

MARIA TERESA SÁ PEREIRA AND RITA SILVEIRA RAMOS



THE PORT OF LISBON, PORTUGAL: MAINTENANCE DREDGING IN A SENSITIVE ENVIRONMENTAL SYSTEM

ABSTRACT

The Port of Lisbon borders almost a dozen municipal districts and shares territory under its jurisdiction with national, European and international organisations in an extremely sensitive environment. Yet, owing to its site on an estuary, the Port of Lisbon Authority (Administração do Porto de Lisbon, APL) must regularly and systematically dredge the beds of its access channels and manoeuvring and anchorage basins.

This article explains the strategy adopted by the Port of Lisbon to obtain five-year environmental licences by presenting a dredging plan and a monitoring plan and procedures report on the environment. It described the existing situation in detail, presenting proposals for the sinking of dredged sediment and providing information on future projects. It also includes projects of the APL in partnership with local municipal districts and the Ministry of the Environment to recover river bank areas and combat erosion. Finally, it focusses on current projects to adapt the Port of Lisbon as to assure its capacity to handle increasingly large ships, resulting from the continuing changes in the world shipping fleet prior to the opening of the Panama Canal in 2015. These changes call for the available sea beds to be adapted, not

only at the hub ports that will receive these ships, but also at other ports, such as the Port of Lisbon.

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INTRODUCTION

The Port of Lisbon borders 11 municipal districts and shares territory under its jurisdiction with the following protected areas: at a national level, the Tagus Estuary Nature Reserve; at a European level, a Special Protection Area, Site of Community Interest and Corine Biotype; and internationally, the Ramsar Convention. It is an area that is extremely sensitive from an environmental

Above: The new deep sea container terminal in Lisbon with depths of up to -16.5 m and a capacity of up to 2 million TEUs. The Port of Lisbon is a diverse, multifunctional port which is helped by its sheltered position in an estuary and the good navigational conditions of the main entrance channel.

point of view and yet, owing to its site on an estuary, the Port of Lisbon Authority (Administração do Porto de Lisbon, APL) regularly and systematically dredges the beds of its access channels and manoeuvring and anchorage basins.

The Port of Lisbon therefore adopted a strategy to obtain five-year environmental licences by presenting a dredging plan and a monitoring plan and procedures report to the environment. This described the existing situation in detail, presented proposals for the sinking of dredged sediment and provided information on future projects. In addition, the projects of the APL in partnership with local municipal districts and the Ministry of the Environment to recover river bank areas and combat erosion are described as well as current projects to adapt the Port of Lisbon so as to assure that the port has the capacity to handle increasingly large ships, resulting from the continuing changes that are being noted in the world shipping fleet prior to the opening of the Panama Canal in 2015.

These changes call for the available seabeds to be adapted, not only at hub ports that will receive these ships, but also at other ports, such as the Port of Lisbon, which are prepared to see how the regular shipping lines that use them replace their fleets with larger vessels.



Figure 1. Impact of the Port on the regional economy. In 2012 the Port of Lisbon handled: 11,244 thousand tons of cargo equal to 485,761 TEUs and 314 cruise ships with over 500,000 passengers. This amounted to 2% of national GDP, 5% of the GDP quarter Lisbon region and 40,000 jobs.

SOCIAL AND ECONOMIC FRAMEWORK

The Port of Lisbon is a large European port on the Atlantic coast, with a geo-strategic position that gives it an outstanding status in international trade logistics chains and on the main cruise circuits. The Port of Lisbon hinterland extends to the Portuguese regions in the centre of the country, Lisbon and the Tagus Valley, the Alentejo and the Algarve, as well as to the Spanish regions of Extremadura and Andalusia, with even further possibilities

as can be combined with the extension of this hinterland to Castile la Mancha and Madrid thanks to existing transport and logistics projects.

The Port of Lisbon is a general port in which many segments co-exist, with containers, bulk food and cruise ships especially dominant, but also with areas dedicated to leisure, pleasure craft, water sports and marine tourism together with the river transport of passengers, cargo and fishing. For instance, in



Figure 2. The Port of Lisbon is located in the Tagus estuary which extends up to 80 km with a total area of 320 km² and a maximum tide range of 3.6 m.



Figure 3. The Port's jurisdiction area covers 11 municipalities on both sides of the Tagus estuary, including the city of Lisbon..

June 2012, Lisbon was the scene for one of the world's most important yachting events, a final stage of the Volvo Ocean Race.

A total of 2,641 ships entered the Port of Lisbon during 2012. Sea cargo traffic reached a total of almost 10.350 million tonnes in the same year, and between January and December 2012, 314 cruise ships carrying a total of 522,604 passengers stopped in the Port of Lisbon. For cargo activities, the Port of Lisbon is considered an important link between the Mediterranean and northern Europe, functioning as a turntable for international trade between Europe, America and Africa. For years it has maintained a national leadership in the bulk food sector. Lisbon moves almost 70% of the food products entering Portuguese ports (Figure 1).

Container traffic is especially important for Lisbon, which has regular coastal shipping services with other European countries as well as a large number of direct intercontinental services by the main shipping lines. APL has four marinas on the north bank of the River Tagus with a capacity for more than 1,100 boats. The Port of Lisbon is therefore an important engine for the social and economic development of the Lisbon and Tagus Valley regions and in general for all of Portugal, directly or indirectly generating almost 5% of the region's GDP and helping to maintain almost 40,000 jobs.

BIOPHYSICAL FRAMEWORK

The Tagus estuary, in which the Port of Lisbon is located, is on the western coast of Portugal, with access to the Atlantic Ocean. It is one of the largest estuaries in Western Europe, stretching for almost 80 km and with a total area of 320 km². The Tagus estuary is a meso tidal system with a half-day tidal period. The average amplitude in the centre of the estuary is 3.2 m with spring tides and 1.5 m with neap tides, reaching up stream levels of up to 3.6 m and 1.6 m, respectively, with spring and neap tides (Figure 2).

The hydrodynamic conditions and generation of waves with wind that prevail in the centre of the estuary lead to a differentiation in the sectors next to the right and left banks relating to the sedimentation of fine matter. Their deposits thus tend to concentrate on the right



MARIA TERESA SÁ PEREIRA

graduated in Geographical Engineering in 1980 and is a Member of Portuguese Order of Engineers. She has worked at the Port of Lisbon Authority (APL) since 1983 and is currently chef of the Geographical Information and Environmental department involved with topography, cadastre and studies on the maritime public domain and port jurisdiction. She developed the APL's levelling network, participated in several projects supervising the civil works. Since 1995 she also supervises the Hydrography and Dredging department which cooperates in maritime civil works, hydrodynamic and environmental studies. She is responsible for and co-author of APL's Dredging Plan.



RITA SILVEIRA RAMOS

graduated in Geomatics Engineering in 1997 and is a Member of Portuguese Order of Engineers. She has worked at the Port of Lisbon Authority (APL) since 2002 to the present in the Hydrography and Dredging department. She is involved with public tenders for dredging, participating in several projects and supervising the dredging works. She cooperates in maritime civil works, hydrodynamic and environmental studies and is co-author of APL's Dredging Plan.



Figure 4. Approximately 40% of the Tagus estuary is intertidal areas: mudflats and salt marshes.

bank where the most important container, cargo and cruise ship terminals, as well as the marinas, are located. This causes a strong sedimentation throughout the area, against the existence of inter-tidal zones, cut by the tidal channels, which allows the development of important areas of marshland on the left bank. The APL's jurisdiction extends over 11 riverside municipalities on both banks of the Tagus estuary, including the city of Lisbon (Figure 3).

The Tagus estuary is one of the largest and richest estuaries in Europe, in which the values of nature are respected. Of the almost 320 km² of this estuary, approximately 40% are in the intertidal areas, located especially in its central and upper areas (Figure 4). The great morphological diversity of the Tagus estuary is the origin of a considerable diversity of

habitats and species. Thus, large extents of silt banks and marshland can be found as a result of the smooth slopes of the banks and the high tide level. The estuary banks also contain important salt flats and reed beds and, on the surrounding land, cork oak woods.

The Tagus estuary and its adjacent land areas contain 35 species of mammals, 194 regularly present species of birds as well as nine species of reptiles and 11 of amphibians. There are also references to the overall presence of 101 species of fish in the estuary, although the number regularly present at one time does not exceed 40.

Also, after an "absence" of almost half a century, the Portuguese oyster will be able to return to the Tagus estuary. An agreement was signed in February 2012 to undertake a

pilot project to investigate the viability of breeding oysters in the River Tagus and to determine the suitability of the water quality for the commercial production of molluscs. Likewise, the Tagus Estuary Management Plan, in the final phase of preparation, also identifies aquaculture as one of the potentials that must be developed. In this context, a large part of this estuary, and therefore the area under the jurisdiction of the port authority upstream of it, is protected by various nature conservation statutes:

- At the national level, as a protected area: the Tagus Estuary Nature Reserve.
- At the European level, as Red Natura 2000 landscape, because of the interest in conserving it, and of the presence of the species described in the directive Birds – Tagus Estuary Special Protection Area and of the existence of habitats that must be

preserved within the framework of the directive Habitats – Areas of Community Interest, and also as a place that forms an integral part of the Council of Europe Network of Bioenergy Reserves.

- At the international level, as a place on the Ramsar list of conservation areas relating to marshlands of international importance, especially as a habitat for water wildfowls.

STRATEGIC AND TERRITORIAL FRAMEWORK

The strategic policy and territorial management based on the system of territorial management is organised in three ambits (national, regional and municipal) within a framework of coordinated interaction. In this context and with regard to the port activity and the territorial area of the Port of Lisbon, the following instruments are noteworthy.

National ambit

The Strategic Transport Plan (PET) – Sustainable Mobility – Horizon 2011-2015 has been valid since 2011, because of its effects on marine and port development. This instrument combines a set of public and private investment initiatives in the port sector, both underway and/or in the study phase, that could contribute to increasing the competitiveness of the Portuguese economy, especially the “study for the concession and building of the new Trafaria container terminal (...) with a view to the concession of the new Trafaria container terminal with draughts of -16.5 m and an annual potential traffic of up to 2 million TEUs”.

The planning and spatial management of sea-related activities is one of the strategic pillars on which the National Sea Strategy is based. Additionally, it is one of the main measures proposed by the Inter-Ministerial Commission

for Sea Matters in the ambit of the European Union Integrated Maritime Policy. The Maritime Space Management Plan (POEM) arose within this context. This plan is designed to guarantee the sustainable use of resources, their preservation and recovery, in order to enhance the efficient use of marine space and to encourage the economic, environmental and social importance of the sea. This plan is in the approval phase.

The Tagus Estuary Management Plan (POE Tagus) arose in the sequence of transposing the Water Framework Directive and the publication of the Portuguese Water Law, aimed at the management of the estuary and its banks by suitably making compatible the multiple uses and occupations of the territory with the objectives of protecting and valuing water resources, ecosystems and associated natural values. This plan is in its final preparation phase and awaits public debate.

The Tagus Estuary Nature Reserve

The Management Plan (PORNET) has been in force since 2008. It sets the regimes for safeguarding resources and natural values and sets the uses and management regime that must be applied in its area of intervention to guarantee the conservation of the nature and biodiversity, as well as to maintain and value the properties of the natural and semi-natural landscapes, and encourage the maintenance of the natural vocation of the Tagus Estuary Nature Reserve as a habitat for migratory birds.



Figure 5. Areas subject to maintenance dredging. The numbers correspond to Table I.

Table I. Calendar and estimate of volumes for dredging.

| Area | Area of action (ha) | Annual volume (m³) | Levels (zh) (m) | Number of annual interventions |
|------------------------|---------------------|--------------------|-----------------------|--------------------------------|
| 1 VTS | 2 | 30,000 | -4.0 | 1 |
| 2 Alcântara area | 16 | 200,000 | Between -5 and -15.5 | from 3 to 4 |
| 3 Santa Apolónia area | 29 | 450,000 | Between -7.3 and -1.5 | from 3 to 4 |
| 4 Entrance bar channel | Variable | 250,000 | -17.5 | 1 |
| 5 Marine | 32 | 100,000 | Between -4 and -8.3 | 1 |
| 6 Cala das Barcas | 10 | 50,000 | -3.5 | 1 |
| Total | 89 | 1,080,000 | | |

Regional ambit

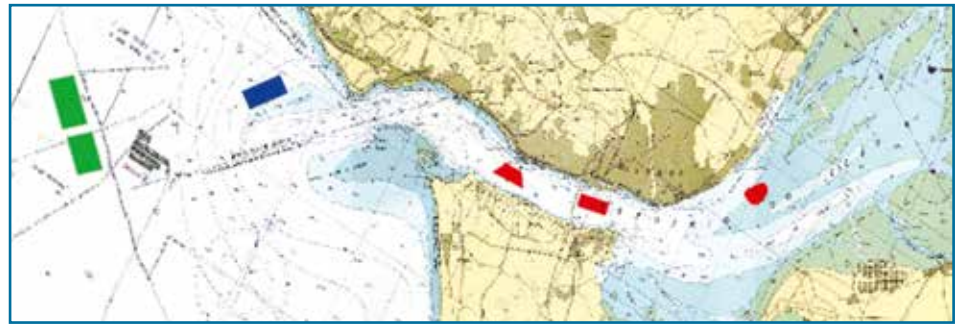
The Regional Territorial Management Plan defines the regional territorial development strategy, integrating the options set at the national level and considering the municipal strategies for local development, forming the reference framework for preparing the municipal plans for territorial management. The Lisbon Metropolitan Area Regional Territorial Management Plan (PROT AML), valid since 2002 and in the revision phase, applies to the area of the Port of Lisbon.

Municipal ambit

The municipal territorial management plans set the regime for the use of land and define the models of the forecast development of human occupation and the organisation of the urban systems, and according to a suitable scale, the parameters for land use and for guaranteeing environmental quality. The APL's area of jurisdiction covers 11 municipalities, the plans of which are being revised, except for the municipalities of Vila Franca de Xira, Moita and Lisbon, which finished the revision in 2009, 2010 and 2011, respectively.

Other plans

The Port of Lisbon Strategic Development Plan (PEDPL, 2007), for which the APL is responsible, is a sectorial and strategic document that identifies the objectives and main actions to be taken to achieve a sustainable development model for the Port of Lisbon. This plan therefore presents the re-ordering and physical development of the APL jurisdiction area in its maritime component, integrated and sustainable management in economic terms and the



■ Class 1 and 2 (sand) ■ Class 1 and 2 (mud) ■ Class 3
Figure 6. Sediment immersion disposal sites.

management of the Tagus estuary and the short, medium and long term planning of the development of infrastructures and installations as its main objectives to be able to guarantee its suitability to the development of the search for traffic and new technological, legal and environmental requirements. The time horizon of the plan is 2025. The plan covers three large strategic business areas, cargo, cruise ships and leisure craft.

The Integrated Plan for the System of Support Infrastructures for Leisure Craft in the Tagus Estuary (PIRANET, 2010), for which the APL is also responsible, has as its main objective the creation of an "integrated system of support infrastructures for leisure craft, suitable for the territorial properties, diversified in type and adapted to the needs of the demand, complemented by a qualified offer of activities and support services that contribute to the development of nautical leisure activities in optimum conditions and with sufficient safety, based on criteria of environmental, social and economic sustainability, to stimulate the

intensification and expansion of the nautical sector, which will benefit the region and the country socially and economically". The PIRANET has been integrated into the POE Tejo (Tagus) as a sectorial instrument.

APL Dredging Plan (2010-2015)

In the realm of the obligations arising from the transposition of the EU Water Directive Framework to Portuguese legislation, the APL prepared its maintenance dredging plan for the five year horizon (2010-2015) for which it intends to obtain environmental permits for carrying out the dredging necessary for the port's operation, avoiding as far as possible administrative procedures. This conforms to the proposed conditions and takes into account a programme that may be set by the environmental authorities, developing the plan subject to approval. The POE Tejo also took this plan into account, revealing its innovative concept.

This plan contains the biophysical and social and economic frameworks of the Port of



Figure 7. Two views of ships dredging at the Port of Lisbon.



Figure 8. Collaboration took place with local communities, for instance, Barreiro and Moita.

Lisbon. It details the geographical features regarding its environmental aspects, the matter of marine accessibility and development and the economic situation and legal and administrative framework of the port authority. The plan identifies the existing port structures as well as the system of maritime accesses including the port entrance channels and the system of navigation channels in the estuary, giving a detailed classification of all the areas subject to dredging. It sets calendars and an estimate of the volumes to be dredged in each place, as shown in Figure 5 and summarised in Table I.

The plan also details the dredging procedures implemented by the APL and for the immersion of sediments especially regarding the checking of the correct positioning of the dredger and of the immersion, as well as checking the project and determining the dredged volumes. Supported by studies by the LNEC (national laboratory of civil engineering), the Port of Lisbon, proposed to immerse class

1 and 2 sediments in the estuary in the areas marked in red.

The blue area was proposed to immerse dredged sand from the entrance channel when these are not reused for beaches. This area was also chosen using hydrodynamic studies, which highlighted the importance of maintaining the shallower depths of the submersed banks that line the entrance channel. Later, as an addition to the dredging plan, the port promoted hydrodynamic and ecological studies that concluded that there was a possibility to use the green areas to immerse class 3 sediments. This was approved by the environment authorities with the condition that the port follow a plan to monitor water quality and biota (Figure 6).

It also explains the dredging methods used by the APL with examples describing the types of dredgers as well as the forms of contracting and the estimated costs. Another chapter explains the places used in the immersion

inside and outside the estuary and the technical bases giving rise to the relevant selection.

Finally, the plan covers the matter of the environmental procedures during the dredging work, describing the existing situation, breaking down the actions promoted by the APL and proposing a water quality monitoring plan which must be implemented in the dredging areas and in the places planned for the immersion. It also includes a programme for the prior classifying of the sediments, differentiating the historically uncontaminated sediment areas from those in which there are contaminated sediments. It also describes the form of contracting and the estimated costs.

The APL plan proposes to present periodic reports to the environmental authorities on the progress of the dredging and the environment monitoring plans as well as the environmental classification being carried out. The plan concludes with the description of the dredging plans for the period 2010-2015, most of which is subject to an environmental impact assessment.

The approval of this plan by the environmental authorities within eight months was seen as a strategic element with which the APL could carry out, in a regular way, maintenance and stabilised dredging, with proper attention on the one hand to the complexity of the environmental framework and the territorial implication and, on the other, to the maintenance frequency of most of the moles (with an average of three times per year) as well as taking into account the irregularity of the areas to be dredged (Figure 7).

STRATEGIC COOPERATION WITH MUNICIPALITIES

The Port of Lisbon understands that, given the framework in which its activity is carried out, the plan can only be viable and have perspectives for development if a strategy of proximity and cooperation is set up with the other organisations in the Tagus estuary. This strategy must be one of taking an active role in the sustainability and the maintenance of the balance of the various factors that contribute to the estuary's quality and the quality of life of the people who live around it. For this reason the attitude of the APL has



Figure 9. Old map of Barreiro and right, the Caldeiras de Alburrica area now.



Figure 10. Area of action in Moita.



Figure 11. Moita, before dredging.

been that of studying and developing projects for rehabilitating the banks to improve the populations' quality of life in collaboration with municipalities and environmental organisations. Examples of this policy are the recent actions carried out in the municipalities of Barreiro and Moita (Figure 8).

Barreiro is a town on the south bank with a long history (Figure 9). In the Middle Ages, part of this area had been used for setting up salt flats and there is documentary proof that these were then converted into piers for installing tidal flow mills, some of which were operating up to the first quarter of the 20th century. With the arrival of windmills built on the white sand areas around the area of As Caldeiras, the tidal flow mills went into decline. In the 1960s the area was the site of much heavy industry. Over time this type of industry declined and in the 1990s an environmental recovery was started, designed to improve the quality of life of its inhabitants. Natural waterside bands were maintained but are also undergoing a process of recovery for the population's leisure use.

With the introduction of modern catamarans to replace the old "cacilheiros" (ferries crossing the River Tagus), used for the transport of passengers between the river banks, these beaches started to erode as a result of the catamarans' wash. APL has developed a project to recover these beaches that includes the artificial supply of approximately 25,000 m³ of sand in the area and a later supervision plan. This work is also designed to safeguard the cultural heritage of the area by protecting the historical mills and piers. This artificial supply of sand has been monitored regularly by the APL by surveying. Currently the beach is also used by persons

practicing water sports, taking advantage of the catamarans' wash.

Another town in which the APL has undertaken dredging, including a wider project to assess the watersides, and in accordance with the wishes of the municipality itself, was Moita, located on the southern bank of the river with a strong tradition of fishing and the use of leisure craft (Figure 10).

The old centre of this town is located on an arm of the estuary, into which a water line with a small flow is discharged. The area at the top of this arm of the estuary contained large accumulations of sediments with the resulting negative environmental impact for the town centre (Figure 11). Together with the municipality, the APL studied and developed a solution to maintain a permanent area of water in the end of the river arm opposite the old centre of Moita, that consisted of dredging an access channel in this area and building a dyke with sluice gates which would function with the tidal cycles to dredge the channel by

itself. This action also included the environmental regeneration of the area. The involvement of the APL consisted of dredging the area of the pier over an area of approximately 35,000 m² to the +0.6 m zh level and dredging an access channel to the +1.0 m zh level for the old Moita mole, with 25 m width and approximately 850 m long. A total of 96,300 m³ of sediments were dredged and returned directly to the old marinas near the area of action.

COOPERATION WITH THE ENVIRONMENTAL AUTHORITIES – SUSTAINABILITY POLICY

The most important and longest involvement of the APL takes place in the area of the Bars of the River Tagus, a complex system of sandbanks and channels at the mouth of the River Tagus, most of which are no longer in the area administered by the port authority but in an area under environmental management (Figure 12).

In the vast area stretching from São Julião da Barra to the north and to Trafaria and



Figure 12. Region of the two entrances and two sand bars of the River Tagus.

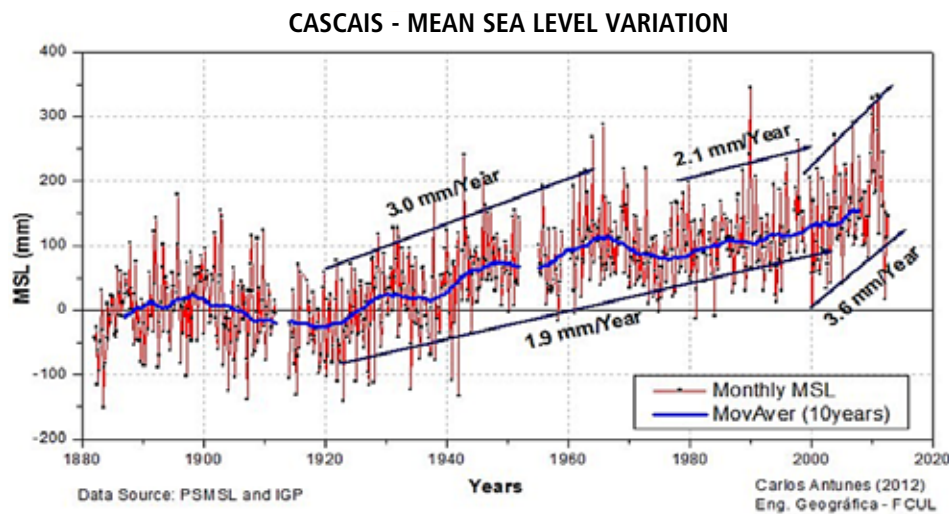


Figure 13. Increase of average level. http://webpages.fc.ul.pt/~cmantunes/hidrografia/NMM_Cascais.JPG

Caparica in the south and various miles into the ocean, there are two entrances to the Port of Lisbon – the northern bar channel and the southern one, which is the main entrance – and two sandbanks, Cachopo north and the Banco do Bugio (Figure 12).

This entire area is considered as one system that must be examined from an overall perspective with awareness that its various parts are related and depend on local hydrodynamics. Any local action must be studied and calculated taking the entire area into account. This is the fundamental reason why the APL, despite being involved only in establishing and maintaining navigation conditions in the southern bar entrance, has for a long time promoted multiple studies and monitoring to deepen and update knowledge

Figure 14. Aerial view of the mouth of the Tagus estuary with natural sand banks in the foreground.



for acting more sustainably with the most recent scientific innovations.

The main ideas arising from the set of studies carried out to date show the importance of the Cachopo north for the stability of the entire area. The maintenance of this bank is also considered a determining factor in the protection of the bank of Municipality of Oeiras and of the beaches at Caparica, given that it dissipates most of the waves that reach this area. Because of this, the APL placed the sand from dredging the southern bar channel in this area to help reinforce it. The resulting monitoring shows positive results that must be interpreted as a trend.

The concern shown by the APL over time for maintaining the hydrodynamic balance of this area has led it to manage dredging and the sand from this dredging in a way that is in accordance with the principles of environmental sustainability. The sand from dredging the channel is deposited on the beaches on the coast of Estoril, on the beaches of the Costa de Caparica, as well as the immersions in the Cachopo north, always giving priority to its placement in the area of the entrance bars system. It is clear that the reality of the area of the entrance bars and all the dynamics of erosion and the build-up of sandbanks is much more complex than was thought in the past, so that firm investment in the supervision of the entire area as well as continuing in-depth studies is important.

In the area of supervisory tasks, the APL systematically and regularly undertakes hydrographical surveys of the bars' areas to monitor the development of their bottoms in the entrance channels and on the sandbanks so that it can act when necessary.

For a better and more objective view of the maritime movement conditions, the APL has also maintained, since 2003, a wave measurement buoy that transmits data on line and that can be seen on the APL Web site, www.portodelisboa.pt. The supervision of the area of the entrance bars, as well as the adjacent coast, is therefore more important since it provides observational data on the rising sea level to worrying values throughout the Portuguese coast.

According to the studies made by Professor C Antunes of the University of Lisbon, based on the functioning tide gauges, the current situation can be seen in Figure 13.

Also in the area of climate change, and because of the greater frequency of extreme phenomena such as storm surges, the APL has kept a record of the most important incidents in the Tagus estuary, which it shares with the environmental authorities (Figure 14).

FUTURE PROJECTS

Lisbon Cruise Ships Terminal

The new structure of the Lisbon cruise ships terminal, the nearest to the city centre, with a total area of 7,790 m², has been developed in phases; the first two phases ended in 2011. They were related to the main work for rehabilitating and reinforcing the moles between Santa Apolónia and the Jardim do Tabaco, including the backfilling of an old dock. With this project the Terminal has 1500 m of quay and can receive up to 5 cruise ships with -8.0 m to -12.0 m of draught.

The next phase will be the construction of the cruise ships terminal building and the conditioning of the exterior areas. The design of this building and the exterior conditioning were the subject of an international request for tenders to provide a new structure for Lisbon with a "friendly" concept, taking into account aspects such as comfort, accessibility, flexibility and the speed of the services provided to passengers in a suitable way for

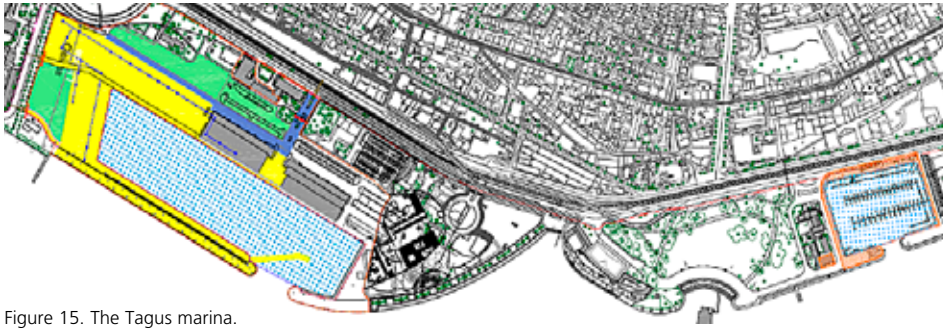


Figure 15. The Tagus marina.

current and future traffic, so that Lisbon could achieve a significant increase in cruise ships departing and arriving at it.

Of the 37 bidders, including 12 from abroad, the first prize was awarded to the architect João Carrilho da Graça, with a project with an overall investment of almost € 20 million. As well as the advantages of urban insertion, this new location makes it possible to reduce dredging together with an increase in the ship reception capacity, taking into account the environment and sustainability concerns in the new port extensions.

Tagus Marina

In 2011 and 2012, the APL reclassified the Pedrouços dock on the Lisbon riverside to host the planet's most demanding regatta, the Volvo Ocean Race (VOR) (Figure 15).

The reclassifying of this dock consisted of the recovery of the berths and walls in the dock as well as the demolition of buildings, the tidying of the surrounding area and the dredging of the interior area and mole accesses, with an approximate area of 330,000 m³ of sediments

at -5.0 m level. Before dredging, the sediments were classified; almost 85% were uncontaminated and were immersed in the estuary and the 15% of slightly contaminated sediments were immersed outside the estuary. This set of actions allowed the environmental recovery of the area. After undertaking this work and after the Volvo Ocean Race was held, the APL held an international public request for tenders for the conversion and operating concession of the Tagus Marina, This comprised the Pedrouços dock and the Bom Sucesso dock, to make it a reference for excellence in leisure boating in Portugal, in order to enhance tourist promotion in the Tagus estuary and in the region of Lisbon and to prepare to host international events such as the VOR regularly, maintaining the draughts in the dock within the levels required for the VOR.

The intention of this request for tenders is that the areas around the docks will become an attractive pillar for supporting nautical activities and for trade, tourism, cultural, sporting and animation services as a complement and accessory to these types of activities.

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CONCLUSIONS

- In a scenario of strong environmental demands and urban pressure such as at the Port of Lisbon, the difficulties that threaten the port's existence can be overcome only by maintaining a permanent dialogue and active cooperation with all the other organisations in the estuary, both local and environmental authorities, which are the territorial planning authorities as well as with the help of the representatives of local communities.
- With regard to the types of uses in the estuary, the APL has included engineering techniques and projects in the choice of solutions that conciliate the achieving of sectorial objectives with the conservation of the estuary's environmental and social and economic balances to minimise the inconveniences to it.
- In an increasingly restrictive economic framework such as is taking place in Europe, it is increasingly essential to find solutions planned not only with the help of other organisations and users, but also with a perspective of balancing existing resources that are compatible with cheaper and more sustainable actions.
- The solutions for actions must increasingly be chosen from the perspective of an integrated community in the framework of the strategic European orientations for the next framework of community support.