

# Introducing ecosystems services for port development



René Kolman, *Secretary General, International Association of Dredging Companies (IADC), The Hague, the Netherlands*

Port authorities, maritime construction groups and dredgers are joining economists and environmentalists to find a way to protect ecosystems whilst achieving port expansion.

In December 2012 the Swedish Agency for Marine and Water Management issued a report identifying human activities that put pressure on the marine environment. Amongst those listed were: waterborne transport and port activities, tourism in coastal areas and the maritime industry including dredging, and fisheries.

Other reports concur: a decrease in marine biodiversity can be caused by deterioration resulting from increased sedimentation from dredging. For instance, surveys indicate that urban development, such as the construction of piers, harbours, maritime infrastructure and dredging operations in the coastal environment of both the Baltic Sea and the North Sea can have a negative impact on the maintenance of habitats.

Everyone seems to agree that dredging is an activity that puts pressure on the ecosystem but how severely, how often and how long lasting? And what about the social and economic importance of maritime infrastructure and port development?

No one can deny that dredging makes an essential contribution to society's well-being. Think of the impact of coastal protection projects like dikes and beach replenishment. For example, less flooding means less economic and physical harm to people living near the coast. It means improved standards of living by creating collateral jobs. It helps develop tourism and its related businesses. And consider all the services a port delivers: waterborne transportation is less expensive and cleaner than overland shipment of goods

by rail or truck. Is dredging an activity that some would say: can't live with it, can't live without it?

## Dredging and ecosystem services

Clearly, the environment versus economics debate is not new. The European Union, the US, Australia and other countries have implemented extensive legislation to meet the challenges of combining economic development with the preservation of ecosystems and biodiversity.

And as an industry, the major international dredging companies have met these challenges with heavy long-term investments in green technologies and designs for executing projects in a sustainable fashion. From the EcoShape Institute's 'Building with Nature' programme to PIANC's 'Working with Nature' to the USACE 'Engineering with Nature', technological innovations in monitoring and equipment have supported and encouraged sustainable methods for dredging and port development. But in the course of the last few years a new tool has been acquired: ecosystem services.

The concept of ecosystem services (ES) offers an opportunity to advance dredging projects in a cost efficient and ecologically sound way by assigning a monetary value to both the project and to the potential impacts. ES allows policymakers and stakeholders to 'compare apples with apples' in estimating the value of a potential project versus that of the ecosystems at the project site.

## The roots of ecosystem services

After a four-year study involving more than 1,300 scientists from 95 countries, in 2005 the United Nations issued a report: the Millennium Ecosystem Assessment (MA). Although the subject of ecosystem

services had been around for decades, what the MA did was a turning point – it was methodical, clear and compelling.

The MA provided an analysis of the state of the Earth's ecosystems. It described ecosystems as the Earth's 'life-support system', providing humankind with essential 'services'. It defined four basic categories of ecosystem service: provisioning - the supplying of food and water; regulatory - the storage of water, climate and air control; life-supporting - nutrient cycles, photosynthesis and crop pollination; and cultural, such as spiritual and recreational benefits. And it provided guidelines for decision-makers and people in general.

To give some concrete examples, ecosystems provide 'services' that have short and long term effects on the planet and people – on land and food supplies, on water and good health. Ecosystems can influence climate and the impacts of climate changes, they can mitigate flooding and droughts, they affect the proliferation of fauna and flora, and the sustainability of oceans, rivers and lakes. They protect animals and their natural habitats. Ecosystems' services provide means of keeping air clean, water drinkable, and biodiversity in balance. But what is the value of these 'services' as compared to economic development?

The idea of ES is to give these natural functions a monetary value. For example, if you clear a forest to build housing are you adding a residential area or destroying a natural ecosystem? Using this as a jumping off point, some environmentally conscious economists asked: How can you evaluate the resources in a natural environment if it doesn't have a monetary value? Thus the idea arose to put a price on nature. Or in other words, what is



Picture courtesy of the IADC

Tidal flats are an important habitat for plants and animals as well helping to maintain coastal defences. This is an aerial photo of a pilot nourishment project at Galgeplaat (The Netherlands) which started in 2008 as part of the 'Building with Nature' research.

the economic value of an ecosystem; how are ecosystems useful to humans in comparison to an infrastructure development project?

### **Dredging and ES**

With the support of the United Nations' assessment, the concept of ES has gained momentum. For the dredging industry this resulted in the recent presentation of the Central Dredging Association's (CEDA) information paper on 'Ecosystem Services and Dredging and Marine Construction' at the World Dredging Conference XX in Brussels in June 2013 [www.dredging.org]. This document has stimulated conversation in the dredging community by specifically framing ES in terms of dredging projects. Obviously, dredging is often a pre-requisite for the development of coastal defences against flooding, marine and inland infrastructure

and land reclamation. But dredging often takes place in sensitive environments, such as coral reefs, seagrass meadows and mangroves.

In this context, strict environmental requirements are usually in place before a project launches; what has changed is the method for implementation. Two decades ago the role of dredging contractors in planning these projects in terms of the protection of sensitive ecosystems can be characterised as passive. Dredging contractors complied with the environmental regulations, but traditionally their role was focused on carrying out appointed mitigation or compensation measures covering project impacts.

Understanding of the relation between dredging and ecosystem health was somewhat limited and left to others. This often resulted from the lack of

available tools and knowledge to predict the behaviour of sensitive ecosystems as a function of dredging operations. Nowadays, the opposite is true.

Contractors are now proactive in developing innovative approaches. Stimulated by tightening environmental requirements and a growing awareness of the role of biodiversity, the contractor's perspective towards dredging close to sensitive receptor sites has changed.

### **A pro-active example**

The research and innovation programme 'Building with Nature' instituted by the EcoShape Foundation focuses on proactive approaches to develop tools for designing sustainable dredging projects. The programme takes a learning-by-doing approach by joining or initiating pilot projects in five crucial environments: Sandy shores, estuaries, tropical coastal



Picture courtesy of the IADC

Land reclamation works for Ras Laffan Port Expansion project (Qatar) took place in a sensitive environment. In a proactive measure, the dredging companies demonstrated that disposal operations could be carried out without violating strict environmental criteria by developing a state-of-the-art 3D plume model to simulate a variety of disposal scenarios.

seas, shallow shelf seas and delta lakes.

The dredging industry is now asking itself: How does the monetary value of a dredging project stack up against that of a nature (natural capital)? By answering that question objectively the long-term value of a project can be established. And by conducting the ES valuation early on, the project design and procurement process can consider the ecosystem from the very start.

### Progress in ES and natural capital concepts

The reach of the ES concept is growing. For instance, in 2011, PUMA the sports manufacturer, as part of its long-term sustainability programme, developed and announced an environmental profit and loss account (EP&L) that puts a monetary value to a business's use of ecosystem services across the entire supply chain.

Recently a new organisation has been established known as the Natural Capital Coalition. This is a global, multi stakeholder open source platform for supporting the development of methods for natural and social capital valuation and

is reaching out to the business world to participate.

As for port development and other maritime infrastructure construction, the dredging industry continues to focus on the essential services dredging offers, such as coastal protection and port expansion. Simultaneously, using the best available scientific and technical practices, dredgers aim to comply with stakeholders' values and concern for ecosystems and biodiversity.

Economic prosperity should be a shared value that reaches all corners of our global community, but it should not be achieved at the degradation of other aspects of our global interests. This inner tension between economics and environment demands creative solutions that promote good policy choices where ecosystems are not sacrificed for economic advancements.

By using ES valuation to quantify the importance of biodiversity and viewing it as natural capital, the process can hopefully be applied to the maritime industries, to port development and related dredging operations.

### About the author

As Secretary General of the International Association of Dredging Companies (IADC), René Kolman takes a leading role in promoting the industry's long-standing commitment to environment and sustainability. Mr. Kolman studied at the Nautical School in Rotterdam and holds a degree in Economics from the University of Groningen, The Netherlands.

### About the organisation

IADC stands for International Association of Dredging Companies and is the global umbrella organisation for contractors in the private dredging industry. As such the IADC is dedicated to not only promoting the skills, integrity and reliability of its members, but also the dredging industry in general. IADC has over a hundred main and associated members. Together they represent the forefront of the dredging industry.

### Enquiries

IADC Secretariat:  
Alexanderveld 84, 2585 DB  
The Hague (NL)  
Tel: +31 (0)70 352 33 34  
Email: [info@iadc-dredging.com](mailto:info@iadc-dredging.com)  
[www.iadc-dredging.com](http://www.iadc-dredging.com)