACTERIZATION PROGRAMME



SEDIMENT SAMPLING

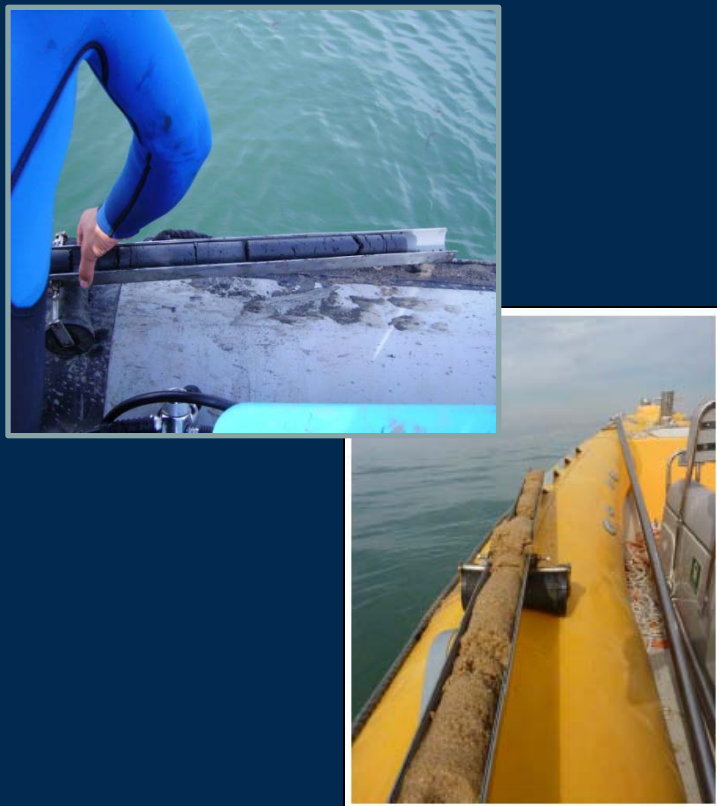
- Sampling Plan
- Number of sampling stations (function of the annual dredging volume)
- Sampling length (function of the maximum dredging reach including dredging tolerance)
- Subsamples of 1 m (in cases where higher levels of contamination are expected)

Dredging Plan 2010-2015

MAINTENANCE DREDGING

SEDIMENT CHARACTERIZATION PROGRAMME

TRANSPORT, PREPARATION AND CONSERVATION OF SAMPLES



- Conservation of the substances and compounds
- Subsamples may be prepared in the field or in the laboratory
- Samples are sent to the laboratory in the day they were collected
- Samples are stored in appropriate recipients after being very well mixed
- Samples are stored and transported at 4° C
- Reserve samples are stored in the freezer

Dredging Plan 2010-2015

MAINTENANCE DREDGING SEDIMENT CHARACTERIZATION PROGRAMME



LABORATORY ESSAYS

- Physical essays (whole sediment)
- Chemical essays (fraction below 2 mm)
- Toxicological and Eco toxicological tests (only for capital dredging)
- Chemical essays are conducted by certified laboratories

3)

www.tabelaperiodicacompleta.com

Fonte: 1) www.splabor.com.br / 2) www.wikipedia.org / 3) www.tabelaperiodicacompleta.com

Dredging Plan 2010-2015

MAINTENANCE DREDGING SEDIMENT CHARACTERIZATION PROGRAMME

LEVELS OF CONTAMINATION

CLASS OF CONTAMINATION		MANAGEMENT
1	CLEAN DREDGED MATERIAL	Immersion in the water and disposal on beaches is allowed with no restriction.
2	DREDGED MATERIAL WITH TRACE CONTAMINATION	Immersion in the water is allowed provided that the sediment characteristics are compatible with those of the site and with its use.
3	DREDGED MATERIAL SLIGHTLY CONTAMINATED	Immersion is allowed provided that the site is adequately studied and monitoring is preformed. Can be used for land filling.
4	CONTAMINATED DREDGED MATERIAL	Immersion is not allowed. Can be used for land filling with some constraints.
5	HIGHLY CONTAMINATED DREDGED MATERIAL	Immersion is not allowed. Can be used for land filling with a lot of constraints. Ideally should not be dredged.

Dredging Plan 2010-2015

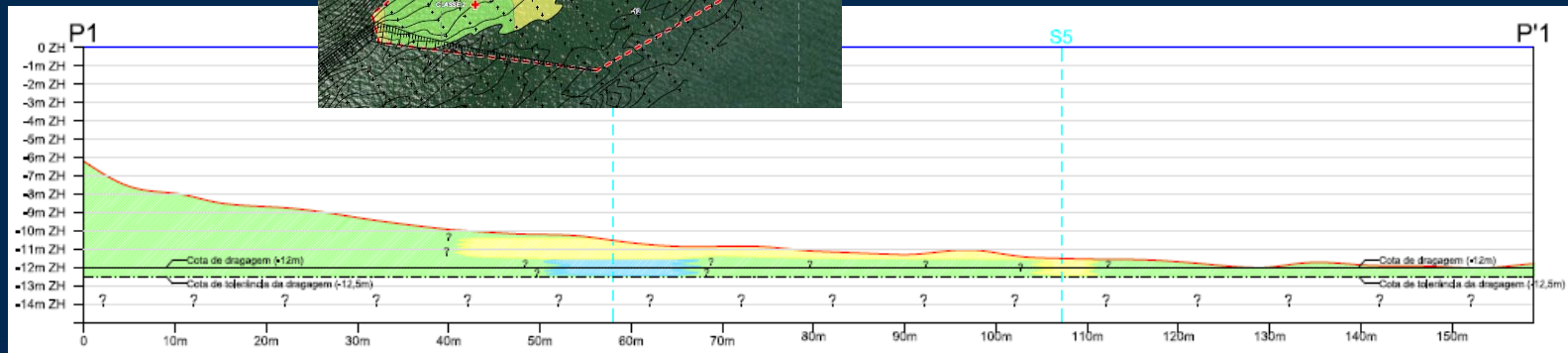
MAINTENANCE DREDGING

SEDIMENT CHARACTERIZATION PROGRAMME



DATA TREATMENT AND MAP OF CONTAMINATION

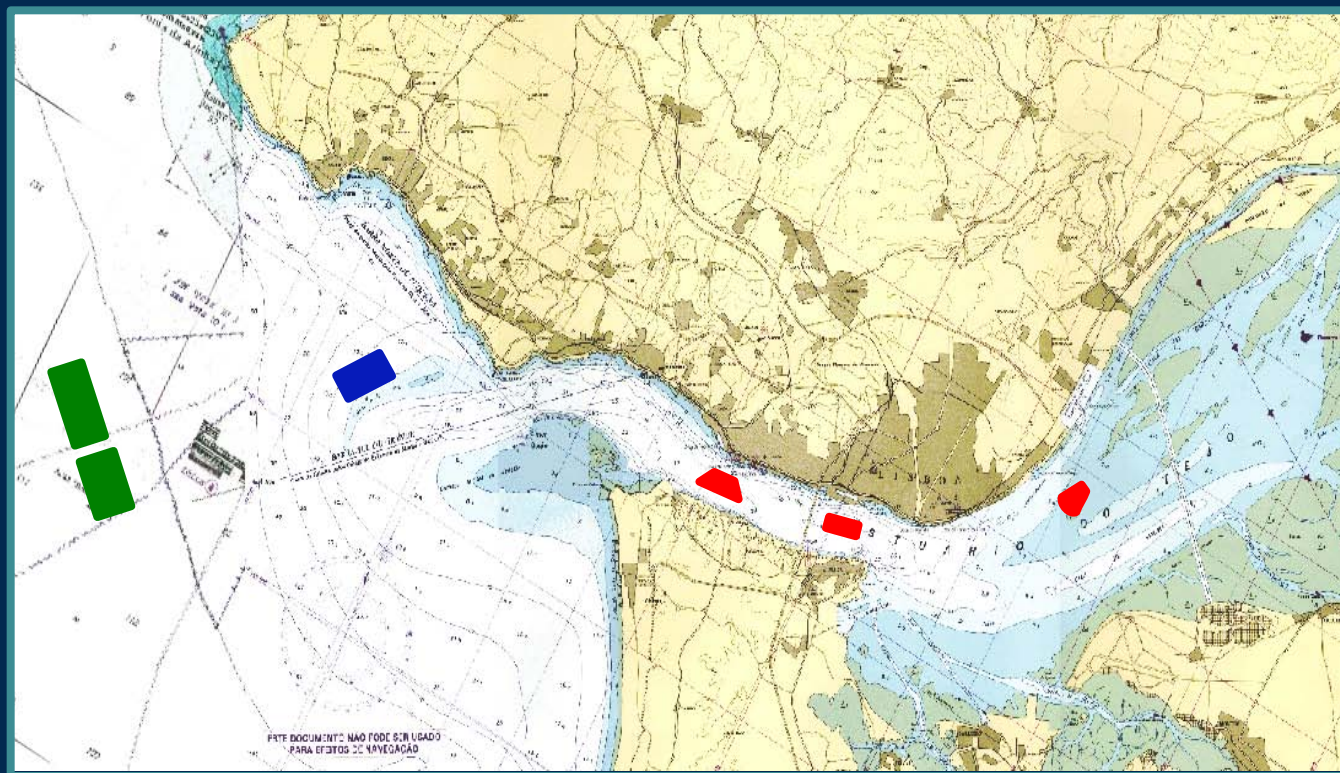
- Results from chemical essays are subject to spatial analysis
- Contamination maps with georeferenced data are drawn in plan and profile
- Volumes of sediments in each class are estimated



Dredging Plan 2010-2015

MAINTENANCE DREDGING

DISPOSAL SITES



 Class 1 and 2
(sandy sediments)

 Class 1 and 2
(silty sediments)

 Class 3

Dredging Plan 2010-2015

MAINTENANCE DREDGING WATER MONITORING PROGRAMME

OBJECTIVE

Determine the extension and the prevalence of plumes generated from dredging and disposal operations

SAMPLING STATIONS

Upstream and downstream and/or inside the dredging areas and the disposal sites inside the estuary

SAMPLES

Samples are collected at the surface, the middle and the bottom of the water column

SAMPLING FREQUENCY

Before, during and after dredging operations

PARAMETERS

Turbidity / Dissolved Oxygen / pH / Total Suspended Solids / BOD5 / COD / Emulsified and Dissolved Hydrocarbons / Mineral Oils



Dredging Plan 2010-2015

OFFSHORE DISPOSAL SITE

WATER AND ECOLOGICAL MONITORING

CLASS 3 DISPOSAL SITE

SENSITIVE AREA FOR FISHERY

OBJECTIVE

Evaluate the effect of disposal of dredged material on the quality of the fish in terms of public health

SAMPLES

Water and marine organisms (fish and / or cephalopods with commercial value)

SAMPLING FREQUENCY

Before, during and 1-2 weeks after the immersing operations

PARAMETERS

Metals and organic compounds



Dredging Plan 2010-2015

OFFSHORE DISPOSAL SITE

WATER AND ECOLOGICAL MONITORING

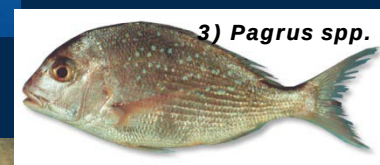
SAMPLING STATIONS

WATER

Central zone of the disposal area
Two depths (5 and 40 m)

MARINE ORGANISMS

Vicinity of the disposal area (0.5 nautical miles)
Catch using common fishing gear
Depth from the bottom to 10m above it
Between 3 and 8 organisms per species with
similar size and/or weight



Photos: 1) www.horta.uac.pt / 2) seabassonfly.blogspot.com / 3) www.unitedfisheries.co.nz
4) www.cobrenord.com / 5) www.coteblue.org / 6) www.wikipedia.org / 7) www.anderssalesjo.com

THANK YOU FOR YOUR ATTENTION

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